Application for a Small Power Plant Exemption

Riverside Energy Resource Center Units 3&4

Submitted to:

California Energy Commission
Sacramento, California

Submitted by:

City of Riverside Public Utilities

Prepared by:

March 2008

TABLE OF CONTENTS

Table of Contents i

List of Appendices vii

List of Tables vii

List of Figures xiii

List of Drawings xvi

Section 1 – Executive Summary 1-1

1.1 Introduction 1-1

1.2 Project Need 1-1

1.3 Existing Site 1-2

1.4 Interconnections 1-5

1.5 No Significant Impacts 1-5

1.6 Environmental Assessment 1-5

1.6.1 Air Quality 1-5
1.6.2 Traffic 1-6
1.6.3 Noise 1-6
1.6.4 Water 1-6
1.6.5 Biology 1-6
1.6.6 Transmission Engineering 1-7
1.6.7 Public Health 1-7
1.6.8 Cultural 1-7
1.6.9 Land Use 1-7
1.6.10 Paleontology 1-7
1.6.11 Visual 1-7
1.6.12 Agriculture and Soils 1-8
1.6.13 Hazardous Materials 1-8
1.6.14 Socioeconomics 1-8

1.7 Transmission Line Safety and Nuisance 1-8

1.8 Alternatives 1-8

Section 2 – Project and RERC Facility Description 2-1

2.1 Introduction 2-1

2.1.1 Goals and Objectives 2-1
2.1.2 Need for RERC Units 3&4 2-2
2.1.3 Relationship to Riverside Transmission Reliability Project 2-5

2.1.4 RERC Facility Operating Hours 2-5
2.1.5 RERC Units 1&2 Black Start Diesel Addition 2-5

2.2 Site Location and Layout 2-6

2.3 Alternative Sites 2-8

2.4 Schedule 2-8

2.5 Process Description 2-8

2.5.1 Combustion Turbine Generation Equipment 2-14
2.5.2 Emission Control Equipment 2-14

2.6 Fuel System 2-17

2.7 Water Supply and Use 2-17

2.7.1 Water Requirements 2-17
2.7.2 Water Supply and Treatment Systems 2-18

2.8 Wastewater 2-19

2.8.1 Process Wastewater 2-19
2.8.2 Storm Water 2-21

2.9 Hazardous Material Management 2-21

2.10 Plant Auxiliaries 2-22

2.10.1 Lighting 2-22
2.10.2 Fire System 2.22

2.11 Electrical System 2-23

2.12 Transmission System 2-23

2.13 Plant Controls 2-23

2.14 Facility Closure 2-24

Section 3 – Energy Efficiency 3-1

3.1 Introduction 3-1

Section 4 – Transmission Line Safety and Nuisance 4-1

4.1 Introduction 4-1

4.2 Project Description 4-1

4.3 Connection to RPU Sub-Transmission Network 4-1

4.4 Laws, Ordinances, Regulations and Standards 4-2

4.5 Environmental Consequences 4-2

Section 5 – Transmission System Engineering 5-1

5.1 Introduction 5-1

5.2 Project Description 5-1

5.3 Laws, Ordinances, Regulations and Standards 5-1

5.3.1 Federal 5-1
5.3.2 State 5-2
5.3.3 Local 5-2

5.4 Subtransmission Facilities 5-2

5.4.1 69kV Transmission Lines 5-2
5.4.2 RERC Switchyard 5-3

5.5 Subtransmission Interconnection Engineering 5-3

5.5.1 Load Flow 5-3
5.5.2 Short Circuit Study 5-4

Section 6 – Environmental Considerations 6.1-1

6.1 Air Quality 6.1-1

6.1.1 Introduction 6.1-1
6.1.2 Air Quality Setting 6.1-3
6.1.3 Overview of Air Quality Standards 6.1-3
6.1.4 Existing Air Quality 6.1-7
6.1.5 Affected Environment 6.1-15
6.1.6 Laws, Ordinances, Regulations and Standards 6.1-17
6.1.7 Environmental Consequences 6.1-28
6.1.8 Construction Operations 6.1-40
6.1.9 Air Quality Impact Analysis 6.1-44
6.1.10 Health Risk Assessment 6.1-54
6.1.11 Laws, Ordinances, Regulations and Standards 6.1-56
6.1.12 SCAQMD Environmental Justice 6.1-63
6.1.13 Summary and Conclusions 6.1-64
6.1.14 References 6.1-66

6.2 Land Use 6.2-1

6.2.1 Introduction 6.2-1
6.2.2 Setting 6.2-6
6.2.3 Impacts 6.2-17
6.2.4 Agency Contacts 6.2-18
6.2.5 References 6.2-19

6.3 Biological Resources 6.3-1

6.3.1 Introduction 6.3-1
6.3.2 Laws, Ordinances, Regulations and Standards 6.6-4
6.3.3 Environmental Setting 6.3-6

6.3.4 Methods 6.3-11
6.3.5 Results 6.3-17
6.3.6 Project Impact Analysis 6.3-36
6.3.7 Species Protection 6.3-39
6.3.8 References 6.3-46

6.4 Cultural Resources 6.4-1

6.4.1 Introduction 6.4-1
6.4.2 Laws, Ordinances, Regulations and Standards 6.4-5
6.4.3 Setting 6.4-7
6.4.4 Methods 6.4-38
6.4.5 Impacts 6.4-40
6.4.6 Mitigation 6.4-41
6.4.7 References 6.4-42

6.5 Geologic Resources and Hazards 6.5-1

6.5.1 Introduction 6.5-1
6.5.2 Laws, Ordinances, Regulations and Standards 6.5-2
6.5.3 Setting 6.5-2
6.5.4 Impacts 6.5-6
6.5.5 Permits Required 6.5-8
6.5.6 References 6.5-8

6.6 Paleontological Resources 6.6-1

6.6.1 Introduction 6.6-1
6.6.2 Laws, Ordinances, Regulations and Standards 6.6-2
6.6.3 Resource Assessment Guidelines 6.6-5
6.6.4 Methods 6.6-6
6.6.5 Geology and Paleontology 6.6-6
6.6.6 Analysis and Results 6.6-11
6.6.7 Impacts 6.6-14
6.6.8 Mitigation Measures 6.6-14
6.6.9 References 6.6.14

6.7 Noise 6.7-1

6.7.1 Introduction 6.7-1
6.7.2 Acoustical Definitions 6.7-2
6.7.3 Ambient Noise Survey 6.7-4
6.7.4 Recommended A-Weighted Sound Level Design Goals 6.7-5
6.7.5 Noise Prediction Modeling of Operational Noise 6.7-6
6.7.6 Environmental Consequences 6.7-8
6.7.7 Laws, Ordinances, Regulations and Standards 6.7-9
6.7.8 Agency Contacts 6.7-12
6.7.9 Schedule of Other Required Permits/Approvals 6.7-12
6.7.10 References 6.7-13

6.8 Public Health and Safety 6.8-1

6.8.1 Introduction 6.8-1
6.8.2 Laws, Ordinances, Regulations and Standards 6-8-2
6.8.3 Aqueous Ammonia Hazard Assessment 6.8-3
6.8.4 Health Risk Impacts from Construction Emissions 6.8-4
6.8.5 Health Risk Impacts from Facility Operations 6.8-4
6.8.6 Agency Contacts 6.8-6
6.8.7 Summary and Conclusions 6.8-6

6.9 Traffic and Transportation 6.9-1

6.9.1 Introduction 6.9-1
6.9.2 Laws, Ordinances, Regulations and Standards 6.9-7
6.9.3 Existing Conditions 6-9-9
6.9.4 Future Baseline Conditions (Year 2009) 6.9-13
6.9.5 Project-Related Traffic 6.9-19
6.9.6 Future WITH Project Construction Conditions (2009) 6.9-26
6.9.7 Impacts 6.9-30
6.9.8 Mitigation 6.9-33
6.9.9 Conclusions 6.9-35

6.10 Agriculture and Soils 610-1

6.10.1 Introduction 6.10-1
6.10.2 Laws, Ordinances, Regulations and Standards 6.10-2
6.10.3 Setting 6.10-3
6.10.4 Impacts 6.10-4
6.10.5 Mitigation 6.10-5
6.10.6 Permits Required 6.10-6
6.10.7 References 6.10-6

6.11 Visual Resources 6.11-1

6.11.1 Introduction 6.11-1
6.11.2 Laws, Ordinances, Regulations and Standards 6.11-1
6.11.3 Setting 6.11-2
6.11.4 Impacts 6.11-25
6.11.5 Mitigation 6.11-29
6.11.6 Agency Contacts 6.11-29
6.11.7 References 6.11-29

6.12 Socioeconomic Resources 6.12-1

6.12.1 Introduction 6.12-1
6.12.2 Laws, Ordinances, Regulations and Standards 6.12-1
6.12.3 Setting 6.12-32
6.12.4 Impacts 6.12-18
6.12.5 Mitigation 6.12-32
6.12.6 References 6.12-33

6.13 Water Resources 6.13-1

6.13.1 Introduction 6.13-1
6.13.2 Laws, Ordinances, Regulations and Standards 6.13-1
6.13.3 LORS Compliance Strategy 6.13-3
6.13.4 Hydrologic Setting 6.13-4
6.13.5 Project Water Supply 6.13-5
6.13.6 Process Wastewater 6.13-6
6.13.7 Impacts 6.13-8
6.13.8 Cumulative Impacts 6.13-10
6.13.9 Mitigation and Monitoring 6.13-11
6.13.10 Agency Contacts and Permits 6.13-11
6.13.11 References 6.13-11

6.14 Hazardous Materials 6.14-1

6.14.1 Introduction 6.14-1
6.14.2 Setting 6.14-3
6.14.3 Hazardous Materials Management 6.14-8
6.14.4 Waste Generation 6.14-10
6.14.5 Impacts 6.14-12
6.14.6 Involved Agencies and Agency Contacts 6.14-17
6.14.7 References 6.14-18

Section – 7 Alternatives Considered 7-1

7.1 Introduction 7-1

7.2 Alternative Resources 7-1

7.3 Alternative Fuels and Technologies 7-3

7.4 Turbine Inlet Air Cooling 7.4

7.5 Alternative Water Supply and Discharge 7-4

7.6 “No Project” Alternative 7-5

7.7 Transmission Line Alternatives 7-5

7.8 Alternative Emission Controls 7-5

Section 8 – List of Preparers 8-1

Section 9 – Acronyms 9-1

List of Appendices

Appendix to Section 2.6 – Fuel System

Appendix to Section 2.7 – Water Supply and Use

Appendix to Section 6.1 – Air Quality

Appendix to Section 6.3 – Biological Resources

Appendix to Section 6.4 – Cultural Resources

Appendix to Section 6.7 – Noise

Appendix to Section 6.8 – Public Health and Safety

Appendix to Section 6.9 – Traffic and Transportation

List of Tables

Table 2.5-1 Equipment Items Selected for RERC Units 3&4 2-10

Table 2.5-2 Expected Performance of RERC Units 3&4 Facility 2-11

Table 2.5-3 SCR and CO Oxidation System 2-16

Table 2.7-1 Process Water Usage 2-18

Table 5.3-1 Design and Construction LORS 5-2

Table 5.5.1 Breaker Replacement Requirements 5-5

Table 6.1-1 Ambient Air Quality Standards 6.1-6

Table 6.1-2 Ambient Ozone Levels (ppm) Riverside, California, 1997-2007 .....6.1-8

Table 6.1-3 Ambient Nitrogen Dioxide Levels (ppm) Riverside, California 1997-2006 .....6.1-9

Table 6.1-4 Ambient Carbon Monoxide Levels (ppm) Riverside, California 1997-2006 .....6.1-10

Table 6.1-5 Ambient Sulfur Dioxide Levels (ppm) Riverside, California 1997-2006 .....6.1-11

Table 6.1-6 Ambient Particulate Sulfate Levels (μg/m3) Riverside, California 1997-2006 ..... 6.1-12

Table 6.1-7 Ambient PM10 Levels (μg/m3) Riverside, California 1997-2006 ..... 6.1-13

Table 6.1-8 Ambient PM2.5 Levels (μg/m3) Riverside, California 1999-2006 ..... 6.1-14

Table 6.1-9 Ambient Lead Levels (μg/m3) Riverside, California 1997-2006 ..... 6.1-15

Table 6.1-10 Air Quality Agencies 6.1-16

Table 6.1-11 SCAQMD Offset Emission Thresholds (lb/yr) 6.1-24

Table 6.1-12 Regulations and Permits for Protection of Air Quality 6.1-26

Table 6.1-13 Equipment Summary GE LM 6000 Gas Turbine 6.1-30

Table 6.1-14 Equipment Summary Cooling Tower 6.1-30

Table 6.1-15 Equipment Summary Gas Turbine Emission Control Systems 6.1-31

Table 6.1-16 Criteria Pollutant Emission Factors and Hourly Emission Rates 6.1-32

Table 6.1-17 Criteria Pollutant Emissions Summary for One Combustion Turbine 6.1-32

Table 6.1-18 Criteria Pollutant Emissions Summary for One Combustion Turbine - Startup 6.1-33

Table 6.1-19 Criteria Pollutant Emissions Summary for One Combustion Turbine – Shutdown 6.1-34

Table 6.1-20 Criteria Pollutant Emissions Summary for One Combustion Turbine – Normal Operations 6.1-34

Table 6.1-21 Criteria Pollutant Emissions Summary – Cooling Tower 6.1-35

Table 6.1-22 Criteria Pollutant Emissions Summary Facility Total RERC 6.1-35

Table 6.1-23 Combustion Turbine Toxic Pollutant Emissions Summary 6.1-37

Table 6.1-24 Cooling Tower Toxic Pollutant Emissions Summary 6.1-38

Table 6.1-25 Greenhouse Gas Emissions - Operation.....6.1-38

Table 6.1-26 Peak On-site Daily Criteria Pollutant Construction Emissions (lbs/day).....6.1-41

Table 6.1-27 On-site Project Criteria Pollutant Construction.....6.1-42

Table 6.1-28 Daily Regional On-highway Criteria Pollutant Emissions ...6.1-43

Table 6.1-29 Project Regional On-highway Criteria Pollutant Emissions.....6.1-43

Table 6.1-30 Greenhouse Gas Emissions - Construction 6.1-43

Table 6.1-31 Air Quality Impact Results for Refined Modeling Analysis of Proposed Project.....6.1-47

Table 6.1-32 Air Quality Impact Results for Refined Modeling Analysis of Entire Facility.....6.1-48

Table 6.1-33 Inversion Breakup Impacts for the Proposed Project and Black Start Engine 6.1-50

Table 6.1-34 Inversion Breakup Impacts for the Entire Facility with Black Start Engine.....6.1-50

Table 6.1-35 Inversion Breakup Impacts Compared to AERMOD Maximum Impacts.....6.1-50

Table 6.1-36 Summary of Air Quality Impact Analysis Construction Activities Point of Maximum Impact – MEI 6.1-53

Table 6.1-37 Health Risk Assessment Results – General Operations 6.1-55

Table 6.1-38 Health Risk Assessment Results – Construction Activities .6.1-56

Table 6.1-39 Comparison of Emissions with PSD Applicability Thresholds 6.1-57

Table 6.1-40 Recent BACT Determinations 6.1-59

Table 6.1-41 Priority Reserve Compliance Demonstration for RERC Units 3&4 .....6.1-61

Table 6.1-42 Emission Thresholds.....6.1-64

Table 6.1-43 Air Quality Environmental Impact Checklist.....6.1-65

Table 6.2-1 CEQA Environmental Checklist – Land Use 6.2-17

Table 6.3-1 Biotic Habitats within the RERC Project Area 63-17

Table 6.3-2 List of Plant Species that Will Not be Used in Landscaped Areas Within the Project Area 6.3-40

Table 6.3-3 CEQA Environmental Checklist – Biological Resources 6.3-45

Table 6.4-1 Previously Conducted Cultural Resources Studies within 1 Mile of the Project Area 6.4-25

Table 6.4-2 Previously Recorded Cultural Resources within 1 Mile of the Project Area 6.4-30

Table 6.4-3 CEQA Environmental Checklist – Cultural Resources 6.4-41

Table 6.5-1 Geologic Resources and Hazards.....6.5-2

Table 6.5-2 CEQA Environmental Checklist – Geology 6.5-7

Table 6.6-1 Summary of Paleontological Laws, Ordinances, Regulations, and Standards.....6.6-3

Table 6.6-2 Geologic Units Underlying the RERC Units 3&4 Project Area and their Paleontological Sensitivity Ratings.....6.6-9

Table 6.6-3 CEQA Environmental Checklist – Paleontological Resources.....6.6-14

Table 6.7-1 Long-Term Noise Level Summary, March 15-19, 2004.....6.7-14

Table 6.7-2 Short-Term Noise Measurements, March 16-17, 2004 .....6.7-15

Table 6.7-3 Noise Standards, City of Riverside, California.....6.7-5

Table 6.7-4 CEC Impact Criteria Thresholds.....6.7-6

Table 6.7-5 Compliance with Noise Standards 6.7-16

Table 6.7-6 Estimated Leq at Nearest Noise-Sensitive Receptors.....6.7-9

Table 6.7-7 CEQA Environmental Checklist – Noise 6.7-11

Table 6.8-1 Summary of Principal Regulations for Public Health 6.8-3

Table 6.8-2 Summary of Health Risk Analysis – Construction Activity.....6.8-4

Table 6.8-3 Summary of Health Risk Assessment – Facility Operation ...6.8-5

Table 6.9-1 Level of Service Descriptions.....6.9-5

Table 6.9-2 Levels of Service for Intersections 6.9-5

Table 6.9-3 Laws, Ordinances, Regulations and Standards 6.9-7

Table 6.9-4 AM/PM Peak Hour Intersection Performance for Existing Conditions (Year 2008) 6.9-11

Table 6.9-5 AM/PM Peak Hour Intersection Performance for Future Conditions Without Project (Year 2009) 6.9-13

Table 6.9-6 Project Construction Traffic Generation Forecast 6.9-21

Table 6.9-7 AM/PM Peak Hour Intersection Performance Future WITH Project Construction Conditions (Year 2009) 6.9-26

Table 6.9-8 Level of Service Analysis/Determination of Impacts for Future with Project Construction Conditions (Year 2009).....6.9-29

Table 6.9-9 School Characteristics in the Project Vicinity 6.9-30

Table 6.9-10 CEQA Checklist – Traffic-Related Issues.....6.9-34

Table 6-10-1 Laws, Ordinances, Regulations and Standards – Agriculture 6.10-2

Table 6.10-2 CEQA Environmental Checklist – Soils.....6.10-5

Table 6.11-1 CEQA Environmental Checklist – Aesthetics 6.11-25

Table 6.12-1 Historical Population Trends, Riverside County, City and State.....6.12-3

Table 6.12-2 Historical Populations and Communities Adjacent to the City of Riverside, 2007 .....6.12-4

Table 6.12-3 Racial and Ethnic Heritage Profiles, 2006.....6.12-4

Table 6.12-4 Population Projections, Riverside, San Bernardino Counties, State.....6.12-5

Table 6.12-5 Housing Data, City of Riverside and Riverside County, 2006 .....6.12-7

Table 6.12-6 Riverside County Employment by Industry, 2006.....6.12-8

Table 6.12-7 San Bernardino County Employment by Industry, 2006....6.12-11

Table 6.12-8 Employment and Unemployment Trends in the Cities of Riverside, Norco, Corona, Moreno Valley, and Mira Loma, Pedley and Rubidoux CCD's, 2007 ..... 6.12-13

Table 6.12-9 Recent Income Distribution of Households in the City of Riverside and Adjacent Communities, 2006 ..... 6.12-13

Table 6.12-10 Projected Employment by Industry, Riverside and San Bernardino Counties MSA's 6.12-15

Table 6.12-11 Fiscal Year 2006-2007 General Fund Breakdown by Source 6.12-18

Table 6.12-12 Summary of Projected Construction Labor Force Requirements 6.12-19

Table 6.12-13 Race/Ethnic Characteristics, 2000 Census Tracts within Six Miles of the Project 6.12-23

Table 6.12-14 Income Distribution, Census Tracts within Six Miles of the Project 6.12-27

Table 6.13-1 Applicable Laws, Ordinances, Regulations and Standards .. 613-3

Table 6.13-2 Precipitation and Temperature Statistics 6.13-4

Table 6.13-3 Plant Water Usage 6.13-6

Table 6.13-4 CEQA Environmental Checklist – Water Resources 6.13-9

Table 6.14-1 Laws, Ordinances, Regulations and Standards 6.14-4

Table 6.14-2 Hazardous Materials – RERC Units 3&4 ..... 6.14-9

Table 6.14-3 Non-hazardous Waste Management Methods 6.14-10

Table 6.14-4 Hazardous Waste Management Methods 6.14-11

Table 6.14-5 CEQA Environmental Checklist – Hazardous Materials 6.14-12

Table 6.14-6 Anticipated Frequency of Hazardous Materials Deliveries to RERC 6.14-15

List of Figures

Figure 1.3-1 Project Location Map 1-3

Figure 1.3-2 Vicinity Map 1-4

Figure 2.1-1 RERC Facilities 2-4

Figure 2.2-1 RERC Joint Use 2-7

Figure 6.2-1 Land Use Study Area 6.2-2

Figure 6.2-2 Northern/Southern Study Area 6.2-5

Figure 6.3-1 Project Location Map 6.3-3

Figure 6.3-2 Habitat Types 6.3-19

Figure 6.3-3 View Slope Bank Used for Burrowing Owl Habitat Mitigation Area 6.3-20

Figure 6.3-4 View of Gravel Area and Existing RERC Facilities 6.3-21

Figure 6.3-5 View from Northeast Corner of the Project Area or Ruderal Habitat and Santa Ana River Riparian Habitats 6.3-23

Figure 6.3-6 View of Recently Disked Ruderal Habitat Along Payton Avenue 6.3-24

Figure 6.3-7 Industrial Areas Along Payton Avenue 6.3-25

Figure 6.3-8 Special-status Plant and Sensitivity Habitat Species Occurrences 6.3-27

Figure 6.3-9 Special-status Wildlife Species Occurrences 6.3-28

Figure 6.4-1 Project Location Map 6.4-3

Photograph 6.4-1 Overview of the RERC Project Area, Facing South, 2007 ..... 6.4-4

Figure 6.4-2 Cultural Chronologies for Coastal and Southern California 6.4-10

Figure 6.4-3 Cultural Resource Studies within 1 Mile of the Project Area 6.4-28

Figure 6.4-4 Cultural Resources within 1 Mile of the Project Area 6.4-34

Figure 6.4-5 Archaeological Survey Area 6.4-39

Figure 6.5-1 Regional Geologic Map 6.5-9

Figure 6.5-2 Seismicity 1978-2003 ..... 6.5-11

Figure 6.6-1 Geologic Map of Project Area 6.6-10

Figure 6.6-2 Paleontological Sensitivity Map 6.6-12

Figure 6.6-3 View of Southeastern Portion of the RERC Units 3&4 Project Area, Facing Southwest 6.6-13

Figure 6.6-4 View of the Northern Portion of the RERC Complex, Facing Southwest 6.6-13

Figure 6.7-1 Noise Measurement Locations 6.7-17

Figure 6.7-2 Site Vicinity Map with Noise Contour 6.7-18

Figure 6.9-1 Project Vicinity Map 6.9-3

Figure 6.9-2 Expanded Study Area 6.9-4

Figure 6.9-3 Existing Geometrics 6.9-12

Figure 6.9-4 Existing (Year 2008) Traffic Volumes – AM Peak Hour 6.9-15

Figure 6.9-5 Existing (Year 2008) Traffic Volumes – PM Peak Hour 6.9-16

Figure 6.9-6 Future Baseline Conditions (Year 2009) Traffic Volumes – AM Peak Hour 6.9-17

Figure 6.9-7 Future Baseline Conditions (Year 2009) Traffic Volumes – PM Peak Hour 69-18

Figure 6.9-8 Project Trip Distribution 6.9-23

Figure 6.9-9 Project Related Traffic Volumes – AM Peak Hour 69-24

Figure 6.9-10 Project Related Traffic Volumes – PM Peak Hour 6.9-25

Figure 6.9-11 Future (Year 2009) With Proposed Project Construction Traffic Volumes – AM Peak Hour 6.9-27

Figure 6.9-12 Future (Year 2009) With Proposed Project Construction Traffic Volumes – PM Peak Hour 6.9-28

Figure 6.11-1 Photo Location Map (Photos A – M) 6.11-8

Figure 6.11-1a Photo A – RERC Units 3&4 .....6.11-9

Figure 6.11-1b Photo B – RERC Units 3&4 .....6.11-9

Figure 6.11-1c Photo C – RERC Units 3&4 .....6.11-10

Figure 6.11-1d Photo D – RERC Units 3&4 .....6.11-10

Figure 6.11-1e Photo E – RERC Units 3&4 .....6.11-11

Figure 6.11-1f Photo F – RERC Units 3&4 .....6.11-11

Figure 6.11-1g Photo G – RERC Units 3&4.....6.11-12

Figure 6.11-1h Photo H – RERC Units 3&4.....6.11-12

Figure 6.11-1i Photo I – RERC Units 3&4 .....6.11-13

Figure 6.11-1j Photo J – RERC Units 3&4.....6.11-13

Figure 6.11-1k Photo K – RERC Units 3&4 .....6.11-14

Figure 6.11-1l Photo L – RERC Units 3&4 .....6.11-14

Figure 6.11-1m Photo M – RERC Units 3&4 .....6.11-15

Figure 6.11-12 KOP Location Map 6.11-18

Figure 6.11-2-1a - KOP 1 Existing Condition – View looking northeast from approx. 200 ft. west of the Jurupa Ave. and Acorn St. intersection ..6.11-20

Figure 6.11-2-1b – KOP 1 Simulated Condition 6.11-20

Figure 6.11-2-2a – KOP 2 Existing Condition – View looking southeast from General Road East of Clay St. 6.11-21

Figure 6.11-2-2b – KOP 2 Simulated Condition 6.11-21

Figure 6.11-2-3a – KOP 3 Existing Condition – View looking southeast from Indian Hills Golf Club Course parking lot.....6.11-22

Figure 6.11-2-3b – KOP 3 Simulated Condition 6.11-22

Figure 6.11-2-4a – KOP 4 Existing Condition – View looking southwest from Jurupa Hills Country Club Golf Course 6.11-23

Figure 6.11-2-4b – KOP 4 Simulated Condition 6.11-23

Figure 6.11-2-5a – KOP 5 Existing Condition – View looking southeast from the Santa Ana River Trail 6.11-24

Figure 6.11-2-5b – KOP 5 Simulated Condition 6.11-24

Figure 6.12-1 Racial and Ethnic Heritage, Percentage of Total Population, 2006 ..... 6.12-5

Figure 6.12-2 Historical Employment and Unemployment, Riverside County (1997-2007) 6.12-8

Figure 6.12-3 Historical Employment by Industry, Riverside County, 2005 ..... 6.12-9

Figure 6.12-4 Per Capita Income, Riverside and San Bernardino Counties and State of California, 2000-2005 ..... 6.12-10

Figure 6.12-5 Historical Employment and Unemployment, San Bernardino County (1997-2007) 6.12-10

Figure 6.12-6 Historical Employment by Industry, San Bernardino County, 2005 ..... 6.12-11

Figure 6.12-7 Total Historical Unemployed Work Force, Riverside and San Bernardino Counties, 2007 ..... 6.12-12

Figure 6.12-8 Income Distribution, 2006 ..... 6.12-14

List of Drawings

Drawing RIG0M1001-01_RE RERC Units 3&4 Site Arrangement 2-13

Drawing RIG0M0201-01 RERC Units 3&4 Process Flow Diagram Heat and Water Balance 2-20

Section 1
Executive Summary

1.1 Introduction

The City of Riverside, Riverside Public Utilities (RPU) is seeking a Small Power Plant Exemption (SPPE) to authorize the construction and operation of two additional simple cycle power plant units at its Riverside Energy Resource Center (RERC). RPU will develop, build, own, and operate the facility. The two proposed units will be nearly identical to RERC Units 1&2, providing approximately 95 MW of additional peaking capacity to City customers. All of the power generated by RERC Units 3&4 will be used for the internal needs of RPU.

1.2 Project Need

The proposed RERC Units 3&4 will primarily provide summer peaking capacity and reliability to RPU's electric system. Presently, the RPU electric system is tied to the grid through the Southern California Edison (Edison) 230-69kV Vista Substation. RPU load growth unexpectedly exceeded the maximum Vista Substation capacity in 2006. RPU has contracted with Edison for construction of a double-circuited 230 kilovolt (kV) transmission line and a new 230kV interconnection substation (the Riverside Transmission Reliability Project, or RTRP). Construction of the RTRP is not expected to be complete until at least 2012.

Initially, at the time of permitting and construction of RERC Units 1&2, RPU anticipated that further internal generation might be needed to replace expiring power contracts and also anticipated being able to import power to replace those contracts. Accordingly, only Units 1&2 were constructed. However, because RPU unexpectedly exceeded the Vista Substation import capacity in 2006, and with completion of the RTRP not expected until 2012 at the earliest, internal generation is now needed to limit transformer loading until the new Riverside Transmission Reliability Project (RTRP) is operational.

RPU load growth, not meter (new customer) growth, unexpectedly exceeded the maximum Vista Substation capacity of 557 MW in 2006 with Riverside's peak demand reaching 587 MW in 2006 and 610 MW in 2007. This meant that if RPU had not had its internal generation in 2006, RPU would not have had enough power to meet customer demands. Currently forecasted peak loads for 2008 and 2009 are 645 MW and 682 MW respectively.

Further complicating the situation is the condition of RPU's single point of interconnection to California's transmission system, the Vista Substation. RPU receives all base load, intermediate, and some peaking power electricity through this connection from power plants outside of the city. Further, the Vista Substation is at maximum

capacity, is approximately 45 years old, and is located close to the San Andreas Fault. RPU is planning a second interconnection, to be completed in 2012.

As a result, with Vista Substation limited to a maximum of 557 MW, and RPU's existing RERC Units 1&2 and Springs Units 1,2,3, & 4 providing 96 MW and 32 MW respectively under summertime conditions, total RPU capacity is limited to 684 MW – essentially the same as the forecasted 2009 peak load with no reserves. RPU now needs to have at least one of the RERC 3&4 units available to meet anticipated summer 2009 peak loads, which is 682 MW, or it will not have enough power for its customers.

Thus, the only solution available to RPU is to add additional internal generation or another interconnection to the California transmission system. While the latter is underway in the form of the RTRP, that solution is at least four years off into the future. Thus the only viable alternative to curtailing customers is to add additional internal generation.

1.3 Existing Site

The proposed RERC Units 3&4 will be constructed on 2.2 acres of the existing 16 acre RERC site, which is owned by the City of Riverside and located adjacent to the Riverside Regional Water Quality Control Plant (RRWQCP). The additional units will be located immediately north of the existing RERC Units 1&2 and to the east of the RRWQCP. The site has appropriate zoning and the land use is compatible with zoning requirements and existing uses. The portion of the RERC site which will be used for the additional units, construction parking, and a laydown area is rough graded, having been cleared in the early 1990s. Refer to Figures 1.3-1 and 1.3-2.

Riverside Public Utilities
Riverside Energy Resource Center - Units 3 & 4

Project Location Map
Figure 1.3-1

POWER ENGINEERS

CITY OF RIVERSIDE PUBLIC UTILITIES

OWNER CONTACT INFORMATION

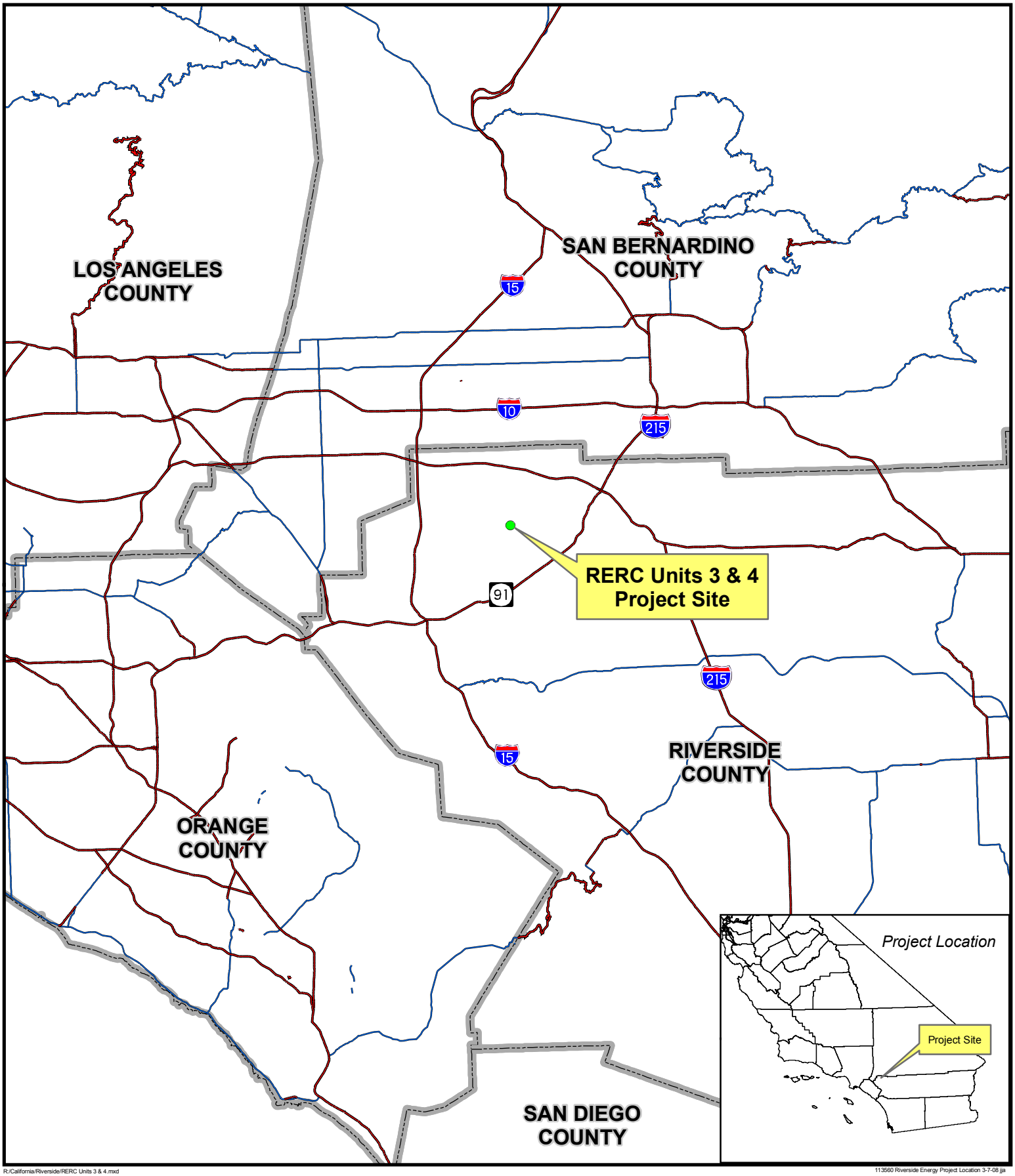
RIVERSIDE PUBLIC UTILITIES
Mr. ROBERT GILL
2911 ADAMS
RIVERSIDE, CA 92522
PHONE: (909) 312 - 6212

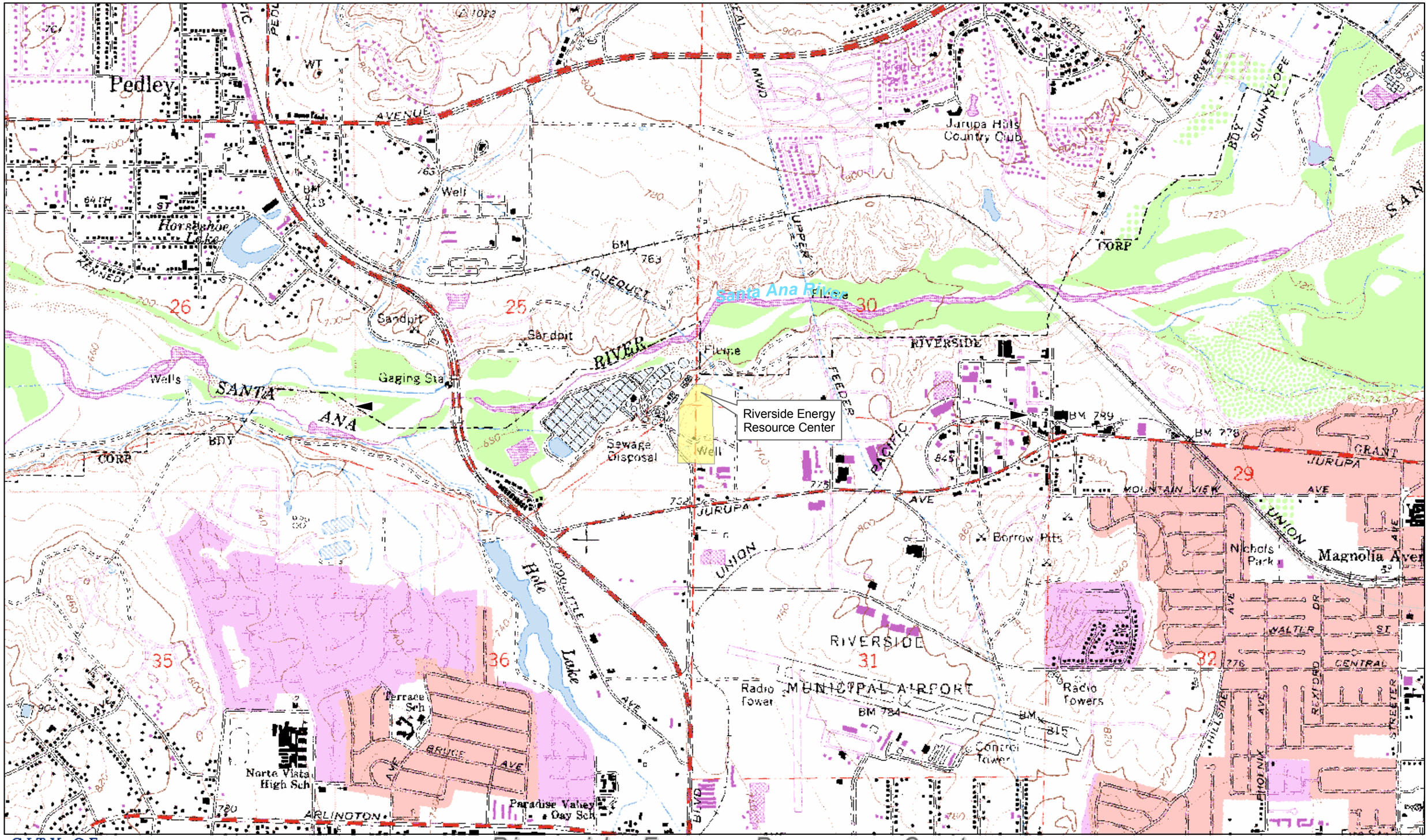
SITE ADDRESS

5901 PAYTON AVENUE
RIVERSIDE, CA 92504

N

0 5 10
Miles





CITY OF RIVERSIDE
PUBLIC UTILITIES

Riverside Energy Resource Center
RERC Units 3 & 4

Vicinity Map
Figure 1.3-2

Scale 1:15,840
1" to 1320 ft.
Feet
0 1,320 2,640

POWER ENGINEERS

R:/California/Riverside/PDF_printfiles/RERC 3 & 4 site location

RERC Units 3 & 4 - aerial.mxd, rev2 3-7-08

1.4 Interconnections

The Project will require no new off-site interconnections. The new units will connect to the City's 69kV sub-transmission system through an expansion of the existing RERC switchyard. Natural gas will be provided by Southern California Gas Company through the existing gas line and metering station.

Reclaimed tertiary water provided by the RRWQCP will used for process water needs. All process waste water will be recycled.

Ammonia for the Project's Selective Catalytic Reduction system will be delivered to the existing RERC Units 1&2 off-loading and storage facility for use by all four units.

1.5 No Significant Environmental Impacts

There will be no significant environmental impacts resulting from Project construction and operation. RPU sought and was granted a Small Power Plant Exemption for RERC Units 1&2 on December 15, 2004. The California Energy Commission determined that RERC Units 1&2 would not result in any significant effect on the environment. The Commission observed that the entire project site has been previously disturbed and is degraded for habitat. Since that time, RERC Units 1&2 have been constructed, along with a required operations building, assorted facility support structures and parking. Construction and operation of proposed RERC Units 3&4 will have no significant effects on the environment.

1.6 Environmental Assessment

A thorough environmental and safety assessment of the proposed Project has been conducted by RPU. Due primarily to the already graded site, the lack of new linear facilities associated with the Project, and the project location, construction and operation of the proposed Project will not have significant environmental impacts.

1.6.1 Air Quality

RPU will file an application with the South Coast Air Quality Management District seeking approval to operate the new facilities 2460 hours per year. RERC Units 3&4 will be very clean units, permitted at 2.3 ppm NOx, 6 ppm CO and ammonia slip of 5 ppm. Permitting at 2.3 ppm NOx is required to satisfy SCAQMD's new efficiency standard as promulgated through the Rule 1309.1 adoption process. RPU will obtain offset credits through the reclaim market and on the open market for all required offsets except PM10, which are in very short supply and must be obtained from the SCAQMD.

SCAQMD has adopted Rule 1309.1 which grants PM10 credits to certain qualifying generation facilities and the RERC Units 3&4 project qualifies. There is, however, pending litigation over

this rule and it is not entirely certain that SCAQMD will be able to grant the credits to RPU immediately. Therefore, RPU is asking the CEC to consider the Project under two scenarios (1) assuming SCAQMD is able to issue PM10 ERCs to RPU when needed, and (2) that there will be a delay in the issuance of the ERCs. In the latter event, RPU proposes that RERC Units 3&4 will temporarily operate with no increase in operating hours above what was obtained through the licensing of RERC Units 1&2. Under this latter scenario, RPU will obtain the necessary PM10 credits when they become available.

1.6.2 Traffic

The operation of RERC Units 3&4 will require only one or two new employees, so the impacts upon the area transportation network will be negligible. There will be some minor impacts resulting from the construction workforce, resulting from adding approximately 75 vehicles to the system for the brief construction schedule. Because peak construction is expected to last only a few months and the work day will start and stop outside of peak traffic hours, there will be no significant impacts upon the area traffic.

1.6.3 Noise

The nearest receptor is over 2,800 feet to the north of the site. Other receptors are over 4,000 feet to the south and east, although a dog kennel is approximately 500 feet to the south. Noise measurements and predictions indicate that RERC Units 3&4 will comply with all local regulations and plant operations are not expected to increase ambient noise levels by 5 dB at the receptors or cause a significant impact.

1.6.4 Water

The Project will use reclaimed water from the RRWQCP located directly to the west of the proposed units. Potable water will be used for domestic service and fire protection, and also serve as an emergency backup source of water. Process wastewater will be recycled on site using the same system currently used for RERC Units 1&2.

1.6.5 Biology

Due to the disturbed nature of the site, there are few biological resources that could be impacted from project construction or operation. As part of RERC Units 1&2, burrowing owl habitat was constructed in a berm on the east side of the site. Measures will be taken to ensure that this successful habitat project is not permanently impacted by Project construction.

1.6.6 Transmission Engineering

There will be no new transmission lines constructed to serve RERC Units 3&4. The existing switchyard will be expanded to create two new bays for RERC Units 3&4.

At peak anticipated loading for the summer of 2009 (682 MW) and with the addition of RERC Units 3&4, there are six N-1 outages contributing to seven overloaded lines. While the overloads are not desirable, the addition of RERC Units 3&4 improves the situation from thirteen N-1 outages which leads to sixteen overloaded lines with only the existing RERC Units 1&2 and Springs generation on-line. Mitigation of the overloads will necessitate shedding some load. Thus not adding RERC Units 3&4 will necessitate shedding even more load due to the increased overloads.

1.6.7 Public Health

RPU has assessed the public health impacts due to both construction and operating emissions. Construction impacts are significantly reduced as compared to RERC Units 1&2 due to the site already having been rough graded. Operational impacts meet all applicable health criteria.

1.6.8 Cultural

The RERC site has been disturbed in the past. Archeological surveys have been performed and no indications of cultural resources were found. In the event cultural resources are found during construction, work will stop and a cultural resource specialist will be brought on-site to assess and deal with the find.

1.6.9 Land Use

Construction and operation of RERC Units 3&4 will require no zoning change. The area of the Project is characterized as industrial and business parks. The Project is compatible with both General and Specific Plans for the region.

1.6.10 Paleontology

Paleontological surveys have been performed and no paleontologic resources were found. Although no impacts are expected, a paleontologist will be brought to the site if paleontological resources are found.

1.6.11 Visual

The visual quality of the Project and the immediate vicinity of the Project are considered low due to the surrounding industrial nature of the area. The Project will also be compatible with the

current scenic character of the Project site. Therefore, no significant impacts to visual resources are anticipated.

1.6.12 Agriculture and Soils

Native soils have previously been removed from the site some years ago. Runoff will be controlled and landscaping will installed. No significant impacts to agriculture or soils are expected.

1.6.13 Hazardous Materials

Aqueous ammonia will be the only hazardous material present on the site in large quantities. As the storage tank used for RERC Units 1&2 will also be used for RERC Units 3&4, there will be no increase in on-site storage. Small quantities of hazardous materials already in use for RERC Units 1&2 will be brought to the site. These materials will be properly stored in accordance with applicable regulations.

1.6.14 Socioeconomics

There will be no significant impacts to public services. Although there will be a small increase in the burden placed on local fire, police and health services, none of these impacts are considered to be significant.

1.7 Transmission Line Safety and Nuisance

No new transmission facilities will be constructed for RERC Units 3&4.

1.8 Alternatives

RPU investigated a number of sites utilizing criteria and project goals that would meet the requirements of the City of Riverside. There was only one other site that would meet most of the requirements (the “Acorn” site), but due to complexities that result from two different projects (RERC Units 3&4 and a regional transmission upgrade project), the site was deemed unsuitable. RPU selected the RERC site for RERC Units 3&4 because this location has minimal environmental impacts and best meets the timing and certainty requirements of the utility.

Section 2
Project and RERC Facility Description

2.1 Introduction

The City of Riverside, Riverside Public Utilities (RPU) proposes to build, own, and operate two simple cycle units at its Riverside Energy Resource Center (RERC) within the City of Riverside, California. The two new units, RERC Units 3&4 (Project), with a nominal generation capacity of 95 megawatts (MW), will be largely identical to the first two units (Units 1&2) constructed at the RERC. RERC Units 3&4 will be located adjacent to Units 1&2 (refer to Figure 2.1-1). The Project will interconnect to the City of Riverside's 69kV sub-transmission system at the existing RERC Switchyard.

The California Energy Commission (CEC) has exclusive jurisdiction to certify sites and related thermal power plants of 50 MW or more in capacity and all related facilities that are constructed for the operation of a proposed power plant. The CEC may exempt thermal power plants from the certification process if the project is less than 100 MW and has:

- No unmitigated significant adverse impacts on the environment
- No unmitigated significant adverse impacts on energy resources

Because the Project is not expected to have any significant adverse impacts on the environment or energy resources, RPU is submitting this application as a Small Power Plant Exemption (SPPE) Application in accordance with the CEC's Power Plant Site Certification Regulations.

2.1.1 Goals and Objectives

RERC Units 3&4 are intended to satisfy the goals and objectives of the City of Riverside, Riverside Public Utilities Department. These goals and objectives guided the selection of the GE LM6000 PC SPRINT NxGen engines and the proposed location at the Riverside Energy Resource Center. The goals and objectives are as follows:

- The generation units must be within the city of Riverside, on the Riverside side of the Southern California Edison Vista substation. This is necessary to provide generation to the citizens of Riverside without the constraints of the Vista substation,
- The generation units must be able to provide peaking and shoulder power in order to satisfy the growing peak demand experienced on the RPU system,
- The chosen location and proposed units must be available and RPU must be able to construct the units so that the generation (at least a significant portion of the generation) will be available to the citizens of Riverside for the summer of 2009,

- The project location must have minimal linear additions (such as water pipelines, electric transmission lines and natural gas fuel lines) so that the environmental impacts and costs are minimized, and
- The project must be able to qualify for a CEC Small Power Plant Exemption (SPPE) in order to satisfy the on-line date of summer 2009.

2.1.2 Need for RERC Units 3&4

RPU is committed to providing its customers with a reliable source of electric service at a reasonable cost with minimal environmental impact. RERC Units 3&4 will supply internal peaking needs of the City of Riverside primarily during summer peak electrical demands. No portion of the power from RERC Units 3&4 will be exported outside of the City. In addition, RERC Units 3&4 in combination with RPU's 40 MW Springs Generation Project, and 96 MW RERC Units 1&2, will serve the City's minimum emergency loads in the event RPU is islanded from the external transmission system upon which it relies for power[1].

As a municipal utility, Riverside Public Utilities' first obligation is to provide its customers with safe, reliable, and high quality electric services at low, fixed rates. The City of Riverside has steadily grown in population, particularly since 1970. The City more than doubled in population between 1970 and 2007 (from 140,089 in 1970 to 291,398 in 2007). Over the years, the City's load demand has also increased at a steady pace.

Currently, there is a need for approximately100 MW of additional peaking generation in 2009. In addition to serving the load, RERC Units 3&4 generation will help relieve the loading on two 230/69kV 280 MVA transformers at Southern California Edison's Vista Substation, which currently supplies most of the City's imported electrical power needs[2] and is at its electrical limits on the higher load days at RPU.

In 2002, when planning RERC Units 1&2, RPU anticipated that additional internal generation would not be needed until well after 2011. Accordingly, only RERC Units 1&2 were constructed and came on line in 2006, with no immediate plans to construct more units. As stated in the SPPE application for RERC 1&2 (04-SPPE-1), the City's 2003 peak demand of 517 MW was expected to grow to an estimated 570 MW peak over the next five years.

Actual peak demand has grown much more rapidly than was expected with Riverside's peak demand reaching 587 MW in 2006 and 610 MW in 2007 – an additional 40 MW one year earlier than what was anticipated in 2003. Currently forecasted peak loads for 2008 and 2009 are 645 MW and 682 MW respectively. In 2006 and 2007, only through

---

[1] Riverside Public Utilities has only one point of interconnection to California's transmission system through Southern California Edison's Vista Substation. The Vista Substation is at maximum capacity, is approximately 45 years old, and is located close to the San Andreas Fault.

[2] Riverside Public Utilities receives all base load, intermediate, and some peaking power electricity through this connection from power plants outside of the city in which it owns a share, such as the San Onofre Nuclear Generating Station and Intermountain Power Project, as well as power purchase contracts.

the availability of RERC Units 1&2 and the four Springs units was the City able to avoid the rolling blackouts that, without those units, would have been necessary in order to avoid overloading the sole Southern California Edison (SCE) Vista Substation transformer bank that serves all of RPU. Without either of RERC Units 1&2, RPU customers would have been subjected to rolling blackouts.

RERC FACILITIES

RERC UNITS 1 & 2

- **A** Units 1 & 2
- **B** Fuel Gas Compressor
- **C** Demineralized Water Tank and Pumps
- **D** Raw Water Tanks and Pumps
- **E** Process Waste Water Recycling
- **F** Switchyard (Original 2 Bays)
- **G** Not Used
- **H** Communications Tower and Shed
- **I** Warehouse
- **J** Administration Building
- **K** Retention Basin
- **L** Gas Metering Station

RERC UNITS 3 & 4

- **A** Units 3 & 4
- **B** Fuel Gas Compressor
- **C** Demineralized Water Tank and Pumps
- **D** Not Used
- **E** Process Waste Water Recycling
- **F** Switchyard (2 New Bays)
- **G** Temporary Construction Units 3 & 4

ANCILLARY FACILITIES

- **1** Water Labratory
- **2** Scheduling and Dispatch Building

RIVERSIDE PUBLIC UTILITIES	POWER ENGINEERS	Riverside Energy Resource Center Units 3 & 4	Figure 2.1-1	REV A

2.1.3 Relationship to Riverside Transmission Reliability Project

To enhance the reliability and capacity of RPU's interconnection to SCE there is a separate project underway, the Riverside Transmission Reliability Project (RTRP). This project is being permitted through the City of Riverside to add a second point of electrical power delivery from the SCE transmission system to the RPU 69kV transmission system. As part of RTRP, RPU has contracted with SCE for construction of a double-circuit 230kV transmission line and a new 230kV interconnection substation. However, the RTRP will not be completed until 2012 at the earliest[3]. Given the greater than anticipated load growth to date, further projected additional growth in peak load of 95 MW between 2006 and 2009, and with completion of the RTRP not expected until 2012 at the earliest, adding RERC Units 3&4 to the City's generation portfolio is an essential project that improves electric service reliability for the citizens of Riverside.

2.1.4 RERC Facility Operating Hours

With the addition of two more units at the RERC, RPU is seeking to increase the site operating hours from approximately 2,200 to 4,700 hours combined for all four units in order to obtain both more capacity to address increasing peak demand and additional energy to meet growing load. RPU's application to the South Coast Air Quality Management District (SCAQMD) is also being submitted consistent with this increase in operating hours. Recognizing that there is ongoing litigation with respect to SCAQMD's implementation of a revised Rule 1309.1, if Rule 1309.1 cannot be implemented by the time needed to support issuance of the SCAQMD Permit to Construct and California Energy Commission (CEC) Small Power Plant Exemption (SPPE), RPU will accept a Condition of Exemption that temporarily allows operation of the RERC facility with no increase in annual megawatt hours until such time as SCAQMD issues an amended air permit granting the full increase in facility operating hours.

If it is necessary to take this approach, RPU anticipates modifying the air permit in the future when Rule 1309.1 is finalized to gain the additional operating hours. RPU is proceeding to obtain offsets consistent with the increase in operating hours except for PM10 whose procurement is tied to resolution of Rule 1309.1.

2.1.5 RERC Units 1&2 Black Start Diesel Addition

On October 26, 2007 RPU lost its Vista connection and the entire City went black. In light of this city-wide black out, RPU is proceeding to install a dedicated black start capability for RERC Units 1&2. The black start diesel will not be connected to RERC Units 3&4. This change is being permitted through SCAQMD and the CEC will be involved in accordance with the RERC Units 1&2 SPPE Small Power Plant Exemption

[3] The purpose of the RTRP project is to increase the reliability of the RPU transmission system under baseload conditions. It consists of a new 230/69 kV substation providing a second inter-tie between SCE and RPU along
with additional SCE 230 kV and RPU 69 kV transmission lines as well as upgrades to eight other RPU substations.

Decision facility modification notification requirements and the existing SCAQMD operating permit. While the black start generator is being evaluated under those rules and is expected to be in service starting in fourth quarter 2008. For completeness the cumulative air emissions impact of the generator has also been addressed in this application.

2.2 Site Location and Layout

The proposed project site is owned by the City of Riverside and is located adjacent to and on the east side of the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. The primary source of raw water for the RERC Units 3&4 will be reclaimed water supplied by the City's RRWQCP.

RERC Units 3&4 will consist of two aero-derivative LM6000 PC SPRINT NxGen combustion turbine generators with Emission Control Modules (ECMs), the addition of two more bays to the existing RERC switchyard, the addition of two demineralized water storage tanks to the existing make-up water system, a new Dispatch and Scheduling Building for RPU, and a water laboratory (refer to Figure 2.1-1). The plant will be used primarily for peaking generation needs and all power produced will stay entirely within RPU's system.

RERC Units 3&4 will be located immediately north of Units 1&2 (Figure 2.1-1). They will occupy approximately 2.2 acres of the 16 acre RERC site. The remaining rough graded, undeveloped portion of the RERC site will be used for construction laydown (approximately 5 disturbed acres in total). Construction parking will occur in the same location as was used for RERC Units 1&2 (immediately to the west of the project). The Dispatch and Scheduling Building will be located to the east of RERC Units 1&2 between the roadway and toe of the earthen slope going up to Payton Avenue.

With the addition of Units 3&4 and the Dispatch and Scheduling Building, the total RERC site population is expected to rise from approximately eighteen people to approximately thirty people. While the new Dispatch & Scheduling Building is unrelated to the direct operation of the RERC facility, environmental impacts associated with the building are addressed as part of the Project.

The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls with landscaping installed per City of Riverside standards. The RERC site has paved roads and parking areas which will be extended to include RERC Units 3&4. This and other joint use areas are depicted on Figure 2.2-1. RPU will pave the main power block area and remaining areas will be covered with crushed rock. Storm water that does not naturally infiltrate within the graveled areas is routed to the existing detention basin. While the detention basin is sized to accommodate a greater than 100 year storm event, in the rare events that overflow from the detention basin were to occur, it will flow to the Water Quality Control Plant where it is treated as waste water and processed.

RERC JOINT USE

JOINT USE AREAS

- Paved Roads
- Gravel Roads
- Crushed Rock Surface
- Landscaped Entry (L)
- Burrowing Owl Habitat
- Future Development Areas (Temporary Construction Yard)
- Paved Parking Areas (P)

RIVERSIDE PUBLIC UTILITIES / POWER ENGINEERS	Riverside Energy Resource Center Units 3 & 4	Figure 2.2-1	REV A

2.3 Alternative Sites

RPU evaluated alternative sites during the planning stage of the Project. The main criteria considered in selecting a suitable site included appropriate land area, environmental compatibility, proximity to existing utilities including transmission lines, natural gas pipelines and water supply, and compatibility with local land uses and zoning. This screening process narrowed the number of potential sites to two, with the proposed site offering the greatest potential to meet RPU's goal while minimizing potential project delays.

One of the primary alternatives, the Acorn site, was to place two additional units in a portion of the Wilderness site adjacent to the Wilderness and Wildlife Substation components of the RTRP. This site was dropped from consideration due to the complexities of permitting separate projects under different jurisdictions on the same site introducing significant uncertainty that additional generation would be available for 2009.

Alternative sites for both single and two units were also considered on the east side of Riverside. No suitable existing City owned property sites were located that a) had reclaimed water available as a source of supply, and b) had adequate space except for Acorn. While potentially suitable non-City owned sites do exist, these sites could not be procured and developed in time to have operational units by summer 2009.

2.4 Schedule

Construction of RERC Units 3&4 is anticipated to last approximately nine months following approval by the CEC and once all permits and authorizations are in place. Commencement of construction is anticipated in the fourth quarter of 2008, with commercial operation of the first of the two new units anticipated in the summer of 2009. Completion of the second unit would follow as soon as possible after the first unit is available for dispatch.

2.5 Process Description

The simple cycle power plant will consist of two General Electric LM6000 PC SPRINT NxGen combustion turbine generators (CTG) with the SPRINT Power Boost System equipped with inlet air chiller coils, exhaust ducting, flue gas treatment system to meet the proposed air emission limits, emission monitoring system, a common chiller package with cooling tower, and gas compressor equipment. Two new bays will be added to the electrical switchyard, and the control room facilities will also be expanded to accommodate RERC Units 3&4.

RERC Units 3&4 are substantially identical to Units 1&2. The only notable differences are:

1. The use of fin-fan coolers for lube oil cooling instead of relying on the cooling tower. For RERC Units 1&2 the cooling tower is primarily required for operation of the chiller, and the use of fin fan coolers eliminates the need to operate the

cooling tower for Units 3&4 when chiller operation is not needed. This change also results in a slight reduction in water usage.

2. Additional catalyst will be installed in the SCRs to address General Electric's concerns over sodium poisoning and to achieve 2.3 ppmvd NO_X in emissions. The additional catalyst will result in increased pressure drop through the ECM. As a result, output of the LM6000s will be decreased slightly for RERC Units 3&4 compared to RERC Units 1&2.

Incoming tertiary treated reclaimed water from the RRWQCP is processed into demineralized water using a combination of permanently installed equipment and portable demineralizer trailers. In addition, the plant will recycle all process wastewater. Any water streams which become hazardous material, such as due to contamination with oil, are treated as hazardous waste and removed from the site. Condensate, derived from the inlet air chiller coils as the incoming air is cooled, is captured and either mixed with the incoming reclaimed water or used as makeup to the cooling tower for the mechanical chiller. Process waste water from the cooling tower blowdown is mixed with the incoming reclaimed water. This total system approach results in recycling all process waste water. Reclaimed water from the RRWQCP is used as the only source of supply for process water make-up needs.

Potable water is not used for plant process water needs during normal plant operations. RERC Units 3&4 will have the capability to use potable water as a backup for process needs in an emergency situation.

RERC Units 3&4 will operate primarily to support Riverside summer peaking demands during the months of May through October. The nominal net generating capacity of both units combined will be approximately 95 MW at the annual average dry bulb temperature of 72.2 ºF. Each of the eventual four RERC turbines can operate independently of each other.

To provide a highly reliable source of power for the City, the RERC Units 3&4 electrical system encompasses several features to provide greater than normal degree of redundancy. Each GSU transformer will be sized for 70% of the plant output allowing operation of both units above minimum permitted loads in the event one GSU is unavailable. In addition, sufficient cross-ties are provided such that one unit (Unit 3 or 4) may utilize the other unit's (Unit 4 or 3) GSU transformer. Thus the loss of one transformer in one unit and the CTG in the other unit will not preclude the available unit from being able to deliver energy to the RPU system.

RERC Units 3&4 will be permitted for a combined total of two thousand four hundred (2,460) annual full load equivalent hours and an estimated three hundred (300) annual starts in total from both units. While the plant is capable of 24/7 operations, typical operation will be for several hours per day to address peak demands. Each unit is capable of at least four starts/stops per day.

The stack NO_x emissions will be controlled to 2.3 ppm volume dry (ppmvd) corrected to 15 percent O_2 by a combination of water injection in the combustion turbine generators (CTG) and an emissions control module (ECM) in the exhaust duct. The ECM will control carbon monoxide to 6 ppmvd and VOC to 2 ppm at 15 percent O_2 using an oxidation catalyst system. The ECM will reduce the NO_x content in the gas stream to the permitted level using a selective catalyst reduction (SCR) system utilizing ammonia. Aqueous ammonia slip will be limited to 5 ppmvd. PM_{10} will be limited to 3 lb/hr. The ammonia storage, forwarding and vaporizing skids are included as part of the ECM system. Fuel for the CTGs will be pipeline-quality natural gas.

RPU is in the process of adding a black start 1 MW diesel generator to support RERC Units 1&2 and is expected to be in service in the fourth quarter of 2008. This change is being permitted under the auspices of the RERC 1&2 SPPE Decision requirements, evaluation of the cumulative environmental impacts of the generator have been included in the RERC Units 3&4 application.

Table 2.5-1 provides a description of the major equipment items selected for the RERC Units 3&4 project including the capacities and general features.

Table 2.5-1 Equipment Items Selected for RERC Units 3&4

Equipment	QTY	Nominal Capacity	Description
Combustion Turbine Generator	2	~50,000 kW gross	GE LM6000 PC SPRINT
ECM System	2	2.3 ppmvd NOx	ECM System with ducting and stack
Aqueous Ammonia Storage Tank	1	12,000 gallon working volume	19% aqueous ammonia (the existing tank will be used for REC Units 3&4 as well as Units 1&2)
Continuous Emissions Monitoring (CEM) System	2	NA	Fuel flow, O_2, NOx, CO
Chiller/Cooling Tower	1	3,535 ton	Common chiller and cooling tower system
Natural Gas Compressors	3	12 MSCFD, 725 psig, 573 hp	50% capacity each recip compressor
Air Compressors	3		50% capacity each compressor
Demineralized Water Treatment System	3	208 gallons per minute	Portable trailer mounted mixed bed demineralizers
Oil/Water Separator	1	3,000 gallons oil storage	Double wall, 10 ppm oil
Demineralized Water Tank	2	300,000 gallons	Field fabricated steel tank, storage
Power Distribution Center	1	480V/4160V/13.8kV	MCCs and switchgear
Generator Step Up (GSU) Transformers	2	42/56/70 MVA.	OA/FA/FA, 69kV – 13.8kV, outdoor, oil-filled, two winding, 3 phase, copper windings
Auxiliary Transformers	4	480V/4160V/13.8kV	
High Voltage Breakers	4	69kV	

Table 2.5-2 describes the expected performance of the RERC Units 3&4 facility. The plant will be designed to operate at temperatures up to 115 ^{o}F.

Table 2.5-2 Expected Performance of RERC Units 3&4 Facility

Expected Performance	Units	Value
Gross Power Output	KW	98,520 @ 100 ^{o}F
Net Power Output	KW	94,370 @ 100 ^{o}F
Fuel Consumption	MMBtu/hr LHV	843.3 @ 100 ^{o}F
Net Heat Rate	Btu/kWh LHV	8,936 @ 100 ^{o}F
Gross Power Output	KW	98,520 @ 72 ^{o}F
Net Power Output	KW	94,660 @ 72 ^{o}F
Fuel Consumption	MMBtu/hr LHV	843.3 @ 72 ^{o}F
Net Heat Rate	Btu/kWh LHV	8,908 @ 72 ^{o}F
Operating Hours	Hr/yr for both CTGs	2,460

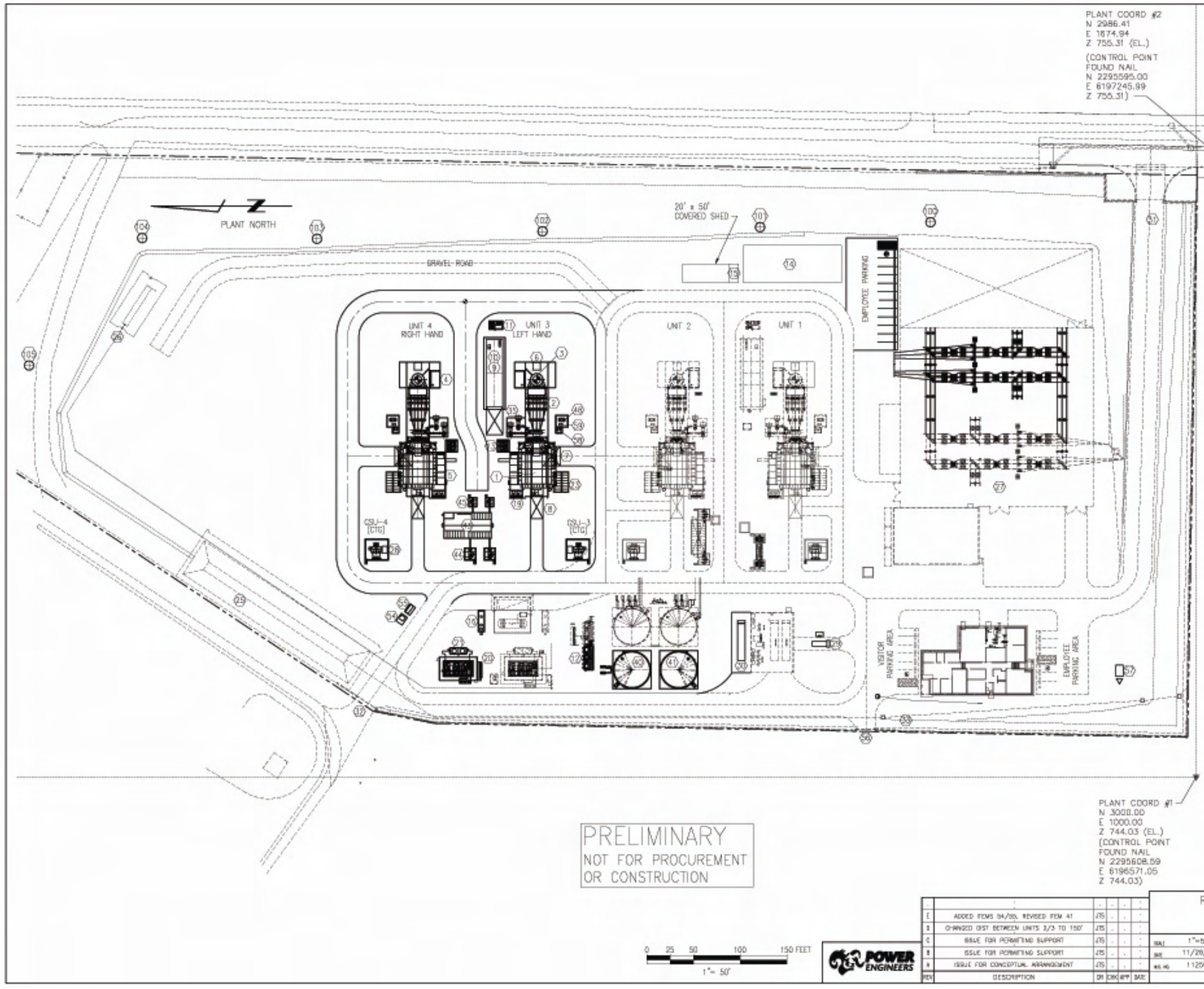
Preliminary engineering indicates that the following on-site RERC Units 3&4 project improvements will include (as shown in Drawing RIGOM1001-01_RD):

- Two simple-cycle combustion turbine generators with ducting for ECM systems and 80 foot tall stacks
- Two ECM systems for control of NOx and CO including tempering air fans and dilution air blowers
- Continuous emission monitoring and data acquisition systems
- Chillers, cooling tower, pumps and auxiliary equipment
- Ammonia forwarding pumps (the existing storage tank will be used)
- Switchyard expansion (addition of two bays)
- Generator step-up transformers
- Station service transformers
- Natural gas compressors
- Air compressors
- Fire protection system
- Equipment enclosures
- Storage tanks for demineralized water
- Oily Water Separator
- Dispatch and Scheduling Building
- Water Laboratory
- Parking
- Outdoor lighting
- CTG Control Houses
- Plant wastewater pumps

Preliminary engineering indicates that the following on-site RERC facility equipment will be utilized for RERC Units 3&4:

- Potable water and tertiary water interconnections
- Process waste water recycling
- Administration/Control Building
- Warehouse
- Ammonia storage tank, loading pad, and catchments basin
- Visitor and employee parking
- Gas Metering Station and gas line
- Storm water detention basin and drainage channel
- Perimeter architectural wall and fencing
- Access control gates
- Outdoor lighting
- Security system

No off-site linear facilities or other off-site improvements are anticipated.



ITEM	DESCRIPTION	NOTES
1	GAS TURBINE GENERATOR	
2	EMISSIONS CONTROL MODULE	
3	EXHAUST STACK	80' HIGH
4	AMMONIA VAPORIZATION SKID	
5	CTG AUXILIARY SKID	
6	CEMS SHELTER	
7	TURBINE REMOVAL AREA	
8	GENERATOR REMOVAL AREA	
9	CHILLER PACKAGE	
10	AUXILIARY COOLING TOWER	
11	AUX COOLING TOWER CHEM FEED SKID	
12	AIR COMPRESSOR/DRYER SKID & RECEIVER	
13	CTG LUBE OIL TK FAN COOLER	
14	SCHEDULING AND DISPATCH BUILDING	
15	WATER LABORATORY	
16	OIL/WATER SEPERATOR	
17	NOT USED	
18	NOT USED	
19	CTG CONTROL HOUSE	
20	FUEL GAS COMPRESSOR SKID	INCLUDES SOUND ENCLOSURE
21	FUEL GAS COMPRESSOR BYPASS COOLER	
22	NOT USED	
23	CTG SWITCHGEAR	
24	NOT USED	
25	STORM WATER RETENTION/INFILTRATION BASIN	
26	GAS METERING STATION	
27	SWITCHYARD	
28	CSU TRANSFORMER (2)	
29	BLACK START GENERATOR	
30	ZERO LIQUID DISCHARGE (ZLD) UNIT	
31	MAIN PLANT ENTRANCE	SLIDING GATE
32	EMERGENCY PLANT ENTRANCE	SLIDING GATE
33	PLANT PERIMETER FENCE (10'-0" HIGH)	
34	NOT USED	
35	TEMPERING AIR FANS	
36	NOT USED	
37	NOT USED	
38	NOT USED	
39	NOT USED	
40	DEMINERALIZED WATER TANK & PUMPS (2)	(300,000 gal)
41	DEMINERALIZED WATER TANK	(300,000 gal)
42	NOT USED	
43	FOE	
44	4.16KV AUXILIARY TRANSFORMER	
45	480V AUXILIARY TRANSFORMER	
46	NOT USED	
47	NOT USED	
48	WAFER WASH DRAIN TANK	
49	NOT USED	
50	NOT USED	
51	NOT USED	
52	NOT USED	
53	NOT USED	
54	ALTERNATE POWER TRANSFORMER	
55	ALTERNATE POWER SUPPLY POWER PANEL	
56	EQUIPMENT/PERSONNEL ACCESS GATE	SLIDING GATE WITH MAN GATE
57	COMMUNICATION TOWER AND SHED	BY RPU
58	CTG FINAL FUEL FILTER SKID	
59	CTG FINAL FUEL FILTER DRAINS TANK	
100	GIM. HABITAT	
101	GIM. HABITAT	
102	GIM. HABITAT	
103	GIM. HABITAT	
104	GIM. HABITAT	
105	GIM. HABITAT	

REV	DESCRIPTION	DR	CHK	APP	DATE
E	ADDED ITEMS 04/05, REVISED ITEM 41	JTS			
D	CHANGED DIST BETWEEN UNITS 3/3 TO 150'	JTS			
C	ISSUE FOR PERMITTING SUPPORT	JTS			
B	ISSUE FOR PERMITTING SUPPORT	JTS			
A	ISSUE FOR CONCEPTUAL ARRANGEMENT	JTS			

POWER ENGINEERS

RIVERSIDE ENERGY RESOURCE CENTER
UNITS 3 & 4
SITE ARRANGEMENT

SCALE 1"=50' | DRAWN J.SMITH | DATE 11/26/07 | DRAWING NO. RIGOM1001-01_RE | SHEET 1 OF 1 | REV. NO. 112596 | RIGOM1001-01_RE.dwg

CITY OF RIVERSIDE
PUBLIC UTILITIES

2.5.1 Combustion Turbine Generation Equipment

The plant will consist of two General Electric LM6000 PC NxGen combustion turbine generators (CTG) with SPRINT Power Boost System. The NxGen package is the latest evolutionary step in the LM6000 to enhance reliability and reduce inadvertent trips through design improvements in the overall engine package. The core LM6000 and associated gas path remains unchanged. Demineralized water will be injected into the engines for both power augmentation (as part of the SPRINT[4] system) and emissions reduction.

The nominal net generating capacity of the simple cycle system will be approximately 95 MW at 72.2 ^{o}F (annual average dry bulb temperature) and approximately 94 MW at 100 ^{o}F. RERC Units 3&4 will primarily be operated as a peaking plant during the months of May to October, but may operate at other times during the year. The plant will be capable of operating with one or both gas turbines operating. Under peaking load operation, the combustion turbine is expected to operate several hours per day, five days a week. However, the plant design will also permit operation 24 hours a day, seven days a week.

Each CTG package is equipped with its own control system that allows operation of the CTG from within the package using a local control station as well as the RERC Control Room. In addition RERC Units 3&4 can be remotely operated from the Utility Operations Center.

The CTGs will come equipped with one common chiller package. The chiller package consists of equipment necessary to condition or chill the inlet air to the gas turbine and maintains the desired power output during hot day conditions. The packaged chilled water system will include one 3,535-ton electric chiller, dual chilled water pumps, dual condenser water pumps, one packaged cooling tower, motor control center (MCC) and chiller controls. The chiller refrigerant will be R134a which is an environmentally acceptable CFC-free refrigerant.

A central control system will be provided for controlling the entire inlet air chiller system. The system proposed will monitor and control the chiller and all chiller related auxiliary equipment. Operation and monitoring of the system will be provided, locally, through full color graphical touch screen HMI interface mounted in the package enclosure.

2.5.2 Emission Control Equipment

Air emissions from the combustion of natural gas in the CTGs will be controlled using best available control technology (BACT). The Emissions Control Modules (ECM), utilizing state-of-the-art systems, will allow RPU to meet a wide range of electrical system operating scenarios while complying with applicable laws, ordinances, regulations and standards (LORS) and California's South Coast Air Quality Management District (SCAQMD) requirements for emissions of carbon monoxide (CO), oxides of

[4] SPRINT is General Electric's acronym for the Spray Intercooling system that injects water ahead of the low pressure and high pressure compressors.

nitrogen (NO_X), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), oxides of sulfur (SO_x), volatile organic compounds (VOCs) and toxic compounds. A continuous emissions monitoring system (CEMS) will be installed to monitor the stack emissions of NOx and CO.

Each CTG will be provided with an Emissions Control Module (ECM) consisting of the following major components:

- Oxidation catalyst to control CO, VOCs
- Selective catalytic reduction system (SCR) to control NOX

The gas turbine combustors control the CTG exhaust CO emissions to approximately 40 ppmv and NOX emissions to approximately 25 ppmvd over the range of operating loads (50-100 percent power). An oxidation catalyst will be provided to further reduce CO (1 hour average) emissions to 6.0 ppmvd. The CO catalyst will also reduce the VOC (1-hr average) emissions to less than 2.0 ppmvd. This catalytic system will promote the oxidation of CO to carbon dioxide (CO2) and VOC to CO_2 and water without the need for additional reagents.

Each turbine will also be equipped with a SCR system to control NO_X concentrations in the exhaust gas emitted to the atmosphere to no more than 2.3 ppmvd (1-hour average concentration excluding startups) at 15 percent O_2 from the gas turbines. The SCR process uses 19 percent aqueous ammonia as a reducing agent to catalytically convert NO_x present in CTG exhaust to molecular nitrogen (N_2) and water vapor. Aqueous ammonia is chosen for this Project because it is easier to transport and store than gaseous ammonia and because it presents minimal health risk in the event of an accidental discharge. Ammonia slip, or the concentration of unreacted ammonia in the exiting exhaust gas, will be limited to no more than 5 ppmvd at 15 percent O_2.

The ECM system includes ductwork, tempering air fans, catalyst bed, ammonia storage system (common to all four units), ammonia vaporization skid, ammonia injection system, and the stack with exhaust silencer. Aqueous ammonia will be delivered periodically to the site via tanker truck. The trucks include vapor recovery systems to prevent the discharge of ammonia vapors into the atmosphere while the storage tank is being filled. Aqueous ammonia will be pumped from the storage tank, vaporized, and then injected into the duct upstream of the SCR catalyst. The ammonia vaporization skid will be provided with the two (2) X 100 percent dilution air fans and four (4) X 33 percent heater elements housed in a common heater box.

The design and performance characteristics of the SCR and CO oxidization system are summarized as detailed in the below Table 2.5-3:

Table 2.5-3 SCR and CO Oxidation System

Controlled NOX Emissions	2.3 ppmvd at 15% O_2
Controlled CO Emissions	6.0 ppmvd at 15% O_2
Ammonia (NH3) Slip	5.0 ppmvd at 15% O_2
Stack Height	80 Feet
Tempering Air Fans (per unit)	2 x 100% Fans
SCR Catalyst Type	Cormetech - Vanadium-based ceramic honeycomb 90% Conversion Efficiency
CO Catalyst Type	BASF - Precious metal carrier on alumina, 95% Conversion Efficiency
Ammonia Type	19% Aqueous
Expected Gas Side Pressure Drop	Less than 13.5" WC
Noise Criteria – Near Field at 3 ft	85 dB(A)
Noise Criteria – Far Field at 90 ft (Plant Boundary)	65 dB(A)
PLC Type	GE Fanuc 90/30 Series

PM and SO_2 emissions will be controlled by the use of pipeline quality natural gas fuel, which contains only trace quantities of sulfur and minimal particulate matter.

One CEMS system will be provided for each of the combustion turbine packages. The proposed CEMS utilizes extractive sampling technology to monitor outlet NOx, CO, and O_2 concentrations. The system will also be used to calculate ammonia slip (NH_3) and CO_2 emissions. Stack flow rates will be calculated based upon measured fuel consumption rates and will be used to determine hourly mass emissions in accordance with South Coast Air Quality Management District (SCAQMD) and U.S. Environmental Protection Act (U.S. EPA) regulations. A common data acquisition system (DAS) will be located in the control room. The CEMS will generate a log of emissions data for compliance documentation and will activate an alarm in the plant control room if stack emissions exceed specified limits. The DAS will calculate all average emission rates and will be the source of historic CEMS output data. The CEMS and DAS will be certified for operation and maintained in accordance with SCAQMD and U.S. EPA regulations.

With RERC Units 3&4, we are proposing an increase in site operating hours from approximately 2,200 to 4,700 hours combined for all four units in order to obtain both more capacity to address increasing peak demand and additional energy to meet growing load.

As all four RERC units are on the same site, the emissions from all four units plus the black start generator were considered in assessing impacts to the environment. Also included in the emissions estimate were twenty (10) annual hours of uncontrolled emissions for each combustion turbine for tuning of the CTGs and SCRs.

RPU's application to the South Coast Air Quality Management District (SCAQMD) is also being submitted consistent with this increase in operating hours. Recognizing that there is ongoing litigation with respect to SCAQMD's proposed changes to Rule 1309.1, if Rule 1309.1 is not approved by the time needed to support issuance of the SCAQMD

Permit to Construct (PTC) and California Energy Commission (CEC) Small Power Plant Exemption (SPPE), then RPU proposes that the CEC's Conditions of Exemption allow for the increase in operating hours once SCAQMD finalizes Rule 1309.1 in order to ensure the ability to serve peak demand with RPU and avoid disrupting customer's supply of energy. If it is necessary to take this approach, RPU anticipates modifying the air permit in the future when Rule 1309.1 is finalized to gain the additional operating hours. RPU is proceeding to obtain offsets consistent with the increase in operating hours except for PM10 whose procurement is tied to resolution of Rule 1309.1.

2.6 Fuel System

Natural gas fuel will be supplied to RERC Units 3&4 through the existing Southern California Gas metering station on the site property. Refer to Appendix 2.6-A for the Will Serve Letter. The onsite natural gas pipeline has a Maximum Allowable Operating Pressure (MAOP) of 584 psig and an operating pressure that varies between 350 and 537 psig, the same as the pipeline supplying RERC.

Three fuel gas compressors, each of which is capable of supplying the needs of one of the two CTGs, will be installed to boost the natural gas pressure to 725 psig to provide adequate pressure at the CTG packages. Inlet scrubbers and a common outlet coalescing filter will remove particulate matter and condensate from the fuel gas.

The CTG packages will be supplied with a natural gas fuel system that utilizes an electronically controlled fuel-metering valve and incorporates a final fuel filter/separator skid. For full-load operation, the gaseous fuel must be supplied to the CTG at 675 psig ± 20 psig (4.658 kPag ± 0.138 kPag).

2.7 Water Supply and Use

The Project's various water uses will include combustion turbine water injection for NOx controls and increased generation through spray intercooling (SPRINT power augmentation), turbine water wash, cooling tower makeup, and potable water for domestic use and fire protection. The water balance diagram is presented in the process flow diagram in Drawing No. RIGOM0201-01.

2.7.1 Water Requirements

The City's RRWQCP supplies reclaimed water for the RERC's plant process water needs. Refer to Appendix 2.7-A for the Will Serve Letter. Reclaimed water is used as a process make up water source for the demineralized water. RERC landscaping is irrigated with reclaimed water from the RRWQCP as well.

Potable water for sanitary use was developed as part of RERC Units 1&2 and comes directly from the City's general water supply.

A separate connection to the City of Riverside potable water system, with an approved backflow preventer, is used to supply fire suppression water to the plant. Layout of the fire suppression water loop and piping, size of piping, spacing of hydrants and equipment

or buildings protected by sprinkler systems will be designed according to National Fire Protection Association (NFPA) standards and local requirements of the City of Riverside Fire Department.

Water requirements under various operating ambient temperatures are shown in the process flow diagram (Drawing No. RIGOM0201-01). The maximum annual water requirement is based on consideration of water use and estimated operating hours at various temperatures at 100 percent load and ambient temperatures up to 115°F. On an annual basis, the estimated water requirement is 165.3 gpm. Based upon the maximum hours of operation per year (2,460 hours for RERC Units 3&4), the annual water consumption will be 24.394 million gallons per year. In a 16 hour operating day at summer design conditions the plant will consume 0.1779 million gallons at a flow rate of 185.36 gpm. These daily and annual water usages and the basis for those usages are shown in Table 2.7-1.

Table 2.7-1 Process Water Usage

Operating Basis	Ambient Operating Temperature, deg. F	Plant Load, %	Reclaimed Water Flow Rate, gpm	Daily Run Time, hrs	Annual Run Time*, hrs	Total Daily Usage, Mgal	Total Annual Usage, Mgal**
Summer Max	115	100	215.25	16	123	0.207	1.589
Summer Design	100	100	185.36	16	1230	0.178	13.680
Annual Average	72.2	100	141.28	8	984	0.068	8.341
Winter Low	18	100	106.34	4	123	0.026	0.785
Totals					**2,460**	**N/A****	**24.394**

* Run time is based on a total of 2460 hours at 100% load for a single unit or 1230 hours each for two units at 100% load.

** Total Daily Usage is based on daily run time and is not additive.

*** The average flow rate in gpm for the annual usage is 165.3 pm.

2.7.2 Water Supply and Treatment Systems

Reclaimed water from the RRWQCP will continue to be used for demineralized water makeup.

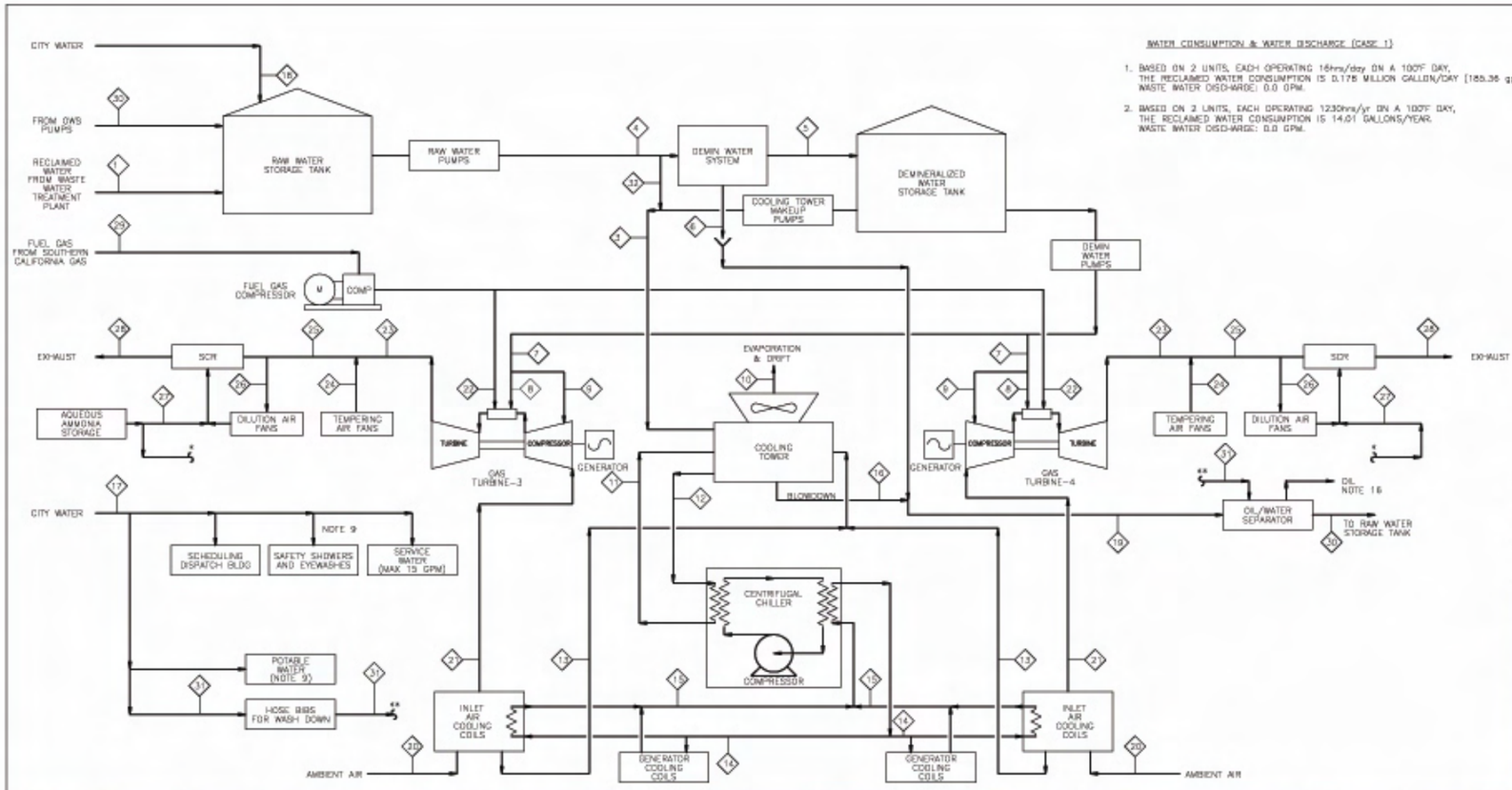
Incoming raw water (reclaimed water from the RRWQCP) is delivered to the existing 300,000-gallon raw water tank. Raw water transfer pumps will deliver the reclaimed water to the plant demineralized water treatment equipment. Demineralized water will be stored in three 300,000 gallon demineralized water tanks, one of which is existing and the other two which will be added as a part of this Project. Demineralized water will be supplied to the CTGS for NOx control and power augmentation. In addition, demineralized water will be used for make-up to the cooling tower.

2.8 Wastewater

2.8.1 Process Wastewater

RERC Units 3&4 will utilize the same process as is currently used for RERC Units 1&2 to process reclaimed water and recycle process waste water. This process recycles all process waste water with none leaving the site other than water which becomes contaminated and must be treated as a hazardous material. Condensate from the CTG inlet air coolers will be routed to the raw water storage tank. Cooling tower blowdown will be mixed with the incoming reclaimed water in the raw water storage tank. Any potentially dirty process waste water, such as that from sumps, will first be routed through the plant's Oily Water Separator with the clean effluent then being returned to the raw water storage tank.

Mobile water treatment trailers will be utilized to process raw water from the raw water storage tank as well as process waste water. When a trailer's treatment capacity is expended, it is removed from the site for regeneration and replaced with a fresh trailer mounted treatment unit. This design eliminates the need to discharge process wastewater to the RRWQCP. Based on RPU's experience at RERC, one trailer is able to process approximately 160,000 gallons of raw water.



WATER CONSUMPTION & WATER DISCHARGE (CASE 1)

1. BASED ON 2 UNITS, EACH OPERATING 16hrs/day ON A 100°F DAY, THE RECLAIMED WATER CONSUMPTION IS 0.175 MILLION GALLON/DAY (185.36 gpm). WASTE WATER DISCHARGE: 0.0 GPM.
2. BASED ON 2 UNITS, EACH OPERATING 1230hrs/yr ON A 100°F DAY, THE RECLAIMED WATER CONSUMPTION IS 14.01 GALLONS/YEAR. WASTE WATER DISCHARGE: 0.0 GPM.

NOTES

1. FUEL GAS HHV = 1012 BTU/SCF.
2. COOLING TOWER IS ASSUMED TO OPERATE AT 20 CYCLES OF CONCENTRATION.
3. DEMIN SYSTEM IS REGENERATED OFFSITE.
4. ELEVATION – 724 FT ABOVE MEAN SEA LEVEL.
5. SCR TEMPERING AIR FLOWS ARE CONSIDERED.
6. EMISSIONS ARE GUARANTEED VALUES AT BASE LOAD OPERATION.
7. AUXILIARY LOADS ARE PRELIMINARY.
8. FLOWS INDICATED ARE DERIVED FROM GE DOCUMENTS.
9. FLOW FOR STREAM 15 TYPICALLY ZERO.
10. THE VALUES LISTED ON THIS DRAWING ARE BASED ON LM 6000 SPRINT COMBUSTION TURBINE WITH NATURAL GAS OPERATION.
11. PLANT AUXILIARY LOADS ARE DERIVED FROM GE GUARANTEES AND FROM LOAD LIST.
12. WASTE WATER WILL BE PUMPED BACK TO THE RAW WATER STORAGE TANK.
13. COOLING TOWER WILL NOT HAVE VARIABLE FREQUENCY DRIVE FANS.
14. FOR WINTER CASE, COMPARTMENT VENT AIR WILL BE RECIRCULATED FOR PREHEATING INLET AIR.
15. BECAUSE OF ROUNDING OF DECIMAL PLACES, FLOWS DO NOT MATCH UP EXACTLY.
16. OIL FLOW IS NEGLIGIBLE
17. DATA DOES NOT DEFINE VENDOR EQUIPMENT PERFORMANCE GUARANTEES.

CASE

I = SUMMER DESIGN, 100°F DBT, 68°F WBT, 19% RH
II = MAX SUMMER, 115°F DBT, 72°F WBT, 12% RH
III = AVERAGE ANNUAL, 72.2°F DBT, 62.8°F WBT, 60% RH
IV = WINTER DESIGN, 18°F WBT, 100% RH

PERFORMANCE SUMMARY (ESTIMATED)

CASE	I	II	III	IV
GAS TURBINE KW/UNIT	49,440	49,440	49,440	48,845
NUMBER OF GTG'S	2	2	2	2
TOTAL GROSS OUTPUT, KW	98,880	98,880	98,880	97,690
TOTAL AUX POWER AND GSU TRANSFORMER LOSSES KW	4,198	4,835	3,850	2,467
NET PLANT, KW	94,682	94,045	95,030	95,223
FUEL INPUT/UNIT MMBTU/HR (LHV)	422.72	422.72	422.72	418.07
TOTAL FUEL INPUT MMBTU/HR (LHV)	845.443	845.443	845.443	836.136
NET PLANT HEAT RATE				
BTU/KWH (LHV)	8,929.31	8,989.79	8,895.58	8,780.82
BTU/KWH (HHV)	9,905.3	9,972.4	9869.0	9,740.6

STREAM NUMBER	1				2 (NOT USED)				3				4				5			
CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	92,880	107,624	70,840	53,172					36,370	51,313	14,329	0.0	92,836	107,780	70,798	53,328	92,836	107,788	78,798	53,328
FLOW RATE (GPM)	185.36	215.23	141.28	106.34					72.7	102.6	28.7	0.0	185.67	215.58	141.59	108.65	185.67	215.58	141.59	108.65
TEMP (°F)	75	75	75	68					75	75	75	60	75	75	75	60	75	75	75	68

STREAM NUMBER	6				7				8				9				10				11			
CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	0.0	0.0	0.0	0.0	28,155	28,155	28,155	28,586	19,961	19,961	19,961	22,863	8,194	8,194	8,194	3,303	38,435	53,784	22,160	0.0	2,393,800	2,393,000	2,393,800	0.0
FLOW RATE (GPM)	0.0	0.0	0.0	0.0	56.31	56.31	56.31	55.17	39.92	39.92	39.92	45.77	16.38	16.39	16.38	7.40	76.87	107.53	44.32	0.0	4,786	4,786	4,786	0.0
TEMP (°F)	75	75	75	60	75	75	75	60	75	75	75	60	75	75	75	60	–	–	–	–	91.0	100.8	81.1	–

STREAM NUMBER	12				13				14				15				16				17			
CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	2,393,000	2,393,800	2,393,000	0.0	1,532	1,225	3,915	0.0	967,500	1,322,540	699,000	0.0	967,500	1,322,540	699,000	0.0	0.00	0.00	0.00	0.00	312	312	312	312
FLOW RATE (GPM)	4,786	4,786	4,786	0.0	3.86	2.45	7.83	0.0	1,835	2,654	1,398	0.0	1,835	2,645	1,398	0.0	0.00	0.00	0.00	0.00	0.623	0.623	0.623	0.623
TEMP (°F)	73.5	79.5	69.9	–	60.0	60.0	60.0	–	39.6	39.6	38.6	–	56	56	56	–	73.0	79.5	75	–	75	75	75	60

STREAM NUMBER	18				19				20				21				22			
CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	0	0	0	0	0.0	0.0	0.0	0.0	1,006,577	1,006,270	1,006,980	1,005,796	1,005,045	1,005,045	1,005,045	1,005,796	19,984	19,984	19,984	18,764
FLOW RATE (GPM)	0	0	0	0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
TEMP (°F)	75	75	63	50	75.0	79.5	75.0	–	100	115	72.2	18	46	46	46	43	140	140	140	148

STREAM NUMBER	23				24				25				26				27				28			
EMISSIONS CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	1,053,184	1,053,184	1,053,184	1,052,148	13,500	13,500	13,500	13,500	1,066,684	1,066,684	1,065,684	1,065,648	HOLD	HOLD	HOLD	HOLD	99	99	99	99	1,066,783	1,065,783	1,066,783	1,065,743
FLOW RATE (CFM)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TEMP (°F)	843	843	843	842	100	115	72.2	18	833	833	833	783	HOLD	HOLD	HOLD	HOLD	–	–	–	–	833	833	833	783
NOx,PPMVD,15% O2	25	25	25	25													–	–	–	–	2.3	2.3	2.3	2.3
NOx, PPH	42	42	42	42													–	–	–	–	–	–	–	–
CO,PPMVD,15% O2	19	19	19	34													–	–	–	–	6.0	6.0	6.0	6.0
CO, PPH	19.68	19.69	19.68	35.10													–	–	–	–	–	–	–	–
PM10 (LB/HR)	–	–	–	–													–	–	–	–	3.0	3.0	3.0	2.9
NH3 SLP, PPMD	–	–	–	–													–	–	–	–	5.0	5.0	5.0	5.0

STREAM NUMBER	29				30				31				32				4			
CASE	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
FLOW RATE (LB/HR)	39,968	39,968	39,968	38,528	156	156	156	156	156	156	156	156	0	0	0	0				
FLOW RATE (GPM)	–	–	–	–	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0	0	0	0				
TEMP (°F)	75	75	75	60	75	75	75	60	75	75	75	60	75	75	75	60				
NOx,PPMVD,15% O2	–	–			–				–				–							
NOx, PPH	–	–			–				–				–							
CO,PPMVD,15% O2	–	–			–				–				–							
CO, PPH	–	–																		
PM10 (LB/HR)	–	–																		
NH3 SLP, PPMD	–	–																		

REV	DESCRIPTION	DR	CHK	APP	DATE
B	REVISED WITH CURRENT INFORMATION	VBD	KPB	CTY	03/20/08
A	ISSUED FOR PERMIT REVIEW	VBD	KPB	CTY	02/04/08

POWER ENGINEERS

RIVERSIDE ENERGY RESOURCE CENTER UNITS 3 & 4
PROCESS FLOW DIAGRAM
HEAT AND WATER BALANCE

SCALE: NTS | DRAWN: J.SMITH | DATE: 02/12/08 | NO. 113560 | DRAWING NO. RIGOM0201-D1 | SHEET 1 OF 1 | CITY OF RIVERSIDE PUBLIC UTILITIES

2.8.2 Storm Water

The storm water management system for RERC Units 3&4 will be integrated with the existing RERC storm water management system which collects and routes storm water to an on-site detention basin using a peripheral channel. The storm water detention basin is sized for a capacity greater than the difference in runoff volume between pre and post development of the site for a 100-year storm event. The storm water detention basin has an open bottom for infiltration.

2.9 Hazardous Material Management

Various chemicals will be stored and used during the construction and operation of the proposed Project. All chemicals will be stored in appropriate storage facilities. Bulk materials will be stored in tanks or containers made of materials compatible with the intended contents. Quantities generally less than 55 gallons will be stored in delivery containers. All hazardous material storage and use areas will be designed to contain leaks and spills. Containment structures will be provided with sufficient volume to contain the spill of a full tank without overflow. All chemicals on-site will be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards (LORS).

All equipment containing significant quantities of oil (transformers, CTGs) will be provided with their own secondary containments. Containments will be sized to contain 110 percent of the nominal capacity plus an allowance for precipitation from a 25-year, 24-hour event and fire suppression water. The secondary containments will be provided with drains with normally closed valves that allow for removal of clean rainwater.

Aqueous ammonia is the hazardous material that will be present in the greatest quantity and therefore presents the largest degree of risk of spills or releases. The existing 12,000 gallon (working volume) aqueous ammonia storage tank will be utilized for RERC Units 3&4 as well as RERC Units 1&2. No increase in ammonia storage capacity will be required for Units 3&4. To mitigate the risk associated with storing large quantities of aqueous ammonia, the storage tank facility includes secondary containment (catchment basin) capable of holding 110 percent of the tank's capacity. Additional capacity is provided to hold precipitation from a 25-year, 24-hour event. Small-quantity chemicals will be stored in their original delivery containers to minimize risk of upset.

Workers will be trained to handle waste generated at the site in accordance with federal and state worker safety and health regulations.

The proposed Project will have a less-than-significant impact on the public or the environment through the routine transport and use of hazardous materials because these materials are consistently transported in similar industrial areas to similar facilities without incident. Transport of hazardous materials will follow all applicable federal Department of Transportation laws and other applicable LORS to minimize the potential for a transportation-related release.

2.10 Plant Auxiliaries

2.10.1 Lighting

The lighting system will be provided in accordance with applicable standards, and will include normal and emergency lighting systems. The indoor lighting system will be high-pressure sodium (HPS) or fluorescent type with battery pack type emergency fixtures being used. No significant new outdoor lighting is anticipated. If any new lights are required, they will be high pressure sodium vapor type with shields to prevent unwanted stray light off-site. These lights will provide illumination in areas of normal personnel traffic. AC (normal) and DC (emergency) lighting for CTG interior lighting is provided by the CTG supplier as an integral part of packaged power plant.

2.10.2 Fire System

The fire protection system will comply with City underwriter's requirements and the local Fire Marshal. Electrical components associated with the fire protection shall be listed and approved by the California Fire Marshal. The new Station 7 Arlanza Fire Station, located at 10191 Cypress Avenue serves the RERC facility. It is located approximately 3 driving miles away from RERC.

Fire Suppression Water

The primary source of fire suppression water is from the City's water system through fire hydrants that meet National Fire Protection Act (NFPA) and the California Fire Code fire flow requirements. The existing raw water tank is equipped with spare nozzles that allow it to serve as a reserve source of fire suppression water. The fire suppression water flow for the facility is 1,500 gpm for two hours or 180,000 gallons.

Fire Suppression Water Loop Piping

The existing fire suppression water loop piping system will be expanded to encompass RERC Units 3&4. The system utilizes CPVC with self-restraining mechanical joints and is installed underground. Above ground piping will be galvanized steel.

Post indicator valves will be provided and located to isolate portions of the loop during repairs while still allowing fire suppression water to be available in other portions of the loop. An isolation valve will be provided for each hydrant to allow for maintenance or repair without shutting down the fire loop.

All pipe, fittings, valves, hydrants, and all other components will be UL and/or FM approved.

Buildings

All construction materials that are to be a part of the completed plant will be non-combustible.

2.11 Electrical System

Each Combustion Turbine Generator (CTG) electrical distribution system consists of 15kV switchgear, 13.8 –4.160kV Medium Voltage Auxiliary Transformer throat connected to a 4160V Motor Control Center (MCC) via main breaker, 13.8kV-480V Low Voltage Auxiliary Transformer throat connected to a 480V Switchboard via a main breaker, 480V Motor Control Center, 125VDC distribution system, 120VAC Uninterruptible Power System (UPS) distribution system, and other low voltage power distribution equipment.

The transformers will be outdoor oil-filled type. The Generator Step-Up (GSU) transformers will be sized for 70% of the plant output and provided with a cross-tie allowing both CTGs to deliver power through one transformer in the event the other transformer is unavailable. The 4160V MCC, the 480V Switchboards and 480V MCCs (except the 480V MCC supplied with the CTG) will be located indoors in a common Power Distribution Center (PDC). The 125VDC and 120VAC UPS distribution systems will be located indoors.

RPU's current standards for protection against arc flash events will be implemented at RERC Units 3&4.

Insulated copper cable will be used to distribute power throughout the plant. The cable will be installed in the plant's raceway system, which will consist of tray, conduit, and underground concrete encased duct bank, as required.

A comprehensive grounding and lightning protection system utilizing a copper ground grid with ground rods will be installed and tied to the existing grounding grid. All equipment grounding taps, metal structure and other major equipment will be grounded to the grounding grid. The lightning protection will be installed to help protect the plant from lightning strikes.

The existing RERC telephone and intercom communication systems, as well as fiber system for plant data communications, will be expanded to include RERC Units 3&4. The existing RERC security cameras and intrusion detection system provide protection for the entire RERC site, including the future Units 3&4.

2.12 Transmission System

The RERC Units 3&4 project will connect to the existing RERC switchyard. The switchyard will be expanded to add two more bays for connection of the two new generators. No new transmission facilities will be needed as part of the Project.

2.13 Plant Controls

The plant instrumentation and control system will be designed to allow the operators to achieve safe and reliable operation of the power plant remotely from either the Riverside Energy Resource Center (RERC) control room or the Utility Operations Center (UOC).

The RERC control room will contain a full-function operator workstation from which full control and monitoring of the CTGs and the balance-of-plant equipment will be possible.

Major equipment monitoring, control, and operation will be provided using the Plant Control System (PCS). The integration of the various plant systems will be accomplished by the PCS. The PCS will be used for supervisory control and monitoring of major plant components and package systems, such as the combustion turbine generator, and it will be used for direct control of SCR loops and other balance-of-plant equipment and processes.

2.14 Facility Closure

Facility closure refers to a ceasing of plant operations either temporarily or permanently. Temporary closure is a temporary plant shutdown for extended periods. This does not include outages for normal maintenance. Temporary closure can be caused by major equipment overhaul/replacement or by significant disruptions to the gas supply, water supply, or power delivery systems. Temporary closures can also be a result of significant damage to the plant due to various events (earthquake, fire, flood, equipment failures, etc.).

Permanent closure is a long-term permanent cessation of operations where there are no plans for re-commissioning the plant. A permanent plant closure could be due to significant damage that it deemed to be economically or physically beyond repair, due to plant age, unfavorable market conditions, etc.

Temporary closures can be divided into two categories: 1) closures due to the spill/release of hazardous materials, and 2) those not due to the spill/release of hazardous materials.

Temporary closures due to an actual spill/release or a threatened spill/release of hazardous materials will follow the Hazardous Material Business Plan developed for the Project site. The procedures outlined in the Hazardous Material Business Plan will include methods to control and contain the spill/release, proper response from trained plant personnel, notification of the proper authorities and the public, and clean up/mitigation procedures for the spill/release. After these steps are completed, the temporary closure of the plant will proceed as described below for a temporary closure NOT due to the spill/release of hazardous materials.

Temporary closures NOT due to the spill/release of hazardous materials can include closure caused by major equipment overhaul/replacement, by significant disruptions to the major utilities (gas, water, or power delivery systems), and by significant damage to the plant due to various events (earthquake, fire, flood, equipment failures, etc.). For these types of temporary closures, additional plant security will be added as needed. A plan will be implemented for proper cessation of operations. The plan will ensure conformance with applicable laws, ordinances, regulations, and standards (LORS) and ensure the protection of public health and safety and protection of the environment. Depending upon the length of the temporary closure and the expected ambient

temperatures, the plan may include draining of water based systems, draining of chemicals, nitrogen purge of equipment, and safe shutdown/lay-up of equipment. All water and chemicals drained will be disposed of in accordance with the applicable LORS.

Permanent closure could be due to significant damage that it deemed to be economically or physically beyond repair, due to plant age, due to unfavorable market conditions, etc. Although the plant is designed for a 30 year life, the actual life may be less than or more than 30 years depending upon many factors such as premature equipment failures, aging of equipment, level of maintenance performed, cost of maintenance and operation, fuel pricing, etc.

Permanent closure of the plant may range from abandoning in-place to removal of all equipment and systems from the site, dependent upon the conditions at that time and the intended future use of the site. Since this information is unknown and highly variable, a specific procedure/plan (decommissioning plan) will be developed and submitted to the California Energy Commission and the City of Riverside when the situation and timing becomes known. The plan will ensure conformance with applicable laws, ordinances, regulations, and standards (LORS) and ensure the protection of public health and safety and protection of the environment.

As a minimum, the decommissioning plan will contain the items outlined below.

- Proposed decommissioning activities for the plant, equipment, and systems associated with the plant.
- Conformance of the decommissioning plan to applicable LORS.
- Activities required to restore the site if the plan calls for removal of all equipment and systems.
- Alternatives for plant decommissioning other than complete site restoration.
- Estimated costs for the proposed decommissioning including the source of the funds to be used for decommissioning.

The decommissioning plan will encourage recycling of equipment and materials from the plant. If possible, unused chemicals and oils will be sold/given back to the suppliers or to other users. Used chemicals and oils, along with all hazardous and non-hazardous wastes will be collected and disposed of in accordance with applicable LORS in appropriate landfills or waste collection facilities if they can not be recycled. Equipment containing chemicals and oils will be drained and shut down to ensure public health and safety and to protect the environment. Site security will be maintained during the decommissioning period as needed.

Section 3
Energy Efficiency

3.1 Introduction

RERC Units 3&4 will utilize two General Electric (NxGen) LM6000 PC SPRINT combustion turbine generators operating in simple cycle. The LM6000 engine is an aeroderivative combustion turbine widely used in peaking power applications. It is designed for quick starting and achieving rated load within 10 minutes.

The LM6000 combustion turbine generators will be equipped with a natural gas fuel system that utilizes water injection to limit NO_x emissions. In addition, inter-stage compressor cooling sprays (SPRINT) will be used to enhance the output. An inlet air mechanical chiller package will provide cool air to the turbine inlet allowing nearly full output to be achieved even on hot days. The LM6000 PC SPRINT can achieve high fuel utilization of 8,929 Btu/kWHr (LHV) or an efficiency of 38.2 percent at full load operation after accounting for the plant auxiliary power consumption.

Though the plant is expected to operate at full load, RERC Units 3&4 will also be designed for part load and cycling duty capabilities. While part load operation will result in slightly lower efficiencies, the LM6000 is equipped with inlet guide vanes to reduce the loss in efficiency during part load operation.

Section 4
Transmission Line Safety and Nuisance

4.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on approximately 2.2-acres of a 16-acre fenced site within the City of Riverside, California. The proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the Project will be exported outside of the City.

This analysis is intended to evaluate the potential for Project impacts during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting transmission line safety and nuisance.

4.2 Project Description

The proposed project is owned by the City of Riverside and is located adjacent to the City of Riverside's existing RERC Units 1&2 and the Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. The Project will consist of two additional aero-derivative combustion turbine generators with Emission Control Modules (ECM), an on-site substation switchyard expansion, and on-site scheduling and dispatch building and water laboratory. RERC Units 3&4 and associated buildings will occupy approximately 2.2 acres with an additional 2 acres reserved for construction laydown. The entire plant perimeter will be fenced with a combination of chain-link fencing and architectural block walls. No transmission lines are required to provide interconnection for RERC Units 3&4.

4.3 Connection to RPU Sub-Transmission Network

The electrical generators for RERC Units 3&4 will be connected to the 69kV Riverside Public Utilities sub-transmission network. The electrical energy will be generated at 13.8kV and stepped up to 69kV by two (2) generator step-up (GSU) transformers, one to be located in the immediate vicinity of each generating unit. The GSU transformers will be provided with primary zones of protection that will include current differential protection around the GSU transformers with ground fault protection provided by the same relay and connected to the neutral bushings of the each GSU transformers. A secondary zone of protection will consist of current differential protection including the 13.8kV GSU transformer breakers, GSU transformers and associated 69kV underground transmission cables.

Each GSU transformer will be connected to separate line terminals at two (2) new breaker-and-a-half bays added to on the east side of the existing RERC Units 1&2 switchyard. Breaker failure protection, synchronization capabilities and secondary overcurrent protection for the 69kV underground cables will be provided by a single relay for each new line position. The RERC Units 1&2 transmission interconnects will be separable from the RERC Units 3&4 transmission interconnects via a 69kV tie breaker.

The interconnection from RERC Units 3&4 GSUs to the switchyard will be via 69kV underground transmission cables. Primary protection for the 69kV underground transmission cables consist of current differential protection including the 13.8kV GSU transformer breakers, GSU transformers, and associated 69kV underground transmission cables. Secondary protection for the 69kV underground transmission cable will consist of overcurrent protection supplied on the switchyard end of the cable where the generation connects to the Riverside Public Utilities 69kV sub-transmission system. The 69kV cables will be run through an underground bus duct consisting of conduits and concrete enclosures. The enclosures will be designed to provide heat transfer that will maintain the cabling within design parameters based on the measured thermal conductivity of the site soils.

Metering for the new generating units will consist of (2) two sets of revenue accuracy meters for each new generating unit and will be located in the switchyard and associated with the new line positions. One set of meters will be used for CAISO metering and will be designed and constructed per CAISO guidelines. The second set of meters will be a multifunction meter used by Riverside Public Utilities for recording energy to the RPU grid in support of revenue and system operations.

4.4 Laws, Ordinances, Regulations and Standards

LORS are not applicable for this section.

4.5 Environmental Consequences

None noted for the Project. No mitigation is proposed.

Section 5
Transmission System Engineering

5.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own and operate two additional simple-cycle combustion turbine generators (CTG) with a nominal capacity of 95-megawatt (MW) on the 16-acre Riverside Energy Resource Center (RERC). The new RERC generators will help supply the internal needs of the City of Riverside primarily during summer peak electrical demands as well as helping serve the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from RERC will be exported outside of the City.

This section describes electric transmission system engineering associated with RERC Units 3&4. Section 5.2 covers laws, ordinances, regulations and standards (LORS) associated with the Project. Section 5.3 covers subtransmission facilities. Section 5.4 addresses subtransmission interconnection engineering. Section 4 covers transmission line safety and nuisance.

5.2 Project Description

The existing 16 acre RERC site is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 3&4 will consist of two aero-derivative combustion turbine generators with Emissions Control Modules (ECM) and associated equipment, expansion of the on-site switchyard, a dispatch and scheduling building, and a water laboratory. RERC Units 1&2 along with ancillary buildings and equipment occupy approximately 8 acres of the site. RERC Units 3&4 along with associated items will occupy approximately 2.2 acres with an additional 2 acres reserved for construction laydown. The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls.

5.3 Laws, Ordinances, Regulations and Standards

This section describes LORS that apply to the proposed electric subtransmission system as well as line safety and nuisance issues.

5.3.1 Federal

There are no federal LORS related to the electric subtransmission system.

5.3.2 State

Design and Construction

LORS associated with design and construction of the proposed RERC electric subtransmission system are listed in Table 5.3-1.

Table 5.3-1 Design and Construction LORS

LORS	Applicability
Title 8 CCR, Section 2700, "High Voltage Electrical Safety Orders"	Defines minimum requirements and standards for installation, operation and maintenance of electrical facilities to provide practical safety and freedom from danger.
ANSI/IEEE, "Recommended Practices for Seismic Design of Substations"	Provides recommended guidelines for substation design to prevent damage and to minimize the effects related to seismic events.
IEEE 1119, "Guide for Fence Safety Clearances in Electric Supply Stations"	Defines minimum clearances from electrical equipment to perimeter fences to protect persons outside of the station from electrical shock.
IEEE 998, "Direct Lightning Strike Shielding of Substations"	Provides guidelines for substation design to protect stations from direct lightning strikes.
IEEE 980, "Containment of Oil Spills for Substations	Provides recommendations to prevent the release of substation equipment oil into the environment.
General Order 95/128, "Rules for Overhead Line Construction"	Provides requirements for electrical overhead construction in California.
ANSI – American National Standards Institute CCR – California Code of Regulation IEEE – Institute of Electrical and Electronic Engineers	

5.3.3 Local LORS

No local LORS related to the transmission system engineering or transmission line safety and nuisance.

5.4 Subtransmission Facilities

5.4.1 69kV Transmission Lines

RERC Units 3&4 will serve the RPU system through the existing RERC switchyard and its connections with two existing 69kV transmission lines. Those two existing lines are the RERC to Mountain View Substation line and the RERC to Riverside Substation line. Both Mountain View and Riverside Substations are owned and operated by RPU. No outside utilities are involved. All new 69kV cabling will be within the RERC plant boundaries.

RPU has filed an integrated application with Southern California Edison that addresses both the addition RERC Units 3&4 and the RTRP.

5.4.2 RERC Switchyard

The step up transformers (GSUs) will be located near the power, each one next to the generating unit it serves. The additional bays in the RERC high voltage switchyard shall be comprised of 69kV bus work, switches, arresters, insulators, interrupting devices, instrument transformers and associated galvanized steel structures. All insulators and bushings shall be ANSI 70 gray.

The upgrades at the 69kV switchyard will be comprised of two full breaker-and-a-half bays consisting of six breakers accommodating the (2) two additional 69kV generator positions and two 69kV line positions. The completed layout for all four units will consist of four bays of breaker-and-a-half with a main north bus and main south bus.

5.5 Subtransmission Interconnection Engineering

5.5.1 Load Flow

The RERC facility is connected to the RPU system via two 69 kV transmission lines. One line is connected to Mountain View Substation and has a normal rating of 114 MW. The other line is connected to Riverside Substation and has a normal rating of 97 MW. The RPU system was studied under peak load conditions of 682 MW with RERC generating its maximum output (191 MW).

The load flow analysis was performed for the base case system, as well as for N-1 conditions. No N-2 conditions were analyzed. The N-1 cases systematically took each 69kV and 33kV transmission line out of service individually. All of these existing system N-1 cases were run at maximum loading levels, with RERC generation all off-line, RERC at present generation levels (RERC Units 1&2 only), and with RERC at maximum generation levels (all four units on-line). The mitigated system N-1 cases were only run at maximum loading levels with all four RERC generators on-line, as this caused the worst case loading on the existing system. A total of 81 cases were run for the existing system, and another 54 cases were run for the mitigated system.

The established criterion used by Riverside for N-1 outages is for a maximum allowable line loading of 110%, with a maximum allowable line loading of 100% for normal system operations. Any line loadings above 125% of nominal will require load shedding.

Under peak loading conditions without any generation at RERC there are sixteen single contingency (N-1) outages that lead to 33 violations of the City's 110% line loading criteria. Under peak system loading with the existing RERC generation on line there are 13 N-1 outages leading to 16 violations of the City's criteria.

The addition of RERC Units 3 & 4 with the RERC switchyard tie breaker open drops the number of N-1 outages leading to violations from 13 to 6, and the number of violations from 16 to 7. Thus while overloads remain, the addition of RERC 3&4 does improve the system condition.

Elimination of all overloads is not possible without implementation of the RTRP. To

mitigate the overloads, RPU will take operator action to shed load as needed to preclude sustained operation in an overloaded condition. RPU has in place a load shedding plan of action which will be used to ensure that system stability and reliability is not compromised. The area(s) which will be affected by the load shedding will be determined on an as needed basis and determined by the N-1 outage which is occurring, system configuration at the time of the outage, and substation loading.

The RPU 69kV electrical system was also studied under minimum loading conditions of 341 MW. Line loading for base case and contingency cases was less than 100% of the nominal conductor rating for this system load condition.

5.5.2 Short Circuit Study

A short-circuit analysis was performed to determine if the addition of RERC Units 3&4 would increase the system fault currents enough to cause any breakers to be operated beyond their interrupting limits. The study modeled the existing system with the addition of 95 MW from RERC Units 3 & 4 and the tie breaker open between the RERC Units 1&2 and RERC Units 3&4 portions of the switchyard.

Using substation configuration drawings and specific breaker rating information, a breaker rating analysis was performed using ASPEN software. This analysis is an automated process within the computer program. Once the individual breaker configuration and interrupting information is added to the model the software performs a series of faults. These faults include the normal system configuration, and also simulated faults with appropriate branch outages to find maximum short-circuit currents that flow through each breaker. The software then computes the ANSI X/R ratio and adjusts the short-circuit current accordingly. Finally, it compares the currents to the rated capabilities of the breakers and reports the findings. Any breakers which have ratings below the short circuit currents seen are flagged. The program logic adheres to ANSI/IEEE standards for total-current related and symmetric-current rated breakers.

Recognizing that the Riverside Transmission Reliability Project (RTRP) is also proceeding in parallel and independently of RERC Units 3&4, consideration was also given to the amount of generation that could ultimately be placed at RERC. This was done so that the new RERC Units 3&4 switchyard breakers were procured with adequate capacity to accommodate potential future growth. Similarly, if other breakers were going to need to be replaced due to the addition of RERC Units 3&4, they too could be procured with adequate capacity to accommodate potential future growth. The incremental cost to do so is small and avoids having to replace the breakers in the future if or when that expansion occurs. As a result, the short circuit study included a fifth 50 MW generator at RERC[1].

The analysis determined that there are six breakers which will require replacement. The

[1] For the RTRP RERC ultimate build out sensitivity case a pair of 2x1 combined cycle plants was considered with each having a 25 MW steam turbine. As this was a sensitivity study only, the two 25 MW steam turbines were lumped into one 50 MW turbine. The sensitivity study looked only at fault duties and did not evaluate load flows as a means of quickly understanding where overloads might occur.

existing RERC Units 1&2 breakers are adequate for the addition of RERC Units 3&4 (refer to Table 5.5-1 below).

Table 5.5-1 Breaker Repla

-cement Requirements

Breaker ID	**Rating**	**Predicted Fault Duty**
Alumax Substation		
Fuse	Note 1	20,408.1 A
Freeman Substation		
FRMAN A4-9	12,600 A	20,382.9 A
FRMAN W2-1	12,600 A	20,382.9 A
FRMAN W2-13	12,600 A	20,382.9 A
Hunter Substation		
HUNTER A8-4	19,000 A	20,575.7 A
Harvey Linn Substation		
LYNN W2-7	12,600 A	16,598.4 A

Note 1: It should be noted that at the Alumax Substation a 20,000 A fuse rating was used for the 69kV fuse. RPU will verify the interrupt rating with the manufacturer or replace the fuse with a different model if the interrupt rating is less than 20,000 A.

Section 6
Environmental Considerations

6.1 Air Quality

6.1.1 Introduction

RPU operates RERC, a nominal 96-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. RPU developed, built, owns and operates the facility. RERC supplies the internal needs of the City of Riverside during summer peak electrical demands and will also serve the city's minimum emergency loads in the event RPU is islanded from the external transmission system. RPU proposes to add another 95 MW capacity through the construction of two LM6000 turbines located on a pad within the existing RERC facility. This pad covers approximately 2.2 acres. Total disturbed area during construction is likely to be approximately 5 acres.

This portion of the report describes existing air quality conditions, maximum potential impacts from RERC, and the mitigation measures that keep these impacts below thresholds of significance. Sections 6.1.2 through 6.1.6 provide a foundation for determining what environmental standards the project must meet. Section 6.1.2 presents the air quality setting, including geography, topography, climate and meteorology. Section 6.1.3 provides an overview of ambient air quality standards that must be maintained. Section 6.1.4 discusses air quality in the vicinity of the proposed project. The affected environment and regulatory framework are analyzed in Section 6.1.5 and 6.1.6.

Section 6.1.7 discusses the environmental consequences of emissions from the project and describes the procedures used in assessing facility emissions and air quality impacts. Section 6.1.8 provides a similar discussion relative to facility construction activities and mitigation measures for construction and operating phases of the project.

Section 6.1.9 includes air quality impact analyses for both the construction and operating phases of the project. Numerous analysis results are presented to facilitate an understanding of project impacts under various operating scenarios. Section 6.1.10 provides an overview of screening level health risk assessments that were conducted to determine health impacts that may be attributed to construction and operation of the facility.

Section 6.1.11 provides an overview of conformity with federal, state and local air quality regulations. Section 6.1.12 concludes that the impacts from the proposed project can be mitigated to levels below significance. Section 6.1.13 includes a list of references used to support the analyses and findings contained in this report.

6.1.1.1 Project Description

RERC is owned by RPU and is located adjacent to the City of Riverside Regional Water Quality Control Plant (RRWQCP) in an area that includes light industrial/manufacturing facilities. RERC currently consists of two aero-derivative combustion turbine generators with SCRs, natural gas and water supply interconnections, and administrative /maintenance buildings. This project will add two additional turbines to the existing facility and these turbines will be identical to those currently installed units. The new turbines and associated structures will occupy approximately 2.2 of 16 total acres. The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls.

Various measures will be implemented to reduce environmental impacts from construction activities. Contractors will be required to utilize certified nonroad engines in construction equipment to the extent practical. Utilization of nonroad engines will reduce NO_X emissions and localized ambient concentrations of NO_2. Ultra-low sulfur fuel will be used to fuel construction equipment. This will help to minimize diesel particulate emissions and related health impacts.

Construction activities, especially earthmoving operations, can result in emissions of fugitive particulate matter (PM_{10} and $PM_{2.5}$). Contractors will minimize potential fugitive particulate emissions by periodically applying water to disturbed areas and stockpiles. Water will also be applied to critical operations such as scraping, loading and unloading of soil. Because the site is already partially developed, all roads to the construction site are paved. Paved roads leading to the site will be swept periodically to remove deposited soils. To further reduce paved road dust emissions, truck tires that may be laden with soil will be washed before exiting the project, and truck beds carrying soil will be covered to prevent soil from being transported to roadways and dispersed to the atmosphere from other vehicles. Earthmoving operations will be curtailed during periods of high wind. The measures taken to reduce emissions during construction activities are consistent with industry management practices, SCAQMD Rule 403 and CEC policies.

Technology will also be implemented to reduce emissions during RERC Units 3&4 operations. The combustion turbines will burn natural gas to reduce emissions of both criteria and toxic pollutants. State-of-art combustion technology will also promote fuel efficiency and reduce emission rates of various pollutants. Selective catalytic reduction technology will be installed to further reduce NO_X emissions, and an oxidization catalyst will be installed to reduce CO emissions from the combustion turbines. The oxidization catalyst will also reduce emissions of toxic organic compounds and also of ozone-forming reactive organic compounds. Makeup water used in the cooling tower will be treated to remove minerals that could become airborne. Mist eliminators will also be installed on the cooling tower to prevent the transport of toxic compounds and particulate emissions.

Criteria pollutant emissions resulting from facility operations will be mitigated through several offset programs. NOX emissions will be fully offset through the purchase of RECLAIM trading credits (RTCs). PM10 emissions will be fully offset through the purchase of offset credits from the SCAQMD Priority Reserve. Construction activities, other than earthmoving operations, cannot occur until after the SCAQMD issues its construction permit and

SCAQMD cannot issue the construction permit until after PM10 offsets are removed from the Priority Reserve. In effect, PM10 offsets used to mitigate facility operations will indirectly mitigate a good portion of emissions from construction activities. The PM10 offset strategy will also ensure that PM2.5 emission increases due to facility operations are also fully mitigated. Emissions of ROG and SOX will be mitigated by allocating offsets that are held by SCAQMD to support its offset exemption program for small sources.

The proposed mitigation measures are integral to the construction and operation of the proposed Project and are discussed in more detail throughout section 6.1. They serve to ensure that the proposed project will not result in air quality impacts that exceed established thresholds of significance.

6.1.2 Air Quality Setting

6.1.2.1 Geography and Topography

The Project site is at an elevation of approximately 724 feet above sea level. Bluffs exist north of the project across the Santa Ana River. Flat terrain extends for many miles to the south and west of the project site.

6.1.2.2 Climate and Meteorology

Hot summers, mild winters, and small amounts of precipitation characterize the climate in the Riverside area. The major climatic controls in Riverside are the mountains on three sides of the region and the semi-permanent Pacific High pressure system over the eastern Pacific Ocean.

In the summer months (June, July and August), daily high temperatures at Riverside average 92ºF. Lows, during the summer, average 62ºF. In winter, average lows are about 42ºF, and average highs are approximately 68ºF.

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and the local meteorological conditions. In the air basin surrounding the project area, stable atmospheric conditions and light winds can produce conditions in which air pollutants accumulate. Winds in the region generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

6.1.3 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (U.S. EPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{1O}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with air pollution levels above these standards are considered "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

The California Air Resources Board (CARB) has also established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{1O}, $PM_{2.5}$, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

National and State air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging period over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and in some cases, damage to paint and other materials. Averaging periods are based upon whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short period (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours or 1 month). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 6.1-1 presents the NAAQS and California ambient air quality standards for selected pollutants. California standards are generally set at concentrations that are more stringent than federal standards, and in some cases have shorter averaging periods.

Promulgated in September of 2006 and effective on December 17, 2006, Federal ambient air quality standards for Ozone were upheld. A one-hour ozone standard of 0.12 ppm is coupled with an eight-hour average standard of 0.08 ppm. Compliance with this standard is based upon the three-year average of the annual fourth highest daily maximum eight-hour average concentration measured at each monitoring station. On June 15, 2005, the 1-hour standard for ozone was revoked for all areas except those listed in 40 CFR, Part 81, Subpart C. The City of Riverside is not included in the list and is currently only subject to the 8-hour ozone standard at the Federal level.

The California Air Resources Board has also adopted regulations implementing ozone standards. One-hour state ozone standards have remained at 0.09 ppm while a new 8-hour standard of 0.07 ppm was approved on May 17, 2006, providing more stringent regulation of ozone concentrations with respect to the Federal standard.

In addition to ozone, state nitrogen dioxide standards have been revised. On February 23, 2007, a reduction of the nitrogen dioxide 1-hour average standard to 0.18 ppm (from 0.25 ppm) as well as implementation of a new annual average standard (based on the annual arithmetic mean) of 0.030 ppm was approved by CARB. The Office of Administrative Law (OAL) approved the changes made to the nitrogen dioxide standard, on February 19, 2008.

The NAAQS promulgated in 2006 also modified the PM_{10} and $PM_{2.5}$ standards. Compliance with the 24-hour PM_{l0} standard will still be based on the 99th percentile of 24-hour concentrations at each monitoring station. The Federal standard for the annual arithmetic mean of PM_{10} concentrations has been revoked due to lack of evidence linking health problems with long-term exposure to coarse particle pollution.

$PM_{2.5}$ standards were also revised in December of 2006. The previous NAAQS (1997) designated a $PM_{2.5}$ standard of 15 µg/m^3, based on the three-year average of annual arithmetic means from single or multiple monitors. This standard has been retained in the current NAAQS (2006) and supplemented with a new, more stringent 24-hour average $PM_{2.5}$ standard of 35 µg/m^3.

California has also implemented PM_{10} and $PM_{2.5}$ standards. On June 5, 2003, the California annual average PM_{10} standard was adjusted to 20 µg/m^3, and a new annual average $PM_{2.5}$ standard of 12 µg/m^3 was put in place. No separate state standard exists for 24-hour average $PM_{2.5}$ levels from the Federal standard.

Table 6.1-1 Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	**1-hour** **8-hour**	0.09 ppm 0.07 ppm	REVOKED 0.08 ppm
Carbon monoxide	**1-hour** **8-hour**	20 ppm 9 ppm	35 ppm 9 ppm
Nitrogen dioxide	**1-hour** **Annual average**	0.18 ppm 0.03 ppm	- 0.0534 ppm
Sulfur dioxide	**1-hour** **3-hour** **24-hour** **Annual average**	0.25 ppm - 0.04 ppm -	- 0.5 ppm 0.14 ppm 0.03 ppm
Suspended particulate matter (PM_{10})	**24-hour** **Annual arithmetic mean**	50 µg/m^3 20 µg/m^3	150 µg/m^3 REVOKED
Suspended particulate matter ($PM_{2.5}$)	**24-hour** **Annual arithmetic mean**	- 12 µg/m^3	35 µg/m^3 15 µg/m^3 (3yr avg.)
Particulate sulfate	**24-hours**	25 µg/m^3	-
Lead	**30 days** **Calendar quarter**	1.5 µg/m^3 -	- 1.5 µg/m^3
Hydrogen sulfide	**1-hour**	0.03 ppm	-
Vinyl chloride	**24-hour**	0.01 ppm	-
Visibility reducing particles	**8-hour (10am to 6pm PST)**	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	-

6.1.4 Existing Air Quality

Data gathered at ambient air monitoring stations, compiled by CARB and SCAQMD, were used to characterize air quality at the RERC site. The closest comprehensive monitoring station is located 3.35 miles northeast of the project at 5888 Mission Boulevard, in Rubidoux. This station monitors ozone, CO, NO_2, PM_{10}, $PM_{2.5}$, lead, SO_2 and sulfates. Data from other nearby ambient stations are used to complement this data for certain pollutants. Additional meteorological stations exist at 7002 Magnolia Avenue, in Riverside, and 5130 Poinsettia Place, in Mira Loma. These stations are located 3.17 miles to the southeast and 3.25 miles to the northwest of the proposed project site, respectively.

6.1.4.1 Ozone

Ozone is an end product of complex reactions between VOCs and NO_x in the presence of intense ultraviolet radiation. VOCs and NO_x emissions from millions of vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight result in high ozone concentrations. For purposes of state and federal air quality planning, the South Coast Air Basin is a non-attainment area for ozone.

Maximum ozone concentrations at the Mission Boulevard monitoring station in Rubidoux are recorded throughout the year. Table 6.1-2 shows the annual maximum hourly ozone levels recorded at this station during the period from 1997-2007 (2007 data may be preliminary), as well as the number of days in which the state and federal standards were exceeded. The data shows that the state ozone air quality standard is frequently exceeded. In 1998, the highest 1-hour average was recorded at 0.195 ppm ozone. In 2003, the ozone 1-hour average was recorded at 0.169 ppm, dropping to 0.141ppm the following year. From 2004 until 2006 the 1-hour average increased steadily, peaking at 0.151 ppm (2006). The data for 2007 indicates a reduction in the 1-hour average to 0.131 ppm, the lowest in the past decade. The high 8-hour concentration was recorded in 1998 at 0.169 ppm, but has since decreased steadily. Preliminary data for 2007 indicate a high 8-hour reading of 0.111 ppm. In 2007 the state 8-hour standard was exceeded on 69 days and the state 1-hour standard was exceeded on 31 days. The federal 8-hour standard was exceeded on 17 days.

Table 6.1-2 Ambient Ozone Levels (ppm) Riverside, California 1997-2007

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007*
Highest 1-hour average	0.187	0.195	0.142	0.140	0.143	0.155	0.169	0.141	0.144	0.151	0.131
Highest 8-hour average	0.129	0.169	0.110	0.112	0.119	0.124	0.140	0.114	0.129	0.117	0.111
Number of days exceeding											
State standard (0.09 ppm, 1-hr)	89	70	38	42	41	56	80	59	46	45	31
State standard (0.07 ppm, 8-hr)	100	86	66	71	64	94	98	87	83	75	69
Federal standard (0.12 ppm, 1-hour)	13	32	3	3	7	12	18	8	3	8	**
Federal standard (0.08 ppm, 8-hr)	52	57	22	26	33	35	62	35	32	30	17

Source: 1997-2006 California Air Resources Board Trends Summary (Riverside-Rubidoux station), 2007 CARB AQMIS2. *Data is preliminary. **The federal 1-hr standard has been revoked.

6.1.4.2 Nitrogen Dioxide

Atmospheric NO_2 is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. For purposes of state and federal air quality planning, the South Coast Air Basin is in attainment for NO_2.

Table 6.1-3 shows the local annual maximum one-hour NO_2 levels recorded from 1997 through 2006 (2007 data are insufficient), as well as the annual average level for each of those years. During this period, there have been no violations of the state 1-hour average standard of 0.25 ppm, nor have any violations occurred with respect to the federal annual average standard (0.0534 ppm). Recorded data also indicate ongoing compliance with the proposed state 1-hour and annual standards. NO_2 levels peaked in 2001, reaching 0.15 ppm for the highest 1-hour average. Since 2001 these levels have been receding in general.

Recently, CARB decreased the 1-hour NO_2 ambient air quality standard from 0.25 ppm to 0.18 ppm and adopted a state standard for the annual average of 0.03 ppm. None of the recorded average values in the last decade from the Mission Boulevard monitoring station have exceeded the newly adopted state standards.

Table 6.1-3 Ambient Nitrogen Dioxide Levels (ppm) Riverside, California 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 1-hour average	0.122	0.099	0.013	0.094	0.15	0.098	0.099	0.092	0.077	0.076
Annual average	0.026	0.022	0.025	0.022	0.024	0.023	0.021	0.017	0.022	0.020
Number of exceedances										
State standard (day) (0.18 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal/ State standard (annual) (Fed. 0.053 ppm) (State 0.03 ppm)	0/0	0/0	0/0	0/0	0/0	0/0	0/0	*	*	*

Source: 1997 –2006 California Air Resources Board Top 4 Summary (Riverside-Rubidoux station)
*Data not published, basin declared in attainment.

6.1.4.3 Carbon Monoxide

CO is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Industrial sources typically contribute less than ten percent of ambient CO levels. Peak CO levels typically occur during winter months, due to a combination of higher emission rates and stagnant weather conditions. For purposes of state and federal air quality planning, the South Coast Air Basin is classified as being in attainment for CO.

Table 6.1-4 shows the California and federal air quality standards for CO, and the maximum 1-hour and 8-hour average levels recorded at the Mission Boulevard, Rubidoux and Magnolia Avenue, Riverside monitoring stations during the period from 1997 to 2006 (2007 data are insufficient). The state standards for this pollutant have been the same since 1982 (retained in 1989). Trends of maximum 8-hour and 1-hour average CO indicate that ambient CO levels at Mission Boulevard and Magnolia Avenue have consistently been below state and federal standards, decreasing almost every year since 1997 during which the highest 8-hour average of the last decade was recorded (5.58 ppm).

Table 6.1-4 Ambient Carbon Monoxide Levels (ppm) Riverside, California 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 8-hour average (*Mission Blvd.*)	5.58	4.78	4.43	4.15	3.49	3.09	3.67	2.97	2.50	2.29
Highest 8-hour average (*Magnolia Ave.*)	5.48	4.57	4.10	4.23	4.48	3.75	3.33	2.15	2.39	2.38
Highest 1-hour average (*Mission Blvd.*)	7	5	7	5	5	8	5	4	3	3
Highest 1-hour average (*Magnolia Ave.*)	11	6	7	9	6	7	5	4	4	4
Number of days exceeding										
State standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0
Federal standard (35 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal standard (9 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0

Source: 1997-2006 California Air Resources Board Top 4 Summary; SCAQMD Current Air Quality and Trends. (Riverside-Rubidoux; Riverside-Magnolia stations)

6.1.4.4 Sulfur Dioxide

SO_2 is produced when sulfur-containing fuel is burned. Chemical plants that treat or refine sulfur or sulfur-containing chemicals also emit the pollutant. Natural gas contains negligible amounts of sulfur, while fuel oils contain larger amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The South Coast Air Basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 6.1-5 presents the state and federal air quality standards for SO_2 and the maximum levels recorded at the Mission Blvd. air monitoring station between 1997 and 2006 (2007 data are insufficient). Maximum 1-hour average and 24-hour average readings have been

well below the state standard during this period. The federal annual average standard is 0.03 ppm; annual average SO_2 levels at this site also have been below the federal standard. Table 6.1.5 shows that the maximum SO_2 levels generally have been well below the state standard for several years. The highest 1-hour and 24-hour average peaked in 2000 (0.11 ppm and 0.038 ppm, respectively). These values can be considered outliers, and do not reflect a general trend. The average annual standard has remained fairly consistent over the last ten years, peaking in 2004 and 2005 at a value of 0.003 ppm.

Table 6.1-5 Ambient Sulfur Dioxide Levels (ppm) Riverside, California 1997-2006

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Highest 1-hour average	0.03	0.02	0.02	0.11	0.02	0.02	0.02	0.02	0.02	0.01
Highest 24-hour average	0.005	0.009	0.012	0.038	0.009	0.003	0.012	0.015	0.011	0.003
Annual average (Federal standard, 0.03 ppm)	0.001	0.001	0.002	0.001	0.001	*	0.002	0.003	0.003	0.001
Number of days exceeding										
State standard (0.25 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State standard (0.045ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal standard (0.5 ppm, 3-hr)	0	0	0	0	0	0	0	0	0	0
Federal standard (0.14 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: 1997 – 2006: SCAQMD (One Hour); CARB: Top 4 Summary (24 Hour & Annual Averages), (Riverside-Rubidoux station); * Insufficient data.

6.1.4.5 Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. The South Coast Air Basin is in attainment for the state standard for sulfates. There is no federal standard for sulfates. Table 6.1-6 presents maximum 24-hour average sulfate levels recorded at the Mission Boulevard and Magnolia Avenue monitoring stations for the period 1997-2006 (2007 data are insufficient). In 1997 the highest 24-hour average for ambient particulate sulfates at the Mission Boulevard monitoring station was recorded to be 13.1 $\mu g/m^3$. Since then, ambient levels of the pollutant have been fairly stable but decreased with respect to the 1997 average. The recorded values for the Magnolia Avenue monitoring station exhibit the same general trend with a brief peak in ambient particulate sulfate levels in 1998 (12.8 $\mu g/m^3$). The state ambient standards for particulate sulfates have not been exceeded between 1997 and 2006.

Table 6.1-6 Ambient Particulate Sulfate Levels (μg/m3) Riverside, California 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 24-hour average (*Mission Blvd.*)	13.1	10.1	10.7	11.0	10.7	11.7	10.1	9.8	10.3	10.8
Highest 24-hour average (*Magnolia Ave.*)	10.4	12.8	10.6	10.2	9.2	10.5	10.0	9.1	10.3	9.9
Number of days exceeding state standard (25 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0	0	0	0

Source: 1997-2006 SCAQMD Annual Summary (Riverside-Rubidoux, Riverside- Magnolia stations)

6.1.4.6 Fine Particulates (PM10 and PM2.5)

Particulates in the air are caused by a combination of wind-blown fugitive dust, particles emitted from combustion sources (usually carbon particles), and organic, sulfate, and nitrate aerosols formed in the atmosphere from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In the South Coast Air Basin, there is a strong seasonal variation in particulate matter, with higher PM_{10} and $PM_{2.5}$ concentrations in the fall and winter months.

In 1984, CARB adopted standards for fine particulates (PM_{10}), and phased out the total suspended particulate (TSP) standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of inhalable particulates related to human health. In 1987, U.S. EPA also replaced national TSP standards with PM_{10} standards. For air quality planning purposes, the South Coast Air Basin is considered to be in non-attainment of both federal and state PM_{10} standards. As discussed in Section 6.1.3, U.S. EPA issued new PM_{10} and $PM_{2.5}$ emission standards twice since then, the most recent change having an effective date of December 17, 2006.

Table 6.1-7 shows the current federal and state air quality standards for $PM_{10,}$ maximum levels and arithmetic annual averages recorded at the Mission Boulevard and Poinsettia Place ambient stations from 1997 through 2006 (2007 data are insufficient). Maximum 24-hour PM_{10} levels at Mission Boulevard regularly exceed the state standards, but have exceeded the federal standard only three times since 1997. A downward trend can be seen at the Mission Boulevard monitoring station with an exception in 2003. This exception may be attributed to the fires in the San Bernardino Mountains in October of 2003, the smoke from which covered parts of the South Coast Air Basin, and resulted in higher levels of pollutants. The annual arithmetic mean at the Mission station has decreased since 1999, but has seen a slight deviation from the downward trend in 2006. Generally, the levels of PM_{10} at the Poinsettia Place station were higher than those measured at Mission Boulevard in the single year of available data. However, the number of measurements exceeding the state standard of 50 $\mu g/m^3$ was fewer at Poinsettia Place.

Table 6.1-7 Ambient PM10 Levels (µg/m3) Riverside, California 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest 24-hour average (*Mission Blvd.*)	163	116	153	139	136	130	164	137	123	109
Highest 24-hour average (*Poinsettia*)	*	*	*	*	*	*	*	*	*	124
Annual arithmetic mean (*Mission Blvd.*)	65.6	58.7	72.2	60.1	63.1	58.5	56.9	55.5	52.0	54.4
Annual arithmetic mean (*Poinsettia*)	*	*	*	*	*	*	*	*	*	64.0
Number of days exceeding										
State standard (*Mission/Poinsettia*) (50 µg/m^3, 24-hour)	41/*	42/*	46/*	68/*	78/*	81/*	62/*	72/*	69/*	71/41
Federal standard (*Mission/Poinsettia*) (150 µg/m^3, 24-hour)	1/*	0/*	0/*	0/*	0/*	0/*	2/*	0/*	0/*	0/0

Source: 1997-1999: CARB Top Four Summary.
2000-2006: SCAQMD Annual Air Quality Trends.
*No data.

In 1998, CARB and local air pollution control districts and air quality management districts began establishing a comprehensive network of $PM_{2.5}$ monitoring sites. Table 6.1-8 shows the federal air quality standards for $PM_{2.5}$ and maximum levels recorded at the Mission Boulevard, Magnolia Avenue and Poinsettia Place monitoring stations during 1999-2006. With respect to the Federal 24-hour standard, the number of exceedances at the Mission and Magnolia stations increased until 2001. This number has decreased steadily since, with only one recorded exceedance in 2006 between all three stations. $PM_{2.5}$ is measured only once every three days so expected daily exceedences can be three times the number of measured exceedences.

Table 6.1-8 Ambient PM2.5 Levels (µg/m3) Riverside, California 1999-2006

	1999	2000	2001	2002	2003	2004	2005	2006
Highest 24-hour average (*Mission Blvd.*)	111.2	119.6	98	77.6	104.3	91.7	98.7	68.5
Highest 24-hour average (*Magnolia Ave.*)	89.9	79.3	74.9	75.5	73.3	93.8	95.0	55.3
Highest 24-hour average (*Poinsettia Pl.*)	*	*	*	*	*	*	*	63.0
Annual Arithmetic mean (*Mission Blvd.*) (State standard = 12 µg/m^3; Federal standard = 15 µg/m^3)	31	28.2	31.1	27.5	24.9	22.1	21	19.0
Annual Arithmetic mean (*Magnolia Ave.*) (State standard = 12 µg/m^3; Federal standard = 15 µg/m^3)	26.7	25.5	28.3	27.1	22.6	20.8	18.0	17.0
Annual Arithmetic mean (*Poinsettia Pl.*) (State standard = 12 µg/m^3; Federal standard = 15 µg/m^3)	*	*	*	*	*	*	*	20.6
Number of measured samples exceeding Federal standard. (*Mission/Magnolia/Poinsettia*) (35 µg/m^3, 24-hour)	9/2/*	11/5/*	17/4/*	8/2/*	8/1/*	5/2/*	4/1/*	1/0/0

Source: 1999: California Air Resources Board Top 4 Summary.
2000-2006: SCAQMD Air Quality Data Tables.
Exceedance data for 1999-2002 based on the old standard of 65 µg/m^3.
*No Data

6.1.4.7 Airborne Lead

The majority of lead in the air results from the combustion of fuels that contain lead. Until 25 years ago, motor gasoline contained relatively large amounts of lead compounds used as octane-rating enhancers, resulting in relatively high ambient lead levels. Beginning with the 1975 model-year, however, manufacturers began to equip new automobiles with exhaust catalysts, which are poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing percentage of new vehicles, and the phase out of leaded gasoline began. As a result, ambient lead levels decreased dramatically, and California air basins, including the South Coast Air Basin, have been in attainment of state and federal airborne lead standards for air quality planning purposes for approximately 10 years. Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, CARB identified lead as a toxic air contaminant in 1997. The standard level is 1.5 µg/m3, measured on a 30-day average for the state level, and a calendar quarter for the federal level.

Table 6.1-9 summarizes airborne lead levels recorded at the Mission Boulevard monitoring station since 1997 (2007 data are insufficient). This table indicates that airborne lead levels have been well below the ambient air quality standard of 1.5 µg/m^3 for the period 1997 through 2006, peaking in 1998 at 0.08 µg/m^3 and decreasing each year since.

Table 6.1-9 Ambient Lead Levels (µg/m3) Riverside, California 1997-2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Highest monthly value	0.07	0.08	0.06	0.06	0.04	0.03	0.02	0.02	0.02	0.01
Highest quarterly average	0.04	0.04	0.05	0.05	0.03	0.02	0.02	0.01	0.02	0.01

Source: 1997-2006 SCAQMD, Annual Summaries.

6.1.5 Affected Environment

The U. S. EPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of U. S. EPA Region IX, which has its offices in San Francisco. Region IX is responsible for the local administration of U. S. EPA programs for California, Arizona, Nevada, Hawaii and certain Pacific trust territories. U.S. EPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

The California Air Resources Board (CARB) was created in 1968 by the Mulford-Carrell Air Resources Act through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement and enforce the state's motor vehicle pollution control program, to administer and coordinate the state's air pollution research program, to adopt and update as necessary the state's ambient air quality standards, to review the operations of the local air pollution control districts, and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards [California Health & Safety Code (H&SC) §39500 et seq.].

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the state (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. Regional air quality management districts (AQMDs), which have more comprehensive authority over nonvehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California (H&SC §40200 et seq.).

Air pollution control districts and air quality management districts in California have principal responsibility for:

- Developing plans for meeting the state and federal ambient air quality standard

- Developing control measures for nonvehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution
- Enforcing air pollution statutes and regulations governing nonvehicular sources, and for developing employer-based trip reduction programs

Local, State and Federal environmental agencies have adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The agencies having permitting authority for this Project are shown in Table 6.1-10. The applicable regulations and compliance with these requirements are discussed in more detail in the following sections. An application for a Permit to Construct will be filed with the South Coast Air Quality Management District (SCAQMD) at approximately the same time as the Small Power Plant Exemption (SPPE) application is filed with the California Energy Commission (CEC).

Table 6.1-10 Air Quality Agencies

Agency	Authority	Contact
U.S. EPA Region IX	PSD permit issuance, Enforcement	Gerardo Rios, Chief, Permits Office USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 972-3974
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch California Air Resources Board 1001 I Street, 6th Floor Sacramento, CA 95814 (916) 322-6026
South Coast AQMD	Permit issuance, enforcement	Moshen Nazemi South Coast AQMD 21865 East Copley Drive Diamond Bar, CA 91765 (909) 396-3385

6.1.6 Laws, Ordinances, Regulations and Standards

6.1.6.1 Federal

The U.S. EPA implements and enforces the requirements of many of the Federal environmental laws. U.S. EPA Region IX, administers Federal air programs in California. The Federal Clean Air Act, as most recently amended in 1990, provides U.S. EPA with the legal authority to regulate air pollution from stationary sources such as those at RERC. U.S. EPA has promulgated the following stationary source regulatory programs to implement the requirements of the 1990 Clean Air Act:

- Standards of Performance for New Stationary Sources (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAPS)
- Prevention of Significant Deterioration (PSD)
- New Source Review (NSR)
- Title IV: Acid Deposition Control
- Title V: Operating Permits

National Standards of Performance for New Stationary Sources

Authority. Clean Air Act §111, 42 USC §7411; 40 CFR Part 60, Subpart KKKK

Purpose. Establishes standards of performance to limit the emission of criteria pollutants (air pollutants for which U.S. EPA has established national ambient air quality standards NAAQS) from new or modified stationary combustion turbines. The applicability of these regulations depends on the equipment size; process rate; and/or the date of construction, modification, or reconstruction of the affected facility. Only the Standards of Performance for Stationary Combustion Turbines, which limit NO_X and SO_2 emissions from gas turbines, are applicable to the project. These standards are implemented at the local level with federal and state oversight.

Administering Agency. SCAQMD, with U.S. SEPA Region IX and CARB oversight.

National Emission Standards for Hazardous Air Pollutants

Authority. Clean Air Act § 112, 42 USC §7412; 40 CFR Part 63

Purpose. Establishes national emission standards to limit the emission of hazardous air pollutants (HAPs, or air pollutants identified by U.S. EPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific source categories. Requires the use of maximum achievable control technology (MACT) for major sources of HAPs that are not specifically regulated or exempted under Part 63. Standards are implemented at the local level with federal oversight. A NESHAPS regulation has been proposed for combustion turbines (40 CFR 63, Subpart YYYY) pursuant to Section 112 of the Clean Air Act. However, this regulation will not be applicable to the RERC project because the facility is not a major source of HAPs.

Administering Agency. SCAQMD, with U.S. EPA Region IX and CARB oversight.

Prevention of Significant Deterioration Program

Authority. Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52

Purpose. Requires preconstruction review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. Prevention of Significant Deterioration (PSD) applies to pollutants for which ambient concentrations do not exceed the corresponding NAAQS (i.e., attainment pollutants). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas). This program is implemented through SCAQMD Regulation XVII and enforced by SCAQMD with USEPA oversight.

Administering Agency. SCAQMD, with U.S. EPA Region IX oversight.

New Source Review

Authority. Clean Air Act §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52

Purpose. Requires preconstruction review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of ambient quality standards. This program is implemented through SCAQMD Regulation XIII and enforced by SCAQMD with U. S. EPA oversight.

Administering Agency. SCAQMD, with U. S. EPA Region IX oversight.

Title IV - Acid Rain Program

Authority. Clean Air Act §401, 42 USC §7651 et seq.; 40 CFR Part 72

Purpose. Requires the monitoring and reporting of emissions of acidic compounds and their precursors. The principal source of these compounds is the combustion of fossil fuels. Therefore, Title IV established national standards to monitor, record, and in some cases limit SO_2 and NO_X emissions from electrical power generating facilities. These standards are implemented at the local level through SCAQMD Regulation XXXI, with federal oversight.

Administering Agency. SCAQMD, with U.S. EPA Region IX oversight.

Title V - Operating Permits Program

Authority. Clean Air Act § 501 (Title V), 42 USC §7661; 40 CFR Part 70
Purpose. Requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, record keeping, and reporting requirements. Title V

applies to major facilities, acid rain facilities, and any other industry group listed by U.S. EPA as requiring a Title V permit. These requirements are administered by SCAQMD through SCAQMD Regulation XXX with U.S. EPA oversight.

Administering Agency. SCAQMD, with U.S. EPA Region IX oversight.

6.1.6.2 State

CARB was created in 1968 by the Mulford-Carrell Air Resources Act through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the State Implementation Plan (SIP) for achievement of the Federal ambient air quality standards.

State Implementation Plan

Authority. Health & Safety Code (H&SC) §39500 et seq.

Purpose. Required by the federal Clean Air Act, the SIP must demonstrate the means by which all areas of the state will attain and maintain NAAQS within the federally mandated deadlines. CARB reviews and coordinates preparation of the SIP. Local districts must adopt new rules (and/or revise existing rules) and demonstrate that the resulting emission reductions, in conjunction with reductions in state and federally controlled mobile source emissions, will result in the attainment of NAAQS.

Administering Agency. SCAQMD, with CARB and U.S. EPA Region IX oversight.

California Clean Air Act

Authority. H&SC §40910 - 40930

Purpose. Established in 1989, the California Clean Air Act requires local districts to attain and maintain both national and state ambient air quality standards at the "earliest practical date." Local districts must prepare air quality plans demonstrating the means by which the ambient air quality standards will be attained and maintained.

Administering Agency. SCAQMD, with CARB oversight.

Toxic Air Contaminant Program

Authority. H&SC §39650 – 39675

Purpose. Established in 1983, the Toxic Air Contaminant Identification and Control Act created a two-step process to identify toxic air contaminants and control their emissions. CARB identifies and prioritizes the pollutants to be considered for identification as toxic air

contaminants. CARB assesses the potential for human exposure to a substance, while the Office of Environmental Health Hazard Assessment evaluates the corresponding health effects. Both agencies collaborate in the preparation of a risk assessment report, which concludes whether a substance poses a significant health risk and should be identified as a toxic air contaminant. In 1993, the Legislature amended the program to identify the 189 federal hazardous air pollutants as toxic air contaminants. CARB reviews the emission sources of an identified toxic air contaminant and, if necessary, develops control measures to reduce the emissions. There have been no measures adopted via the Toxic Air Contaminant Program that are applicable to this project.

Air Toxic "Hot Spots" Act

Authority. CA Health & Safety Code § 44300-44384; 17 CCR §93300-93347

Purpose. Established in 1987, the Air Toxics "Hot Spots" Information and Assessment Act supplements the toxic air contaminant program by requiring the development of a statewide inventory of air toxics emissions from stationary sources. The program requires affected facilities to prepare (1) an emissions inventory plan that identifies relevant air toxics and sources of air toxics emissions; (2) an emissions inventory report quantifying air toxics emissions; and (3) a health risk assessment, if necessary, to characterize the health risks to the exposed public. Facilities whose air toxics emissions are deemed to pose a significant health risk must issue notices to the exposed population. In 1992, the Legislature amended the program to further require facilities whose air toxics emissions are deemed to pose a significant health risk to implement risk management plans to reduce the associated health risks. This program is implemented at the local level with state oversight.

Administering Agency. SCAQMD, with CARB oversight.

CEC and CARB Memorandum of Understanding

Authority. CA Pub. Res. Code § 25523(a); 20 CCR §1752, 1752.5, 2300-2309, and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

Purpose. Establishes requirements in the CEC's decision-making process for an AFC or SPPE that assures protection of environmental quality.

Administering Agency. California Energy Commission.

6.1.6.3 Local

When the state's air pollution statutes were reorganized in the mid-1960s, local districts were required to be established in each county of the state. There are three different types of districts: county, regional, and unified. Local districts have principal responsibility for developing plans for meeting the NAAQS and California ambient air quality standards; developing control measures for nonvehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; implementing permit programs established for the construction, modification, and operation of sources of air pollution;

enforcing air pollution statutes and regulations governing nonvehicular sources; and developing programs to reduce emissions from indirect sources.

South Coast Air Quality Management District Attainment Demonstration Plans

Authority. H&SC §40914

Purpose. The SCAQMD plans define the proposed strategies, including stationary source and transportation control measures and new source review rules that will be implemented to attain and maintain the state ambient air quality standards. The relevant stationary source control measures and new source review requirements are discussed with SCAQMD Rules and Regulations.

Administering Agency. SCAQMD, with CARB oversight.

South Coast Air Quality Management District Rules and Regulations

Authority. H&SC §4000 e eq., H&SC §40200 et seq., indicated SCAQMD Rules

Purpose. Establishes procedures and standards for issuing permits; establishes standards and limitations on a source-specific basis.

Administering Agency. SCAQMD with U.S. EPA and CARB oversight.

6.1.6.4 Summary of Applicable Requirements

This section summarizes applicable federal, state, and local air pollution requirements

Authority to Construct

Rule 203 (Permits Required) specifies that any facility installing nonexempt equipment that causes or controls the emission of air pollutants must first obtain a Permit to Construct from the SCAQMD. Under Rule 1301 (New and Modified Stationary Source Review Rule), the SCAQMD's Final Determination of Compliance acts as an authority to construct for a power plant upon approval of the Project by the CEC, who would then issue an Authority for Construction. In the case of RERC, the SCAQMD Determination of Compliance will not be issued because RPU is seeking a Small Power Plant Exemption (SPPE) from the CEC. Upon issuance of an SPPE, SCAQMD will have the authority to issue a Permit to Construct to RPU. An application for a Permit to Construct will be submitted to SCAQMD at approximately the same time as the SPPE application is submitted to the CEC.

SCAQMD Prohibitory Rules

The general prohibitory rules of the SCAQMD applicable to the Project include the following:

Rule 401 - Visible Emissions:
Prohibits visible emissions as dark or darker than Ringelmann No.2 for periods greater than three minutes in any hour.

Rule 402 - Nuisance:
Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property.

Rule 403 - Fugitive Dust Administrative Requirements for Control of PM_{10}:
Sets forth definitions, applicability and administrative requirements for anthropogenic sources of PM_{10}.

Rule 431.1- Sulfur Compounds:
Prohibits the burning in equipment any gaseous fuel containing sulfur compounds calculated as H_2S, in excess of 40 ppm as measured over a four-hour period.

New Source Performance Standards

Regulation IX (New Source Performance Standards) requires compliance with applicable federal standards of performance for new or modified stationary sources.

Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) applies to gas turbines constructed, reconstructed or modified after February 18, 2005, with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (Gj/hr) (10 MMBtu/hr) at higher heating value of the fuel. Stationary combustion turbines regulated under this subpart are exempt from the requirements of subpart GG.

The proposed turbines at the Riverside Energy Resource Center have an hourly heat input that exceeds the threshold defined in subpart KKKK. The NSPS requirements in this subpart state that for a new turbine firing natural gas and having a heat input peak load (HHV) greater than 50 MMBtu/hr and less than or equal to 850 MMBtu/hr, NO_x emissions must not exceed 25 ppm at 15 percent O_2 or 150 nanograms per Joule (ng/J) of useful output (1.2 lb/MWh). Sulfur emissions are also limited under this subpart. Emissions from any combustion turbine regulated by this subpart must not discharge any gases that contain SO_2 in excess of 110 ng/J (0.90 lb/MWh) gross output, nor shall any fuel be burned in said turbine that contains total potential sulfur emissions in excess of 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input.

Subpart Da (Standards of Performance for Electric Utility Steam Generating Units) applies to steam generating units that are capable of combusting more than 250 MMBtu per hour of fossil fuel. Since there are no duct burners or auxiliary boilers associated with the project, Subpart Da is not applicable.

Review of New or Modified Sources

Regulation XIII (New and Modified Stationary Source Review Rule) implements the federal New Source Review (NSR) program as the NSR requirements of the California Clean Air Act. The rule contains the following elements:

- Best available control technology (BACT)
- Emission offsets
- Air quality impact analysis (AQIA)
- CEC Review

Regulation XX stipulates that a facility with the potential to emit more than 4 tons per year of NO_x is subject to the Regional Clean Air Incentives Market (RECLAIM). RECLAIM NSR implements Rule 2005 which implements distinct requirements for BACT, offsets, and air quality impact analysis for NO_x.

Best Available Control Technology

Best Available Control Technology (BACT) must be applied to any new or modified emissions unit resulting in an emissions increase of any nonattainment air contaminant, any ozone-depleting compound, or ammonia. SCAQMD defines BACT as the most stringent emission limitation or control technique that:

- Has been achieved in practice for such emissions unit and class of source; or
- Is contained in any State Implementation Plan approved by the U.S. EPA for such emissions unit category and class of source. A specific limitation or control technique shall not apply if the owner or operator of the proposed emissions unit demonstrates to the satisfaction of the Air Pollution Control Officer (APCO) that such limitation or control technique is not presently achievable; or
- Is any other emission limitation or control technique, including process and equipment changes of basic and control equipment, found to be technologically feasible for such class or category of sources or for a specific source, and cost-effective as determined by the APCO.

Emission Offsets

A new or modified facility with a potential to emit pollutants in excess of the SCAQMD offset thresholds shown in Table 6.1-11 must offset all emissions increases at a predetermined ratio. In the case of RERC, the only threshold exceedances expected would be for PM_{10} and NO_x. PM_{10} will be offset at a 1.2:1 ratio pursuant to rule 1303. Offsets will be obtained through demonstration of compliance with 1309.1 criteria for eligibility to withdraw from the priority reserve. NO_x will be offset at a ratio of 1.0 to 1 pursuant to Regional Clean Air Incentives Market (RECLAIM) Rule 2005 – Reclaim New Source Review.

Table 6.1-11 SCAQMD Offset Emission Thresholds (lb/yr)

Pollutant	Threshold
NO_x	8,000
SO_2	8,000
CO	58,000
ROG	8,000
$PM_{10}/PM_{2.5}$	8,000

Air Quality Impact Analysis

An air quality impact analysis must be conducted to evaluate impacts of emission increases from new or modified facilities on ambient air quality. Project emissions must not cause an exceedance of any ambient air quality standard or significantly add to an existing exceedance of an air quality standard. Because RPU will be requesting PM_{10} emission offset credits from the SCAQMD Priority Reserve, the project will be subject to a more stringent demonstration of ambient air quality impacts than it would otherwise be subject pursuant to SCAQMD NSR.

CEC Review

Pursuant to California Public Resources Code, section 25500, the CEC has the exclusive right to certify new electricity generating facilities (EGF), or modifications to existing EGFs. Based on section 25541 of the Public Resources Code, EGFs with a capacity less than 100 MW may be exempt from a CEC AFC (this exemption includes modifications to existing facilities that do not add capacity in excess of 100 MW). Instead, a CEC SPPE application may be submitted to demonstrate that the project imposes no substantial adverse impact to the environment. Rule 1301 establishes a procedure for coordinating SCAQMD review of EGFs with the CEC AFC and SPPE processes. SCAQMD will review the SPPE and issue a Permit to Construct. The AQMD may include conditions of exemption relative to air impacts in the Permit to Construct and subsequent Permit to Operate.

Toxic Risk Management

The SCAQMD's Risk Management Review Policy for Permitting New and Modified Sources provides a mechanism for evaluating potential impacts of air emissions of toxic substances from new, modified, and relocated sources in the SCAQMD. Rule 1401 requires a demonstration that the source will not adversely impact the health and welfare of the public. Rule 1401 requires that the maximum individual cancer risk (MICR) from any single source at the facility will not exceed $1x10^{-6}$ ($1x10^{-5}$ if TBACT is utilized). MICR is the estimated probability of a potential maximally exposed individual contracting cancer as a result of exposure to the source's toxic emissions. Rule 1401 also requires a demonstration acute and chronic risks are below district-defined thresholds.

Because RPU will request PM_{10} emissions from the SCAQMD Priority Reserve pursuant to Rule 1309.1, the combined health impacts from turbines 3 and 4 will be subject to more stringent health risk standards including a combined MICR of $1x10^{-6}$, and acute and chronic risk thresholds that are one half of those specified in Rule 1401.

Prevention of Significant Deterioration

The prevention of significant deterioration (PSD) requirements apply, on a pollutant-specific basis, to any project that is a new major stationary source or a major modification to an existing major stationary source. This program is enforced by SCAQMD through Regulation XVII and is overseen by the US EPA. A major source is a listed facility (one of 28 PSD source categories listed in the federal Clean Air Act that has the potential to emit at least 100 tons per year (tpy) of a pollutant. Because the facility is not one of the 28 listed categories, PSD applicability is based upon 250 ton per year emission threshold. PSD also applies to "significant" modifications to existing PSD major sources. Significant modifications are defined as those that result in emission increases of 15 tpy $PM_{10}/PM_{2.5}$, 40 tpy NO_x, 40 tpy ROG, 40 tpy SO_x or 100 tpy CO.

The PSD program contains the following elements:

- Air quality monitoring
- Best available control technology (BACT)
- Air quality impact analysis
- Protection of Class I areas
- Visibility, soils, and vegetation impact analyses.

The proposed Project will consist of two LM6000 simple cycle peaking turbines fired on natural gas. Since RERC is not a steam electric plant, it is subject to the 250-tpy PSD threshold. Emissions from the facility are much less than 250 tpy; therefore, the plant is not considered to be a major stationary source. It follows that the significant modification applicability threshold will not apply to the proposed project. Instead, the overall PTE will be taken into account and weighed against the 250 tpy threshold. RPU expects RERC to remain below the applicability threshold after the proposed modification is made to the facility.

Federal Operating Permit

Regulation XXX (Federally Mandated Operating Permits) requires new major facilities and Phase II acid rain facilities to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the 1990 Clean Air Act Amendments. Currently, RPU holds a Title V permit to operate the existing equipment at RERC. A permit application must be submitted to SCAQMD in conjunction with the project for permits to construct the new units at RERC. Applications will also be submitted to modify the existing facility Permit to Operate. The application must present a process description, all stationary sources at the facility, applicable regulations, estimated emissions, associated operating conditions, alternative operating scenarios, a facility compliance plan, and a compliance certification.

Acid Rain Permit

Regulation XXXI (Acid Rain Permit Program) requires that subject facilities comply with maximum operating emissions levels for SO_2 and NO_X, and obligates monitoring of NO_X, and CO_2 emissions and in some cases SO_2 in addition to exhaust gas flow rates. A Phase II acid rain facility, such as RERC, must obtain an acid rain permit as mandated by Title IV of the 1990 Clean Air Act Amendments (however, being a Phase II facility RERC is not subject to the SO_2 monitoring requirements). The application must present all relevant Phase II sources at the facility, a compliance plan for each unit, applicable standards, and an estimated commencement date of operations. The Title V permit will enforce Title IV and will serve as an acid rain Title IV permit. Therefore, the application submitted to SCAQMD to modify the Title V permit will also satisfy the requirements of Title IV.

Table 6.1-12 summarizes applicable regulations and permits relating to air quality protection.

Table 6.1-12 Regulations and Permits for Protection of Air Quality

Regulation	Purpose	Regulating Agency	Agency Action
Federal			
Clean Air Act (CAA) 160-169A and implementing regulation, Title 42 United States Code (USC) Title 40 CFR Parts 51 &52 (PSD)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	USEPA	PSD is not triggered.
CAA 171-193, 42 USC 7501 et seq. (NSR)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient-concentration levels are higher than NAAQS.	SCAQMD with USEPA oversight	Agency approval to be obtained before start of construction. Issuance of permit with conditions limiting emissions.
CAA 401 (Title IV), 42 USC 7651 (Acid Rain Program)	Requires monitoring of NO_2 and SO_2 emissions and purchase of SO_2 allowances.	SCAQMD with USEPA oversight	Issuance of Acid Rain monitoring plan after review of application
CAA 501 (Title V), 42 USC 7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	SCAQMD with USEPA oversight	Issuance of Title V permit after review of application.
CAA 111, 42 USC 7411, 40 CFR Part 60 (NSPS), Subpart KKKK	Establishes national standards of performance for new stationary sources. KKKK regulates emissions from new stationary gas turbines.	SCAQMD with USEPA oversight	Agency approval to be obtained before start of construction. Issuance of permit with conditions limiting emissions.

Regulation	Purpose	Regulating Agency	Agency Action
State			
H&SC 44300-44384; CCR 93300-93347 (Toxic "Hot Spot" Act)	Requires preparation and biennial updating of facility emissions inventory of hazardous substances; risk assessment.	SCAQMD with CARB oversight	HRA submitted as part of SPPE and SCAQMD application. After review issuance of permit limiting emissions.
CA Public Resource Code	Requires that CEC decision of AFC include requirement to assure protection of environmental quality; AFC required to address air quality protection. Not applicable in SPPE cases.	CEC/SCAQMD	After project review, issuance of Final Certification with conditions limiting emissions.
Local			
SCAQMD Rule 401 (Visible Emissions)	Prohibits visible emissions as dark or darker than Ringlemann No. 2 for periods greater than three minutes in any hour.	SCAQMD with CARB oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Rule 402 (Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	SCAQMD with CARB oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Rule 403 (Fugitive Dust)	Limits Particulate Matter from stationary sources.	SCAQMD with CARB oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Rule 431.1 (Sulfur Compound Emission)	Limits SO_2 from stationary sources.	SCAQMD with CARB oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Rule 1401 (Toxics NSR)	Requires demonstration that the source will not adversely impact the health and welfare of the public and limits the MICR allowed for an emission source.	SCAQMD with USEPA oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.

Regulation	Purpose	Regulating Agency	Agency Action
SCAQMD Reg. XVII (PSD)	Sets forth preconstruction review requirements for stationary sources to ensure that air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth.	SCAQMD with USEPA oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Reg. IX (New Source Performance Standards: 40 CFR 60, Subpart KKKK, Stationary Combustion Turbines)	Authorizes AQMD to implement and enforce NSPS including Subpart KKKK. Requires monitoring of fuel and other operating parameters; limits NO_X, SO_2 and PM emissions, requires source testing, emission monitoring, and recordkeeping.	SCAQMD with USEPA oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Reg. XIII (New and Modified Stationary Source Review)	NSR: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emission offsets, and air quality impact analysis. Also subjects a power facility to more stringent ambient air quality impact and health risk standards if emission offset credits will be drawn from the Priority Reserve.	SCAQMD with CARB/USEPA oversight	Agency approval to be obtained before the start of construction. Issuance of permit with conditions limiting emissions.
SCAQMD Re. XX (Regional Clean Air Incentives Market)	Subjects NO_x emission increases to an independent NSR program, including a dynamic market-based emission offset program.	SCAQMD with CARB oversight	Issuance of a RECLAIM Facility permit after review of application.
SCAQMD Reg. XXX (Federally Mandated Operating Permits)	Implements operating permit requirements of CAA Title V.	SCAQMD with CARB oversight	Issuance of Title V permit after review of application.
SCAQMD Reg. XXXI (Acid Rain Program)	Implements acid rain regulations of CAA Title IV	SCAQMD with CARB oversight	Issuance of Title V permit after review of application.

6.1.7 Environmental Consequences

6.1.7.1 Project Overview

Both proposed combustion turbine generators will be operated as peaking units for up to a combined total 2,460 hours per year. The proposed annual operating schedule for each turbine includes 920 normal operating hours, 150 startup hours, 150 shutdown hours, and an allowance of 10 hours for maintenance operations. Inlet air cooling will be used to maintain power output under warm ambient conditions. Emission control systems will be operational during all operations except a brief commissioning period, startups, shutdowns

and limited maintenance operations. Maximum annual emissions are based on operation of the project at maximum firing rates and include the expected maximum number of startup periods that may occur in a year.

The facility includes a black-start engine that is separately being permitted as a modification to the existing permit and is not part of the Project. Emissions from the black-start engine are reflected in the baseline emission inventory for the facility. Ambient air quality impacts from the black-start engine are combined with RERC Units 1&2 impacts as baseline impacts. Health risks attributed to the black-start engine are disclosed in this report for the sake of transparency, but are not considered part of the project impacts.

The turbines will be fired on pipeline quality natural gas and will be equipped with water injection, selective catalytic reduction (SCR) and CO oxidation systems to control NO_x and CO emissions. Water will be demineralized prior to its injection into the turbines. The applicant anticipates using a water softener, followed by a high efficiency reverse osmosis system and a final crystallizer. The facility will utilize a common inlet air chiller to help cool the inlet air during the summer months.

Aqueous ammonia will be used as a reactant in the SCR system. An existing 12,000-gallon tank will store a 19 percent aqueous ammonia solution at the facility. The ammonia delivery system includes a heated vaporization skid that can be initiated prior to cold-starts. Startup emissions included in this application reflect the assumption that turbine startups may occur without preheating of the vaporization skid.

6.1.7.2 Proposed Equipment

RPU proposes to construct two General Electric LM6000 PC SPRINT combustion turbines, with a net output of approximately 48 MW each. Both turbines will utilize water injection to control NO_x emissions to 25 ppmv corrected to 15 percent O_2. Uncontrolled CO emissions are guaranteed to be less than 40 ppmv corrected to 15 percent O_2, but often are less than 20 ppmv corrected to 15 percent O_2.

To further reduce NO_x and CO emissions from the turbines, SCR and CO catalyst technologies will be used in an Emission Control module (ECM) to be fabricated by Express Integrated Technologies, Inc. SCR and CO catalysts are considered BACT, and are proven technology to reduce NO_x and CO emissions.

RPU proposes to control NO_x emissions to 2.3 ppmv corrected to 15 percent O_2, with ammonia (NH_3) slip at 5 ppmv corrected to 15 percent O_2. CO emissions will be controlled to 6 ppmv corrected to 15 percent O_2 and VOC emissions will be controlled to less than 2 ppmv corrected to 15 percent O_2. Overall, the proposed emission rates, with the exception of NO_x emission rates, reflect recently permitted simple-cycle projects in California, and are believed to reflect the lowest achievable emission rates for simple cycle turbines rated above three megawatts. Proposed NO_x emission rates are more stringent than BACT as applied to similar peaking power turbines. The proposed NO_x emission rate reflects minimum standards established by SCAQMD to qualify for Priority Reserve PM_{10} offset credits. Furthermore, to ensure the effectiveness and increase the life of the catalyst within the SCR system, RPU will

install multiple layers of BASF, Inc., Vanadium-based ceramic honeycomb. This will not only increase the effective treatment of the exhaust gas, but also reduce the likelihood of catalyst failure due to Sodium poisoning.

SCR relies upon injecting NH_3 vapors into the flue gases, which then pass through a catalyst material to reduce NO_x to elemental nitrogen and water. An aqueous ammonia solution of less than 20 percent ammonia will be used instead of a more concentrated solution or anhydrous ammonia to reduce the hazard associated with a potential accidental release. The aqueous solution will be transported to the site via a tanker truck, regulated by the California Department of Transportation (Caltrans).

The existing RERC Units 1&2 12,000-gallon aqueous ammonia storage tank will also be utilized for RERC Units 3&4. The tank is an above ground tank with secondary containment. The NH_3 vaporization skid includes pre-heaters to speed SCR effectiveness during cold starts. NH_3 emissions resulting from the use of SCR will be limited to 5 ppmv, based upon SCAQMD BACT standards.

Water used for injection will be cooled to approximately 45°F in order to improve power performance and to reduce emissions. The facility will contain a common chiller and cooling tower supplying chilled water to the combustion turbine inlet air cooling coils. The integrated chiller and cooling tower package is exempt from SCAQMD permit requirements per District Rule 219.

Tables 6.1-13 through 6.1-15 contain summaries of equipment specifications. Additional equipment information is contained in Appendix 6.1-A.

Table 6.1-13 Equipment Summary GE LM 6000 Gas Turbine

Specification	Description
Manufacturer:	General Electric
Model:	LM 6000 PC SPRINT
Rating:	49.8 MW (gross), 48 MW (net)
Fuel:	Pipeline Natural Gas
Fuel Consumption:	490.35 MMBtu/hr @full load
Water Injection Rate:	19,460 lb/hr
Exhaust Flow:	Approximately 596,475 acfm@full load, including 3,280 acfm tempering air
Stack Temperature:	833º F @full load with quench air injection

Table 6.1-14 Equipment Summary Cooling Tower

Specification	Description
Manufacturer:	Evapco
Model:	AT 314-0972
Rated Flow:	5190.0 GPM
Estimated Max. Evaporation Rate:	83.0 GPM
Dimensions:	71’8” L x 13’11.25” W x 19’3.25” H
Exhaust Diameter:	3 cells @ 13.9’
Exhaust Temperature:	98.6º F

Table 6.1-15 Equipment Summary Gas Turbine Emission Control Systems

Specification	Description
Manufacturer:	Express Integrated Technologies, Inc.
SCR Catalyst:	BASF, Inc. Valadium-based ceramic honeycomb 31.75” d x 106.125” w x 78.5’ h 90% Conversion Efficiency
CO Catalyst:	Engelhard, Inc. precious metal carrier on aluminum 95% Conversion Efficiency
Catalyst Life:	25,000 hrs
Ammonia Storage Capacity:	12,000 gal.
Ammonia Throughput:	76 lb/hr
Tempering Air Addition:	18,200 acfm
Final Exhaust Flow:	596,475 acfm (including tempring)
Stack Height:	80 ft
Stack Dimensions:	13 ft inside diameter
Exhaust Temperature:	833º F @full load
Catalyst Temperature Performance Range:	485º F to 870º F

6.1.7.3 Facility Operating Criteria Pollutant Emissions

The proposed equipment will consist of two General Electric LM6000 PC SPRINT combustion turbines, each rated at approximately 48 MW (net) and a three-cell pre-fabricated, pre-engineered cooling tower used for the inlet air chillers. Natural gas will be the only fuel consumed by the gas turbines.

Natural gas combustion results in the formation of NO_x, SO_2, reactive organic gases (ROG), PM_{10}, $PM_{2.5}$ and CO. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM_{10} and SO_2. The gas turbines will be equipped with water injection that minimizes the formation of NO_x. To further reduce NO_x and CO emissions, selective catalytic reduction (SCR) and oxidation catalyst control systems will be utilized.

Various other pollutants will also be emitted by the facility, including ammonia (NH_3), which s used as a reactant by the SCR systems to control NO_x. Emissions of all of the criteria and noncriteria (toxic) pollutants have been characterized and quantified in this application.

Selected Emission Factors for the Combustion Turbines and Cooling Tower

Table 6.1-16 contains a summary of gas turbine emission and fuel throughput factors used to estimate potential emissions during commissioning, startup and normal operations of the turbines. Emission factors reflect manufacturer guarantees and current BACT determinations for simple cycle turbines. SO_x factors were derived from SCAQMD annual emissions reporting guidance for the year 2007. Excerpts of these reference documents and detailed emission calculations are contained in Appendix 6.1-B.

Table 6.1-16 Criteria Pollutant Emission Factors and Hourly Emission Rates

Pollutant	Uncontrolled Emission Factor (lb/MMBtu)	Controlled Emission Factor (lb/MMBtu)	Hourly Emissions During Commissioning Operations (lb/hr)	Hourly Emissions During Startup Operations (lb/hr)	Hourly Emissions During Typical Operations (lb/hr)
VOC	0.0026	0.0026	1.27	1.17	1.27
SO_x	0.0006	0.0006	0.28	0.26	0.28
CO	0.0942	0.0135	46.19	11.6	6.62
$PM_{10}/PM_{2.5}$	0.00612	0.00612	3.00	2.74	3.00
NO_x	0.0921	0.0085	45.16	11.02	4.17

*(Per Turbine – 100% load)

Emission factors for the cooling towers are estimated to be 0.0013 lbs/hour of $PM_{10}/PM_{2.5}$. The emissions reflect water circulation rates and drift rates for the proposed tower, as well as total dissolved solid content of the make-up water. Demineralized water will be used for make-up to the cooling tower.

Turbine Commissioning Emissions

Table 6.1-17 contains a summary of anticipated hourly, daily and annual emissions during commissioning operations. During turbine commissioning operations of 200 hours, it is expected that RERC Units 3&4 will operate at low loads, without the use of catalysts, but with water injection in full effect. For emission calculations, fuel throughput is assumed to be 100 percent of rated capacity. NO_x and CO concentrations are assumed to be 25 ppmv and 42 ppmv, respectively. A spreadsheet showing commissioning emissions for the project is contained in Appendix 6.1-B.

Table 6.1-17 Criteria Pollutant Emissions Summary for One Combustion Turbine *

	MHC lbs/hr	MDC lbs/day	Annual tons/yr.
VOC	1.27	30.6	0.13
SO_x	0.28	6.71	0.03
CO	46.19	1108.58	4.62
PM_{10} / $PM_{2.5}$	3.00	72.00	0.30
NO_x	45.16	1083.87	4.52

* 24 hours/day, 200 hours total commissioning hours.

Turbine Startup/Shutdown Operations and Emissions

During startup operations, the turbines are assumed to operate at slightly elevated average NO_x and CO concentrations due to the phased effectiveness of SCR and CO oxidation. Fuel consumption during startup operations will be slightly lower than during typical operations.

Table 6.1-18 contains estimated potential emissions from each turbine resulting from startup operations. Hourly emissions reflect a 10-minute process during which fuel consumption and power output rise to 100 percent of rated capacity. NO_x emissions are at 25 ppmvd corrected to 15 percent O_2 through the first five minutes of operations. During the sixth minute of operation, sync idle load is achieved and NO_x concentrations begin to climb to approximately 65 ppmv corrected to 15 percent O_2 at approximately the seventh minute of operation. During the seventh minute, water injection is initiated to meet a NO_x concentration of 25 ppmvd corrected to 15 percent O_2. Full load is achieved at the tenth minute. Overall NO_x emissions are estimated to be 2.5 pounds during the ten-minute startup period.

CO emissions start out at approximately 180 ppmv corrected to 15 percent O_2 during the first minute of operation, then decline rapidly during the sixth minute of operation. By the seventh minute, CO concentrations are approximately 20 ppmv at 15 percent O_2, and remain at that level into normal operations.

The proposed SCR system includes a heated vaporization skid that, if initiated in advance of turbine startup, can allow full operation and effectiveness of the SCR system during the tenth minute of operation. Emissions assumed for the purpose of this application, reflect the possibility that turbine startup cannot be delayed until the vaporization skid is initiated. The resulting estimated startup emissions reflect an additional 15-minute period during which SCR and CO oxidization systems become fully effective. Daily emissions reflect four startup events per turbine, per day. Annual emissions reflect 150 startup hours per turbine, per year. A spreadsheet showing startup emissions for the project is contained in Appendix 6.1-B.

Table 6.1-19 includes a summary of shutdown emissions for each turbine at the facility. The turbine vendor estimates that the shutdown process takes approximately eight minutes. Upon initiation of the shutdown process, ammonia injection will be discontinued. Water injection will be discontinued approximately seven minutes into the shutdown process. NO_x and CO emissions during the eight-minute period are estimated to be 2.7 pounds and 5.21 pounds, respectively. Normal operating emission rates are assumed to occur during the preceding 52 minutes of the shutdown hour. Daily emissions reflect four shutdown events per turbine, per day. Annual emissions reflect 150 startup hours per turbine, per year. A spreadsheet showing startup emissions for the project is contained in Appendix 6.1-B.

Table 6.1-18 Criteria Pollutant Emissions Summary For One Combustion Turbine - Startup

	U-EF lb/MMBtu	**C-EF** lb/MMBtu	**Hourly** lbs/hr	**Daily** lbs/day	**Annual** tons/year
ROG	0.0026	0.0026	1.17	4.66	0.09
SO_x	0.0006	0.0006	0.26	1.02	0.02
CO	0.0975	0.0263	11.60	46.39	1.87
$PM_{10}/PM_{2.5}$	0.0062	0.0062	2.74	10.97	0.21
NO_x	0.0934	0.0250	11.02	44.10	0.83

Table 6.1-19 Criteria Pollutant Emissions Summary For One Combustion Turbine - Shutdown

	U-EF lb/MMBtu	C-EF lb/MMBtu	Hourly lbs/hr	Daily lbs/day	Annual tons/year
ROG	0.0030	0.0030	1.27	5.10	0.10
SO_x	0.0007	0.0007	0.28	1.12	0.02
CO	0.1105	0.0261	10.92	43.68	0.82
$PM_{10}/PM_{2.5}$	0.0072	0.0072	3.00	12.00	0.23
NO_x	0.1080	0.0147	6.14	24.54	0.46

Normal Operations and Emissions

RPU proposes to limit annual operations to a combined 2,460 hours per year for both turbines. Included in these operating hours are 150 startup/shutdown events and 10 hours of maintenance operations per year for each turbine. This would leave an allowance for 920 hours per year under normal operations for each turbine. This restricted operating schedule will also ensure that emissions of pollutants other than NO_x and PM_{10} will remain below SCAQMD emission offset thresholds. During normal operations, the units are assumed to operate at rated capacity with SCR and CO oxidation in full operation. NO_x and CO emission rates will be controlled to 2.3 ppmv and 6 ppmv, respectively.

Table 6.1-20 contains a summary of potential emissions resulting from each turbine during normal operations. Hourly emissions reflect full utilization of SCR and CO oxidation systems. Daily emissions reflect an assumed 16 potential hours under normal operations per turbine. Annual emissions reflect a limited schedule of 920 hours per year under normal operations per turbine. Detailed emission calculation spreadsheets are contained in Appendix 6.1-B.

Table 6.1-20 Criteria Pollutant Emissions Summary For One Combustion Turbine – Normal Operations

	U-EF lb/MMBtu	C-EF lb/MMBtu	Hourly lbs/hr	Daily lbs/day	Annual tons/year
ROG	0.0030	0.0030	1.27	5.10	0.10
SO_x	0.0007	0.0007	0.28	1.12	0.02
CO	0.1105	0.0261	10.92	43.68	0.82
$PM_{10}/PM_{2.5}$	0.0072	0.0072	3.00	12.00	0.23
NO_x	0.1080	0.0147	6.14	24.54	0.46

Cooling Tower Emissions

Table 6.1-21 contains a summary of potential hourly, daily and annual emissions from the cooling tower. Maximum daily emissions reflect an operating schedule of 24-hours per day (4 startup hours, 16 normal operation hours, and 4 shutdown hours). Annual emissions reflect an operating schedule of 1,230 hours per year.

Table 6.1-21 Criteria Pollutant Emissions Summary - Cooling Tower

	lbs/hr	lbs/day	tons/year
$PM_{10}/PM_{2.5}$	0.0013	0.031	0.006

Combined Operations and Emissions

Table 6.1-22 contains a summary of estimated maximum hourly, daily and annual emissions for the entire project and facility during a normal operating year. The total maximum hourly emissions listed in Table 6.1-22 reflect normal operating conditions for VOC, SO_x and PM. For NO_x and CO, maximum hourly operating conditions reflect maintenance operations. Daily emissions reflect up to 16 hours of normal operations and 4 starts/stops.

Commissioning emissions are not factored into the maximum hourly, daily and annual emissions reflected in Table 6.1-22 for NO_x and CO. Estimated first-year potential NO_x emissions are 17.71 tons, due to the allocated 200-hour commissioning period. Estimated first year potential CO emissions are approximately 19.9 tons due to commissioning operations.

Table 6.1-22 Criteria Pollutant Emissions Summary Facility Total RERC

	Hourly (lb/hr)	Daily (lb/day)	Annual Potential (ton/yr)
VOC			
Turbines 3 & 4 Normal Operations	2.55	40.80	1.17
Turbines 3 & 4 Startup	2.33	9.33	0.17
Turbines 3 & 4 Shutdown	2.55	10.20	0.19
Maintenance			0.01
Total Project		**60.32**	**1.55**
Turbines 1 & 2	2.33-2.55	60.32	1.49
Black-Start Engine	0.36	1.09	0.01
Total Baseline		**61.41**	**1.50**
New Facility Total VOC		**121.73**	**3.05**
SO_x			
Turbines 3 & 4 Normal Operations	0.56	8.94	0.3
Turbines 3 & 4 Startup	0.51	2.04	0.0
Turbines 3 & 4 Shutdown	0.56	2.24	0.0
Maintenance			0.0
Total Project		**13.22**	**0.34**
Turbines 1 & 2	0.51-0.56	13.22	0.36
Black-Start Engine	0.008	0.02	0
Total Baseline		**13.24**	**0.36**
New Facility Total SO_x		**26.46**	**0.7**

	Hourly (lb/hr)	Daily (lb/day)	Annual Potential (ton/yr)
CO			
Turbines 3 & 4 Normal Operations	13.24	211.83	6.09
Turbines 3 & 4 Startup	23.19	92.77	1.74
Turbines 3 & 4 Shutdown	21.84	87.36	1.64
Maintenance			0.46
Total Project		**391.97**	**9.93**
Turbines 1 & 2	13.24 – 23.19	391.97	10.82
Black-Start Engine	3.94	11.82	0.11
Total Baseline		**403.79**	**10.93**
New Facility Total CO		**795.76**	**20.86**
PM_{10} / $PM_{2.5}$			
Turbines 3 & 4 Normal Operations	6.00	96	2.76
Turbines 3 & 4 Startup	5.49	21.95	0.41
Turbines 3 & 4 Shutdown	6.00	24	0.45
Maintenance			0.03
Cooling Tower 2	0.0013	0.031	0.006
Total Project		**141.98**	**3.66**
	Hourly (lb/hr)	**Daily (lb/day)**	**Annual Potential (ton/yr)**
Turbines 1 & 2	5.49 – 6.00	141.95	3.90
Black-Start Engine	0.32	0.96	0.01
Cooling Tower 1	0.03	0.779	0.02
Total Baseline		**143.69**	**3.93**
New Facility Total PM_{10}/$PM_{2.5}$		**285.67**	**7.59**
NO_x			
Turbines 3 & 4 Normal Operations	8.34	133.38	3.83
Turbines 3 & 4 Startup	22.05	88.19	1.65
Turbines 3 & 4 Shutdown	12.27	49.09	0.92
Maintenance			0.45
Total Project		**270.66**	**6.86**
Turbines 1 & 2	8.99 – 24	288.44	8.60
Black-Start Engine	12.98	38.94	0.35
Total Baseline		**327.38**	**8.95**
New Facility Total NO_x		**598.04**	**15.81**

*Normal operating year

6.1.7.4 Project Toxic Pollutant Emissions

Table 6.1-23 provides a summary of the toxic emission factors as well as hourly and annual potential emissions from the proposed gas turbines. The estimates are based upon an input rating of 490.35 MMBtu/hr and an annual operating schedule of a combined 2,460 hours for both turbines. Ammonia emissions reflect guaranteed slip rates for the SCR system. For other toxic pollutants, emissions reflect factors that are referenced in the California Air Toxics Emissions Factors (CATEF) database or *AP-42*. A control efficiency factor of 85 percent is applied to all pollutants, except ammonia, to reflect the operation of the oxidization unit.

Table 6.1.24 provides a summary of toxic emissions that may be emitted from the cooling tower. Toxic emission factors for the cooling tower reflect expected total dissolved solids, and calculation methods outlined in U.S. EPA's AP-42, Section 13.4 (1/95). Additional toxic emissions information can be found in Appendix 6.1-C.

Table 6.1-23 Combustion Turbine Toxic Pollutant Emissions Summary

Compound	Emissions (per turbine)		Emissions (total)	
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)
Acetaldehyde	2.94E-03	3.62E+00	5.88E-03	7.24E+00
Acrolein	4.71E-04	5.79E-01	9.41E-04	1.16E+00
Ammonia	3.33E+00	4.10E+03	6.66E+00	8.19E+03
Benzene	8.83E-04	1.09E+00	1.77E-03	2.17E+00
Butadiene (1,3)	3.16E-05	3.89E-02	6.33E-05	7.78E-02
Ethylbenzene	2.35E-03	2.90E+00	4.71E-03	5.79E+00
Compound	**Emissions (per turbine)**		**Emissions (total)**	
	(lbs/hr)	**(lbs/yr)**	**(lbs/hr)**	**(lbs/yr)**
Formaldehyde	5.22E-02	6.42E+01	1.04E-01	1.28E+02
PAH				
Benzo(a)anthracene	1.09E-05	1.34E-02	2.17E-05	2.67E-02
Benzo(a)pyrene	6.68E-06	8.22E-03	1.34E-05	1.64E-02
Benzo(b)flouranthene	5.43E-06	6.68E-03	1.09E-05	1.34E-02
Benzo(k)flouranthene	5.29E-06	6.50E-03	1.06E-05	1.30E-02
Chrysene	1.21E-05	1.49E-02	2.42E-05	2.98E-02
Dibenz(a,h)anthracene	1.13E-05	1.39E-02	2.26E-05	2.78E-02
Indeno(1,2,3-cd)pryene	1.13E-05	1.39E-02	2.26E-05	2.78E-02
Naphthalene	7.98E-04	9.82E-01	1.60E-03	1.96E+00
Propylene Oxide	2.13E-03	2.62E+00	4.27E-03	5.25E+00
Toluene	9.56E-03	1.18E+01	1.91E-02	2.35E+01
Xylene	4.71E-03	5.79E+00	9.41E-03	1.16E+01

*Based upon 1230 hours per year

Table 6.1-24 Cooling Tower Toxic Pollutant Emission Summary

Compound	Concentration	Drift Rate	Emissions	
	(ppm)	(%)	(lbs/hr)	(lbs/yr)
Arsenic	0.018	0.001	4.67E-07	5.75E-04
Cadmium	0.003	0.001	7.79E-08	9.58E-05
Chloride	0.201	0.001	5.22E-06	6.42E-03
Chromium	0.015	0.001	3.90E-07	4.79E-04
Chromium (hexavalent)	0.005	0.001	1.30E-07	1.60E-04
Copper	0.081	0.001	2.10E-06	2.59E-03
Dichloroethene	0.013	0.001	3.38E-07	4.15E-04
Lead	0.012	0.001	3.12E-07	3.83E-04
Manganese	0.054	0.001	1.40E-06	1.72E-03
Nickel	0.015	0.001	3.90E-07	4.79E-04
Trichloroethene	0.010	0.001	2.60E-07	3.19E-04
Zinc	0.321	0.001	8.34E-06	1.03E-02

* Based upon 1230 hours per year

6.1.7.5 Greenhouse Gas Emissions

In 2006 AB32 was passed directing CARB to develop regulations to require reporting and reductions of greenhouse gases. Regulations implementing AB32 are pending and the California Air Pollution Control Officers Association (CAPCOA) has drafted a white paper identifying CEQA implementation options for local districts to consider when guiding lead agencies and project developers.

Table 6-1-25 includes a summary of greenhouse gases to be emitted from the project (turbines 3 and 4, combined). Greenhouse gas emissions were estimated using California Climate Action Registry protocol for power plants, version 2.2. Greenhouse gases are converted to carbon dioxide (CO_2) equivalent emissions, reflecting a weighted impact of methane (CH_4) and nitrogen dioxide (N_2O). Total annual CO_2 equivalent emissions from the project are estimated to be 62,130 metric tons, based upon 100% load operations and a combined 2,460 operating hours per year for both turbines, including 150 start / stop per unit sequences. Additional data can be found in Appendix 6.1-D.

Table 6.1-25 Greenhouse Gas Emissions - Operation

CO_2 (metric tons /yr)	NH_4 (metric tons / yr)	N_2O (metric tons / yr)	CO_2 equivalent (metric tons / yr)
61,731	7	1	62,130

6.1.7.6 Facility Environmental Impact Mitigation Measures

The following measures will be implemented to mitigate air quality impacts resulting from the operation of RERC Units 3&4. These measures are typically implemented through SCAQMD Regulations and enforced, accordingly. Section 6.1.9 provides an overview of the Project's conformity with those regulations.

- Fuel Selection – The combustion turbines will burn only pipeline quality natural gas. The existing black-start engine is the only source that burns liquid fuels. It will burn only ultra-low sulfur fuel.
- Best Available Control Technology – Each turbines will be equipped with Emissions Control Modules (ECM) that includes the following:
- SCR to control NOx emissions to a level of 2.3 ppmv corrected to 15 percent O2. Aqueous ammonia, rather than anhydrous ammonia, will be used as a reactant in the SCR system. The use of aqueous ammonia will reduce the consequences of accidental releases of ammonia into the atmosphere during shipping, transfer and storage.
- An oxidization catalyst will be installed to reduce CO emissions by approximately 85 percent to 6 ppmv corrected to 15 percent O2. The catalyst will also significantly reduce reactive organic gas (ROG) emissions and toxic pollutants from the gas turbines.

The proposed ECM technology reduces emissions to levels consistent with projects that have recently been approved by CEC and that are significantly lower than projects that have recently been permitted by California air districts.

- Emissions Offsets – Increases in emissions of criteria pollutants will be offset in one of two manners. For NOX and PM10 emissions the applicant will purchase offset credits that reflect emission reductions that have occurred elsewhere in the South Coast Air Basin. NOx credits will be purchased in an open market at a ratio of 1.0:1. PM10 offset credits will be purchased from the SCAQMD Priority Reserve at an offset Ratio of 1.2:1 pursuant to Rule 1303. PM10 offset credits will also mitigate PM2.5 emissions. Emission increases for other pollutants are below SCAQMD offset thresholds, so the applicant is not required to secure offset credits pursuant to SCAQMD regulations that have been reviewed and approved by CARB and U.S. EPA. The exemption is funded from otherwise unclaimed emission decreases from facility closures and permit expirations. In order to offer the offset exemption to small emission sources, SCAQMD is required to make periodic demonstration to U.S. EPA that no net increase in emissions occurs when netted across the South Coast Air Basin, pursuant to recently adopted Rule 1315.
- Reinvestment of Priority Reserve mitigation fees – RPU will pay approximately $3.3 million to SCAQMD in mitigation fees to obtain PM10 emission offset credits. SCAQMD is required pursuant to Rule 1309.1 to reinvest the funds into new technologies and projects aimed at reducing emissions and promoting renewable energy. These projects would reduce not only emissions of criteria contaminants, but also emissions of greenhouse gases and conceivably emissions of hazardous air pollutants. SCAQMD's objective is to ensure that the impact of emission reduction projects funded through the sale of priority reserve credits result in reduced ambient concentrations of PM10 and PM2.5 in key regions of the South Coast Air Basin, including Riverside. The emission reductions resulting from the reinvestment of 1309.1 mitigation fees will be in excess of the initial reductions that served to generate priority reserve credits.

6.1.8 Construction Operations

The majority of Project construction activities occur over an approximate 9-month period. Equipment removal and site restoration activities will occur following the 9-month period. The turbines will be constructed on an approximately 2.2 acre portion of RERC. An additional 2 acres will be disturbed during construction and used as a lay-down area.

The surface of the construction site is relatively flat, with little or no vegetation. Consequently, earthmoving operations in support of the Project will be relatively short in duration and minor in scope. Peak daily construction emissions are expected to occur in the fourth quarter of 2008, when excavation will occur, foundations are poured and large volumes of material and equipment will be delivered to the site.

The project will entail no construction of transmission lines, water lines or gas pipelines outside the facility boundaries.

6.1.8.1 Facility Construction Criteria Pollutants

Two categories of emissions are classified for the construction of the Project. The first category of emissions includes those emissions that will be emitted at the construction site. These emissions include combustion emissions from construction equipment, and fugitive particulate emissions from road dust, earthmoving operations and wind erosion. The second category of emissions directly related to the turbine facility construction project includes regional onroad emissions from construction worker passenger vehicles and from delivery vehicles. $PM_{2.5}$ emissions were derived based on factors taken from Tables 4 and 5 of the SCAQMD document, "Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds" (October 2006).

On-site Criteria Pollutant Emissions

It is estimated that peak fuel consumption will occur immediately after earthmoving operations are complete, and when excavation and foundation work is initiated. During this phase, much equipment and materials will also be delivered to the construction site. Peak monthly fuel consumption is estimated to be 6,438 gallons. Peak daily fuel consumption in is estimated to be 544 gallons. Appendix 6.1-E contains detailed emission calculations, projected construction schedules and an overview of typical construction equipment.

On-site combustion emissions from construction equipment were calculated using a spreadsheet developed by CEC. Calculations within the spreadsheet reflect the assumption that the on-site construction equipment fleet will be powered by certified Tier 1 or newer nonroad engines, combined with the use of ultra-low sulfur fuel. Tier 1 certification standards were implemented for new engines manufactured between the years 1996 and 2000. Calculations also reflect U.S. EPA emissions quantification methods that supported the agency's subsequent 2002 rulemaking activities for non-road compression-ignition engines as well as established methodology for determining emissions from gasoline-fueled construction equipment (NR-009b) and typical duty cycles of construction equipment.

Emissions from unpaved road dust, grading, loading and erosion reflect the construction schedule that was prepared by the applicant. These emissions were calculated using methods outlined in the SCAQMD CEQA Air Quality handbook. Emissions from scraper operations were calculated using methods and factors outlined in a report written by Midwest Research Institute for SCAQMD.

Table 6.1-26 provides a summary of estimated maximum daily on-site construction emissions for the turbine facility construction project during the peak month of January. Peak daily NO_x emissions in January are 117.2 pounds. PM_{10} and $PM_{2.5}$ emissions are expected to be 24.5 pounds/day and 10.2 pounds per day, respectively. PM emissions reflect combustion emissions, earth moving emissions, fugitive emissions due to wind-blown dust, and unpaved road emissions from both off-road and on-road vehicles expected to be on-site.

Table 6.1-26 Peak On-site Daily Criteria Pollutant Construction Emissions (lbs/day)

Activity	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$
Construction Equipment Combustion Emissions	117.2	116.7	13.2	0.1	7.40	6.59
Unpaved Road Travel Fugitive PM Emissions					12.14	2.55
Grading / Bulldozing Fugitive PM Emissions					4.22	0.89
Earth Loading Fugitive PM Emissions					0.68	0.14
Disturbed Soil Wind Erosion PM Emissions					0.02	0.004
Total Max. Pounds per Day	117.2	116.7	13.2	0.1	24.5	10.2

Table 6.1-27 provides a summary of on-site construction-related emissions for the duration of the construction project. Emissions reflect the same factors and methodology used to estimate daily construction emissions. The Project schedule commences in November 2008 with most activity occurring in January 2009. Activities are expected to continue through July 2009. Combustion-related emissions from construction equipment reflect projected fuel throughput of approximately 46,000 gallons of diesel fuel. Total PM_{10} emissions from fuel combustion are 657 pounds. PM emissions from earthmoving operations reflect the same calculation methodology used to determine maximum daily emissions and estimated activity levels over the duration of the project. Total PM_{10} emissions from on-site, non-combustion activities are estimated to be approximately 2,431 pounds, most of which reflects unpaved road dust. Combined with emissions from fuel combustion, total PM_{10} for the project is estimated to be 3,089 pounds. Total $PM_{2.5}$ emissions for the project are estimated to be 1,095 pounds. Total on-site NO_x emissions are estimated to be 9,652 pounds.

Table 6.1-27 On-site Project Criteria Pollutant Construction

Emissions (lbs/project)	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$
Construction Equipment Combustion Emissions	9,652	15,597	1,145	10	657	585
Unpaved Road Travel Fugitive PM Emissions					2,212	465
Grading / Bulldozing Fugitive PM Emissions					186	39
Earth Loading Fugitive PM Emissions					26	5
Disturbed Soil Wind Erosion PM Emissions					7	2
Total Pounds per Project	9,652	15,597	1,145	10	3,089	1,095

Offsite Construction-related Emissions

During construction of the facility, additional emissions will be generated due to worker commute and delivery vehicle trips. These emissions will occur on a regional basis. Table 6.1-28 includes a summary of daily maximum on-highway emissions from these sources. Table 6.1-29 includes a summary of on-highway emissions over the duration of the project. Detailed emissions calculations and supporting data are contained in Appendix 6.1-E.

Estimated emissions reflect a workforce of 30 construction workers in January and up to 100 construction workers in later months of the Project. Ten visitor trips per day are also envisioned. Overall, 7,920 passenger vehicle trips are envisioned during the Project, with an average round-trip commute distance of 40 miles.

The emissions in Tables 6.1-28 and 6.1-29 also reflect heavy-duty truck trips to the Project site. Truck activity typically includes the delivery of equipment and supplies to the site. For this analysis, all trucks are assumed to be diesel-fueled. Thirteen truck trips are estimated per day, with project total truck trips estimated at 525 trips for the project. Average heavy-duty truck round-trip travel distance is estimated to be 30 miles.

Travel distances to and from the site are assumed to be comprised of 5 percent local street miles, 5 percent collector street miles, and 90 percent freeway miles. Workers and visitor vehicles are assumed to be 50 percent light duty passenger, and 50 percent light duty truck. Heavy-duty trucks serving the project are assumed to be diesel-fueled. Emissions were calculated using SCAQMD peak month 2009 on-road emission factors. PM_{10} and $PM_{2.5}$ emissions from vehicles reflect combustion, tire wear, brake wear and paved road dust.

Table 6.1-28 Daily Regional On-highway Criteria Pollutant Emissions

Emissions (lbs/day)	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$
Passenger Vehicle – Combustion Emissions	1.21	11.62	1.19	0.01	0.10	0.06
Heavy-duty Truck – Combustion Emissions	8.72	7.86	1.09	0.01	3.14	0.27
Passenger Vehicle – Paved Road Dust					2.56	0.43
Heavy-duty Truck – Paved Road Dust					42.09	7.11
Total (lbs/day)	9.93	19.48	2.28	0.02	47.90	7.87

Table 6.1-29 Project Regional On-highway Criteria Pollutant Emissions

Emissions (lbs/project)	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$
Passenger Vehicle – Combustion Emissions	318	3,068	314	0	127	11
Heavy-duty Truck – Combustion Emissions	352	318	44	3	27	17
Passenger Vehicle – Paved Road Dust					676	114
Heavy-duty Truck – Paved Road Dust					1,700	287
Total (lbs/project)	671	3,386	358	4	2,530	430

Construction-related Greenhouse Gas Emissions

Greenhouse gas emissions were estimated using California Climate Action Registry Protocol, Version 2.2 and SCAQMD peak season on-highway emission factors for the year 2009 and are presented in Table 6.1-30. Greenhouse gases are converted to carbon dioxide (CO_2) equivalent emissions, reflecting a weighted impact of methane (NH_4) and nitrogen dioxide (N_2O). Total CO_2 equivalent emissions during construction operations are expected to be 2,887 metric tons. Additional information is contained in Appendix 6.1-D.

Table 6.1-30 Greenhouse Gas Emissions - Construction

	CO_2 (metric tons/ project)	NH_4 (metric tons/ project	N_2O (metric tons / project)	CO_2 equivalent (metric tons / project)
On-site heavy Equipment	463	0	0	464
Passenger Vehicles	174	6	6	2,271
Heavy-duty Trucks	19	0	0	151
Total Construction	656	7	7	2,887

6.1.8.2 Mitigation of Air Quality Impacts from Construction Operations

Environmental impacts from construction operations will be mitigated through environmental protection and engineering design features incorporated into the Project, and good management practices. The following measures are examples applicable to the Project.

- Fuel Selection - Ultra-low sulfur fuel is available in the South Coast region and will be used in construction equipment.

- Construction Equipment – To the extent practical, construction will be conducted using EPA-certified non-road engines. These engines are expected to have lower PM and NOX emissions than similar non-certified models. The use of Tier 1 nonroad engines is also recognized mitigation for greenhouse gases.
- Dust Suppression – Water will be applied to the construction site to reduce fugitive emissions during work hours.
- On-road Road Dust Control – If warranted, the facility will include a track-out control device. If on-road dust becomes problematic, truck tires may be washed prior to exiting the facility. Street sweeping activities on the adjoining roads may also be conducted to minimize road dust emissions.

6.1.9 Air Quality Impact Analysis

Air quality impact analyses were conducted to demonstrate the significance of the Project's impacts and to demonstrate compliance with local air quality regulations. One set of analyses was completed for various operating scenarios for the facility, including commissioning operations, startup operations and normal operations. A screening level fumigation analysis was also completed, as well as an analysis of the impacts from facility construction activities.

This section describes the air quality modeling results (in both magnitude and spatial extent) of estimated ground level concentrations resulting from emissions from the Riverside Energy Resource Center (RERC). Maximum modeled concentrations were added to the maximum background concentrations to calculate total impacts for the proposed project and entire facility for comparison to state and national ambient air quality standards (AAQS).

6.1.9.1 Air Quality Modeling Methodology

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described herein. All input and output modeling files are contained on a CD-ROM disk provided to the CEC Staff and the SCAQMD under separate cover. All modeling analyses were performed using the techniques and methods discussed with the SCAQMD and presented to SCAQMD in air quality modeling protocols. A number of minor changes to the information presented in the air quality modeling protocols were required due to revisions in USEPA modeling guidance and software that were released in January of 2008. Also, distance-dependant NO_2/NO_X ratios given by the SCAQMD were used to assess 1-hour NO_2 impacts using an Excel spreadsheet of the PLOTFILE model output. A complete summary of modeling methodology, a stack height analysis, model grid selection and model input parameters is contained in Appendix 6.1-F.

The air quality impact analysis includes the cumulative impacts of the proposed Project and existing sources at RERC. RPU queried SCAQMD to determine if other sources of air pollutants have been recently permitted or constructed within a six-mile radius of the Project that should also be included in a cumulative impact analysis. While complete data from SCAQMD are pending, preliminary data suggest that further cumulative impact analyses are not warranted. Once complete data are received from SCAQMD, RPU will forward it CEC for review and final determination of the need for additional cumulative impact analyses.

6.1.9.2 Ambient Air Quality Impacts – Facility Operations

Meteorological data, receptor grids, source characteristics, and model options described in Appendix 6.1-F were used in conjunction with the AERMOD model to determine the magnitude and location of the maximum impacts for each pollutant and averaging period. In order to assess the significance of the modeled concentrations, the maximum concentrations were modeled and compared to the Class II Prevention of Significant Deterioration (PSD) Significant Impact Levels (SILs). In addition, impacts are added to maximum background concentrations and compared to the AAQS. Impacts are presented below for both the proposed project and for the entire facility.

The AQIA included several different operating scenarios. The first scenario evaluated was a normal year of operation. Normal operating parameters were used to determine hourly NO_X and CO impacts, and for 3-hour SO_2 impacts. Eight-hour CO impacts reflect two turbine startup hours, two shutdown hours and four normal operating hours.24-hour PM_{10} and $PM_{2.5}$ impacts reflect 24 hours of normal operations. Annual impacts reflect 1230 hours of operation for each turbine and the cooling tower, including 150 starts and stops for each turbine and 10 hours of maintenance operations for each turbine. Similar operating schedules were assumed for RERC Units 1&2, and the existing cooling tower. Impacts from the existing black start engine reflect ½ hour of operation per day and 54 hours of operation per year. Additional supporting information, including screening level analyses, operating assumptions and model input parameters are included in Appendix 6.1-F.

Table 6.1-31 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods for normal operations, for start-up/shutdown periods, and for initial commissioning activities for the proposed project only. Background ambient data reflect the highest levels recorded for the applicable averaging period at the Rubidoux, Riverside and Mira Loma monitoring stations between the years of 2004 and 2006. The analysis results indicate that when combined with background ambient concentrations, the Project's emissions will not lead to a violation of state or federal standards for NO_2, CO, sulfates and SO_2.

Ambient levels of PM_{10} and $PM_{2.5}$ are already in excess of the most stringent 24-hour and annual ambient air quality standards. SCAQMD has established thresholds for PM_{10} increases in Rule 1303 to determine permit eligibility. For the 24-hour average, Rule 1303 allows an increase of 2.5 $\mu g/m^3$. The 24-hour increase from the Project is projected to be 0.36 $\mu g/m^3$. Rule 1303 allows an increase in the annual average ambient concentration of level of significance of 1.0 $\mu g/m^3$. The annual average increase from the project is expected to be 0.019 $\mu g/m^3$. The expected increase in the 24-hour average ambient concentration is approximately 0.7% of the most stringent PM_{10} standard of 50 $\mu g/m^3$. The expected increase in annual average ambient PM_{10} is approximately 0.1% of the most stringent standard of 20 $\mu g/m^3$.

SCAQMD has not amended Rule 1303 to specify acceptable changes in ambient concentrations of $PM_{2.5}$ that can be allowed under a new permit. The increase in the ambient $PM_{2.5}$ concentration of 0.36 $\mu g/m^3$ over a 24-hour averaging period is

approximately 1.0% of the most stringent 24-hour standard of 35 µg/m^3. The increase in the ambient $PM_{2.5}$ concentration of 0.019 µg/m^3 over an annual averaging period is less than 0.16% of the most stringent 24-hour standard of 12 µg/m^3. These slight increases in ambient concentrations of PM_{10} and $PM_{2.5}$ are not significant.

An air quality impact assessment scenario reflecting startup and commissioning operations was performed. During startup operations turbines are assumed to operate at slightly reduced average load and with partial NO_X and CO emissions control. One-hour NO_X and CO impacts, and 8-hour CO impacts were analyzed. For the analysis, both turbines were assumed to be started at a single point in time. The project increase of 4.4798 µg/m^3 NO_X and 8.504 µg/m^3 CO would not lead to an exceedence of 1-hour ambient air quality standards. The project increase of 2.411µg/m^3 would not lead to an exceedence of the 8-hour CO standard.

During commissioning the turbines are assumed to operate at full load and with no level of NO_X or CO emissions control. One-hour NO_X and CO impacts, and 8-hour CO impacts were analyzed. For the analysis, one turbine was assumed to operate in commissioning mode at a time. The analysis results show that the Project increase of 9.985 µg/m3 NO_X and 19.361 µg/m3 CO would not lead to an exceedence of 1-hour ambient air quality standards. The project increase of 6.733µg/m3 would not lead to an exceedence of the 8-hour CO standard.

All modeled pollutant concentrations for the proposed project are less than the SILs for those pollutants. This includes modeled impacts for normal operations, start-up/shutdown periods, and commissioning activities. Combined impacts (maximum proposed project impacts plus maximum background concentrations) are only greater than the AAQS for those pollutants and averaging times than the background concentrations are already greater than the AAQS. Since the proposed project impacts are less than the SILs, emissions from the proposed project will not significantly affect the ambient air quality of the area.

Table 6.1-31 Air Quality Impact Results for Refined Modeling Analysis of Proposed Project

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS	
						($\mu g/m^3$)	($\mu g/m^3$)
Normal Operating Conditions							
NO_2	1-hour	1.685	172.7	174.4	-	338	-
	Annual	0.036	41.3	41.3	1	56	100
CO	1-hour	4.826	4571.4	4576.2	2000	23,000	40,000
	8-hour	1.779	3394.3	3396.1	500	10,000	10,000
SO_2	1-hour	0.204	52.2	52.4	-	655	-
	3-hour	0.108	41.8	41.9	25	-	1,300
	24-hour	0.033	39.2	39.2	5	105	365
	Annual	0.002	7.8	7.8	1	-	80
PM_{10}	24-hour	0.360	137.0	137.4	5	50	150
	Annual	0.019	64.0	64.0	1	20	-
PM_{10} Turbines Only	24-hour	0.359			5	SCAQMD 1309.1 SILs for sources <500 MW in Zone 3 and not in an EJ area	
	Annual	0.019			0.75		
$PM_{2.5}$	24-hour	0.360	98.7	99.1	-	-	35
	Annual	0.019	22.1	22.1	-	12	15
Start-up/Shutdown Periods							
NO_2	1-hour	4.479	172.7	177.2	-	338	-
CO	1-hour	8.504	4571.4	4579.9	2000	23,000	40,000
	8-hour	2.411	3394.3	3396.7	500	10,000	10,000
Commissioning Activities							
NO_2	1-hour	9.985	172.7	182.7	-	338	-
CO	1-hour	19.361	4571.4	4590.8	2000	23,000	40,000
	8-hour	6.773	3394.3	3401.1	500	10,000	10,000

Table 6.1-32 summarizes maximum-modeled concentrations for each criteria pollutant and associated averaging periods for normal operations, for start-up/shutdown periods, and for initial commissioning activities for the entire facility, including all four turbines, both cooling towers, and the black-start engine. For start-up/shutdown periods and commissioning activities, it was conservatively assumed that the black-start engine was also concurrently being tested. Combined facility impacts plus maximum background concentrations are only greater than the AAQS for those pollutants and averaging times where the background concentrations are already greater than the AAQS (PM_{10} and $PM_{2.5}$,). For those pollutants, the proposed project impacts are less than SILs, emissions from the proposed Project will not significantly affect the ambient air quality of the area.

Table 6.1-32 Air Quality Impact Results for Refined Modeling Analysis of Entire Facility

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS	
						($\mu g/m^3$)	($\mu g/m^3$)
Normal Operating Conditions							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
	Annual	0.100	41.3	41.4	1	56	100
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	3.674	3394.3	3398.0	500	10,000	10,000
SO_2	1-hour	0.411	52.2	52.6	-	655	-
	3-hour	0.209	41.8	42.0	25	-	1,300
	24-hour	0.063	39.2	39.3	5	105	365
	Annual	0.004	7.8	7.8	1	-	80
PM_{10}	24-hour	0.725	137.0	137.7	5	50	150
	Annual	0.040	64.0	64.0	1	20	-
$PM_{2.5}$	24-hour	0.725	98.7	99.4	-	-	35
	Annual	0.040	22.1	22.1	-	12	15
Start-up/Shutdown Periods							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	5.038	3394.3	3399.3	500	10,000	10,000

Pollutant	Avg. Period	Maximum Concentration (µg/m^3)	Background (µg/m^3)	Total (µg/m^3)	Class II Significance Level (µg/m^3)	Ambient Air Quality CAAQS/NAAQS	
						(µg/m^3)	(µg/m^3)
Commissioning Activities							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	8.438	3394.3	3402.7	500	10,000	10,000

Fumigation Analysis:

USEPA Model SCREEN3 (version 96043) was used to conduct an analysis of inversion breakup fumigation impacts. Since the site location is greater than 3000 meters from any large body of water, shoreline fumigation impacts are not expected to occur based on USEPA guidance given in *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019).

Inversion breakup fumigation impacts of 1.027 micrograms/cubic meter (µg/m^3) for a unitized emission rate (1 gram/second, g/s) were predicted to occur at 18,621 meters from the turbine stacks. These results are predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speeds at the stack release heights. Since the site vicinity is urban in nature, SCREEN3 impacts were evaluated in both rural and urban modes for the turbine stacks at the inversion breakup distance for all SCREEN3 meteorological conditions. At this distance, the maximum urban impact was 2.3833 times higher than the maximum rural impact (i.e., 0.9371 µg/m^3 vs. 0.3932 µg/m^3 for 1 g/s emissions for urban and rural conditions, respectively). Thus, the inversion breakup fumigation impact was adjusted to 2.448 µg/m^3 for a unitized emission rate to account for urban dispersion conditions (i.e., 2.3833 x 1.027 µg/m^3). At the inversion breakup distance, the maximum black-start engine impact was 1.607 µg/m^3 for a 1 g/s emission rate under urban conditions for all SCREEN3 meteorological conditions.

These unitized impacts were used to calculate 1-hour inversion breakup impacts for all pollutants by multiplying the unitized impacts by the pollutant emission rates (in g/s). The fumigation impacts from the two new proposed turbines are added to the black-start engine impacts at the same location to obtain combined pollutant impacts for the facility. Table 6.1-33 summarizes these results.

Table 6.1-33 Inversion Breakup Impacts for the Proposed Project and Black Start Engine

Pollutant/ Avg.Time	Impacts (µg/m^3) at Inversion Breakup Location			Maximum Impacts from SCREEN3 for Normal Dispersion
	Fumigation Impacts for Turbines	BS Engine Impacts	Total Impacts	
NO_X 1-hour	2.557	1.314	3.871	1157
SO_2 1-hour	0.171	0.001	0.172	0.713
CO 1-hour	4.061	0.399	4.460	351.2

Inversion breakup impacts can be similarly calculated to the entire facility. These impacts are shown on Table 6.1-34.

Table 6.1-34 Inversion Breakup Impacts for the Entire Facility with Black Start Engine

Pollutant/ Avg.Time	Impacts (µg/m^3) at Inversion Breakup Location			Maximum Impacts from SCREEN3 for Normal Dispersion
	Fumigation Impacts for Turbines	BS Engine Impacts	Total Impacts	
NO_X 1-hour	5.333	1.314	6.647	1157
SO_2 1-hour	0.344	0.001	0.345	1.058
CO 1-hour	8.122	0.399	8.521	351.2

As shown above, maximum SCREEN3 impacts at all offsite locations under normal urban dispersion conditions are much higher than fumigation impacts. Fumigation impacts are also less than the maximum facility AERMOD impacts predicted to occur in the general vicinity of the project site under normal operating conditions as shown in Table 6.1-35.

Table 6.1-35 Inversion Breakup Impacts Compared to AERMOD Maximum Impacts

Pollutant/ Avg.Time	Impacts (µg/m^3) for Proposed Project (Two Proposed Turbines)		Impacts (µg/m^3) for Entire Facility (Four Turbines and Black-Start Engine)	
	Fumigation Impacts	Maximum AERMOD Impacts	Fumigation Impacts	Maximum AERMOD Impacts
NO_X 1-hour	2.557	3.039 (NO_X)	6.647	20.313 (NO_2)
SO_2 1-hour	0.171	0.204	0.345	0.411
CO 1-hour	4.061	4.826	8.521	61.8

Since 1-hour fumigation impacts are less than the maximum overall SCREEN3 and AERMOD 1-hour impacts, no further analysis of additional short-term averaging times (3-hour, 8-hour, or 24-hour) is required as described in Section 4.5.3 of *"Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised"* (EPA-454/R-92-019). Also, the AERMOD impact analyses presented

previously are conservative for this project and for the entire facility.

6.1.9.3 Air Quality Modeling Methodology – Facility Construction

As in the analysis of project operating impacts, the USEPA model AERMOD was used to estimate ambient impacts from construction activities. A detailed discussion of the AERMOD dispersion model and the modeling options, meteorological data, and receptor grids used for the facility is included in Section 6.1.9.1. The same meteorological data and modeling options in the Project operating impact analysis was used for the construction impacts analysis, with minor modifications to accommodate efficient processing of data for the higher number of construction sources. Appendix 6.1-F contains information regarding overall modeling methodology that was incorporated into the both the operations and construction impact analyses. Appendix 6.1-G contains modeling input, methods and results that are specific to the construction impact analysis.

The emission sources for the construction site were grouped into two categories: exhaust emissions from mobile and stationary combustion equipment and fugitive dust emissions. Combustion equipment exhaust emissions were modeled as 10' high point sources placed at regular 20-meter intervals around the 3-acre construction area. Dust emissions were modeled as an area source with an effective plume height of 0.5 meters that covered the total 3-acre construction area. The construction impacts modeling analysis used the 10-meter spaced downwash and fence line receptor grids from the project operating impact analysis. The worst-case daily onsite construction emission levels shown in Tables 6.1-26 were used to determine the construction impacts in relation to the short-term state and national ambient air quality standards (AAQS, i.e., 24 hours and less). For pollutants with annual average AAQS, the annual onsite emission levels shown in Table 6.1-27 were used.

6.1.9.4 Ambient Air Quality Impacts – Facility Construction

Based on the emission rates of NOx, SO2, CO, PM10, and PM2.5 and the meteorological data, the AERMOD model calculates hourly and annual ambient impacts for each pollutant. The modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NOx, SO2, CO, PM10, and PM2.5. The annual impacts are based on the project total emission rates of these pollutants.

As shown in Table 6.1-36, maximum modeled impacts including background concentrations for construction activities for NO2 CO and SO2 are less than the most stringent state and national AAQS. The state and national 24-hour and annual PM10 and PM2.5 AAQS are already exceeded (or nearly exceeded in the case of the national 24-hour PM10 AAQS) in the absence of the construction emissions for the project site. The significance of an air quality impact is based upon two criteria. The first is the project's potential to cause and exceedance of an AAQS. For both pollutants, the increase in ambient concentrations are less than the lowest AAQS, so the project itself does not constitute an exceedance of an AAQS.

The second criteria for determining significance for PM10 and PM2.5 is the degree to which the project would contribute to an existing exceedance of an AAQS. The model results indicate that the increase in PM10 ambient concentrations is 42.1 µg/m3 on a 24-hour average, and 7.5 µg/m3 on an annual average. The increase in ambient PM2.5 concentrations is 10.4 µg/m3 on a 24 average and 1.8 µg/m3 on an annual average.

Various factors related to the model results warrant further discussion of resulting ambient concentrations to better understand the significance of impacts due to construction activities. The model results indicate that peak ambient PM concentrations resulting from construction activities are predicted to occur at the eastern fence line of the RERC facility, rather than on inhabitable property farther away from the facility. The model does not consider the degree to which the block wall on the eastern perimeter of the facility may aid in containing ground-level fugitive PM emissions. Concentrations to the north, west and south of the facility and city-controlled property are significantly lower than those to the east of the facility. The model also predicts that ambient concentrations of PM will decrease significantly with only a small increase in distance from the facility. For example, at a distance of approximately 25 meters east of the fence line, 24-hour PM concentration decreases by approximately 45%. At a distance of only 200 meters east of the fence line, the 24-hour PM10 concentration decreases by 88% to approximately 5 µg/m3. Similar dramatic decreases in annual PM10, 24-hour PM2.5 and annual PM2.5 concentrations are also predicted by the model. Isopleths demonstrating the distribution of PM concentrations resulting from construction activities are included in Appendix 6.1-G.

A second factor related to model results is the limitation of the model itself. The AERMOD model overpredicts construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the AERMOD model are derived from observations of hot plumes associated with typical smoke stacks. The AERMOD model does compensate for plume temperature; however, for ambient temperature plumes the model assumes negligible buoyancy and dispersion. Consequently, ambient concentrations in cold plumes remain high even at significant distances from a source. The construction site impacts predicted for this site are not unusual in comparison to the modeled impacts for most construction sites. Construction operations that are controlled through good dust suppression techniques and the use of low-emitting vehicles have not typically resulted in measurable violations of AAQS.

Additional guidance exists to determine the significance of air quality impacts resulting from construction activities. SCAQMD has implemented an independent process to aid project developers and permitting agencies in determining the significance of both regional and localized impacts from construction activities. SCAQMD's threshold for determining significance from construction activities on a regional basis is 150 pounds per day of PM10 and 55 pounds per day of PM2.5. Estimated emissions of 24.5 lb/day of PM10 and 10.2 pounds per day of PM2.5 for the proposed project are well below SCAQMD's regional significance thresholds.

SCAQMD has also established localized significance thresholds (LSTs) for PM10 and PM2.5. LSTs are daily mass emission rate thresholds that reflect the amount of emissions that can be expected to result in a significant localized increase in ambient concentrations of a pollutant. For the proposed project, estimated daily emissions of 24.5 pounds per day of PM10 and 10.2 pounds per day of PM2.5 are below the applicable SCAQMD LSTs of 96 pounds per day and 31 pounds per day, respectively. An analysis of conformance with SCAQMD's LSTs for construction activities is contained in Section 6.1.12.

The significant decrease in ambient PM concentrations over relatively short distances from the project site, the conservative nature of AERMOD relative to construction operations, compliance with SCAQMD regional significance thresholds, compliance with SCAQMD LSTs, and the temporary nature of construction activities support the conclusion that ambient air quality impacts resulting from construction activities are below a level of significance.

Table 6.1-36 Summary of Air Quality Impact Analysis Construction Activities Point of Maximum Impact – MEI

Pollutant	Averaging Time	Maximum Construction Impacts (µg/m^3)	Maximum Background (µg/m^3)	Total Impact (µg/m^3)	State AAQS (µg/m^3)	National AAQS (µg/m^3)
NO_2[a]	1-hour	18.1	172.7	190.8	338	-
	Annual	4.2	41.3	45.5	56	100
SO_2	1-hour	0.22	52.2	52.4	655	-
	3-hour	0.10	41.8	41.9	-	1300
	24-hour	0.04	39.2	39.2	105	365
	Annual	0.01	7.8	7.8	-	80
CO	1-hour	228.8	4571.4	4800.2	23,000	40,000
	8-hour	101.2	3394.3	3495.5	10,000	10,000
PM_{10}	24-hour	42.1	137.0	179.1	50	150
	Annual	7.5	64.0	71.5	20	-
$PM_{2.5}$	24-hour	10.4	98.7	109.1	-	35
	Annual	1.8	22.1	23.9	12	15

6.1.10 Health Risk Assessment

Two health risk assessments were completed for the Project. The first assessment was completed to determine the increase in health risks attributed to the operation of the gas turbines and auxiliary equipment. The second assessment was completed to determine the increase in health risks that could be attributed to diesel emissions during construction of the facility.

The health risk assessments were conducted to determine expected increases in cancer risk as well as chronic and acute health risks. They were completed in accordance with the CARB *Air Toxics Hot Spots Program Risk Assessment Guidelines (August 2003)* and with SCAQMD Rule 1401 Toxics New Source Review guidelines. The health risk assessment for facility operations calculates the offsite cancer risk as well as chronic and acute health risks for the maximally exposed individual (MEI). The health risk assessment for construction emissions calculates the offsite cancer risk and chronic risks for the MEI.

The HARP model uses emission rates for toxic compounds, site specific parameters, dispersion characteristics, and pollutant-specific toxicity data. The toxicity data is a value that represents the estimated probability of adverse health effects due to exposure of a particular pollutant for a given duration. The toxicity data is provided by the California Office of Environmental Health Hazard Assessment (OEHHA) specifically for use in health risk assessments.

In accordance with state and local requirements, maximum individual cancer risk (MICR), chronic (long-term) hazard indices, and acute (short-term) hazard indices must be evaluated. For this health risk assessment, these requirements were calculated for the point of maximum impact.

<u>Cancer Overview:</u>
The cancer risk is the estimated probability of a potential receptor contracting cancer as a result of continuous exposure to carcinogenic air contaminants over a period of 70 years. The cancer risk must be calculated as delineated by CARB and must be less than 10 in one million (1.0×10^{-05}) potential cancer incidents in most circumstances. Cancer burden is a population-level risk calculation.

<u>Acute Hazard Overview:</u>
The acute hazard is the non-cancer health risk due to short-term exposure to non-carcinogenic pollutants over a short time period (usually 1 hour). The acute hazard index, which is a calculated index characterizing acute non-cancer health impacts, must be less than 1.0 in most circumstances.

<u>Chronic Hazard Overview:</u>
The chronic hazard index is the non-cancer health risk due to exposure to noncarcinogenic pollutants for one year or more. The chronic hazard, which is a calculated index characterizing acute non-cancer health impacts, must be less than 1.0 in most circumstances.

6.1.10.1 Health Risks Resulting from Facility Operations

Table 6.1-37 includes a summary of the health risk assessment results for facility operations. Detailed assessment data are included in Appendix 6.8-C. The assessment reflects toxic pollutant emissions from the two gas turbines and the cooling tower. Emission estimates for the gas turbines reflect appropriate control levels from the SCR/CO catalyst system. The commissioning operations scenario reflects no emissions control. Emission estimates from the cooling tower reflect the use of reclaimed water and reflect the presence of chemicals that are typically found in cooling water treatment products.

The point of maximum impact is located very near the eastern property boundary on Payton Avenue. The maximum individual cancer risk of 1.06×10^{-07} reflects a 70-year exposure period with no adjustments for limited workplace exposure. Significance thresholds reflect CEC policy for determining significance. Health risk assessment results indicate that at the point of maximum impact health risks are below the levels of significance. Health risk assessment results also demonstrate compliance with relevant SCAQMD Rules 1401 and 1309.1 thresholds. In addition, calculated health risks at all sensitive receptor locations are below relevant significance thresholds.

Table 6.1-37 Health Risk Assessment Results - General Operations

Hazard Description	Results	Significance Threshold
Normal Operations Point of Maximum Impact		
Cancer Risk	1.06×10^{-07}	$1.0 \times 10\text{-}0^{5}$
Chronic Hazard Index	0.002	1.0
Acute Hazard Index	0.085	1.0
Cancer Burden	0.00001	0.5
Commissioning Operations Point of Maximum Impact		
Cancer Risk	Not Applicable	Not Applicable
Chronic Hazard Index	Not Applicable	Not Applicable
Acute Hazard Index	0.442	1.0
Cancer Burden	Not Applicable	Not Applicable

6.1.10.2 Health Risks Resulting from Construction Activities

Table 6.1-38 includes a summary of the health risk assessment results for construction activities. The construction assessment results reflect calculated health risks at specific sensitive receptors. The health risk assessment for construction operations also reflects estimated emissions over the duration of the construction period. In accordance with CARB guidelines, the assessment considers both cancer risk and chronic health risks. The cancer risk calculations contained in the HARP model reflect a 70-year lifetime exposure. The model results were then multiplied by 2 years divided by 70 years in order to more accurately reflect the impacts of a short-term project. The results indicate that health risks attributed to the construction project are well below levels of

significance. Detailed assessment data are included in Appendix 6.8-B.

Table 6.1-38 Health Risk Assessment Results - Construction Activities

Hazard Description	Results	Significance Threshold
Cancer Risk	6.22×10^{-07}	1.0×10^{-06}
Chronic Hazard Index	0.00215	1.0

6.1.11 Laws, Ordinances Regulations and Standards

6.1.11.1 Consistency with Federal Requirements

U.S. EPA has delegated authority to implement and enforce all applicable federal programs to SCAQMD. Consistency with applicable federal requirements such as Title V permits and the Acid Rain Program is met through compliance with SCAQMD regulations.

6.1.11.2 Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). SCAQMD administers PSD through Regulation XVII.

Table 6.1-39 includes a summary of potential annual emissions from the proposed Project and PSD applicability thresholds. The proposed Project is not subject to PSD applicability thresholds because it does not increase the facility total emissions above the PSD major source threshold of 250 tons per year for any pollutant and also does not result in emissions exceeding the thresholds for a significant modification. Therefore, further PSD analysis is not required. A separate application or notification to U.S. EPA is not required due to SCAQMD's authority to implement the PSD program under Regulation XVII.

Table 6.1-39 Comparison of Emissions with PSD Applicability Thresholds

Pollutant	Project Emissions (tons per year)	Facility Emissions (tons per year)	PSD Major Source Threshold (tons per year)	PSD Significant Modification Threshold (tons per year)	PSD Applicable?
$PM_{10}/PM_{2.5}$	3.7	7.6	250	15	No
ROG	1.6	3.1	250	40	No
NO_x (first year)	15.06	23.2	250	40	No
NO_x (normal year)	6.9	15.8	250	40	No
SO_2	0.3	0.7	250	40	No
CO (first year)	17.8	28.1	250	100	No
CO (normal year)	9.9	20.9	250	100	No

The nearest Class I area is Joshua Tree National Park, approximately 75 km from the proposed Project. As discussed above, the proposed project does not trigger PSD review for any pollutant, so a Class I impact analysis is not required in accordance with PSD regulations. No formal analysis of impacts was conducted for this Project, but it should be noted that the Project impacts listed in Table 6.1-39 are significantly below PSD limits for Class I areas. It is reasonable to conclude that further dispersion of the exhaust plume over the 75 km distance between the proposed facility and the nearest Class I area would result in impacts at the Class I area that are below the level of significance.

6.1.11.3 Consistency with State of California Requirements

CARB has delegated responsibility for implementing and enforcing all stationary source air quality regulations to SCAQMD. Compliance with SCAQMD regulations ensures consistency with state air quality laws and regulations.

6.1.11.4 Consistency with SCAQMD Regulations

SCAQMD Regulation II

Rule 212: Standards for Approving Permits:
This equipment is not located within 1000 feet of a school, but the proposed facility will have potential NO_x emissions that are in excess of the levels specified in Rule 212 (g). Public notification is required and will be coordinated through SCAQMD.

Rules 218 and 218.1: Continuous Emissions Monitoring:
The turbines will be equipped with continuous emissions monitoring systems (CEMS) to ensure compliance with BACT for NO_X and CO. The portion of the CEMS used to monitor CO is subject to the application, certification and quality assurance requirements of Rules 218 and 218.1. A CEMS vendor has been selected for this system. The proposed CEMS package has been demonstrated to comply with monitoring requirements of applicable SCAQMD and U.S. EPA. The CEMS vendor will submit applications and QA/QC plans and initiate certification testing of the CEMS in accordance with Rules 218 and 218.1.

SCAQMD Regulation IV – Prohibitory Rules

Rule 401: Visible Emissions:
The opacity limits established in Rule 401 are not expected to be exceeded since the equipment will be fired on natural gas. Compliance with Rule 401 is expected.

Rule 402: Nuisance:
Based upon experience with similar equipment, operation of this system is not expected to emit air contaminants so as to cause a nuisance. Compliance with Rule 402 is expected.

Rule 403: Fugitive Dust
Because the Project does not meet the definition of a medium or large construction operation, no construction plans are required to be submitted to SCAQMD. Paragraph (d)(4) specifies that PM_{10} levels cannot exceed 50 $\mu g/m^3$ over a 5-hour period. Paragraph (h)(4) specifies that the project is exempt from the 50 $\mu g/m^3$ limit as long as certain mitigation measures are taken. If specified by SCAQMD, RPU will comply with the exemption requirements during grading operations to demonstrate compliance with Rule 403. Such requirements include watering daily when earthmoving exists at a point more than 100 feet from property fence lines. For operations near fence lines, the applicant will either curtail operations during periods when exceedences are likely to occur, or will maintain soil moisture content to a minimum of 12 percent.

Rule 431.1 Sulfur Content of Gaseous Fuels:
The equipment proposed for this project will be fired on pipeline quality natural gas. Compliance with Rule 431.1 is expected.

SCAQMD Regulation IX

Subpart KKKK – Standards of Performance for Stationary Combustion Turbines:
Based upon performance characteristics for the turbine model and compliance with BACT standards, the maximum NO_x and SO_2 concentrations allowable under Subpart KKKK (1.2 lb/MWh and 0.90 lb/MWh, respectively) should not be exceeded.

Regulation XI

Rule 1134: Emissions of Oxides of Nitrogen from Stationary Gas Turbines
New turbines and reclaim sources are exempt from Rule 1134.

Regulation XIII and Regulation XX New Source Review

Rule 1303 and Rule 2005: Best Available Control Technology (BACT):
Table 6.1-40 includes a summary of recent BACT determinations. BACT for non-emergency simple cycle gas turbines generally consists of 2.5 ppm for NOX, 6.0 ppm for CO and 2.0 ppm for ROG based upon recently permitted facilities. Even more recently, the City of Anaheim submitted an application to the CEC to obtain an AFC for their 200 MW Canyon Power Plant Project. The included BACT analysis concluded that 6.0 ppm CO, 2.0 ppm ROG and 2.3 ppm NOX reflect BACT. RPU proposes to meet the same limits for CO and ROG, and also proposes a NOx limit of 2.3 ppm, which is below accepted BACT. CEMS will be installed pursuant to Rules 218, 218.1 and 2012 to ensure BACT compliance. A complete BACT analysis is included in Appendix 6.1-H.

Table 6.1.40 Recent BACT Determinations

Important Dates	Project Name	NO_x (ppm)	CO (ppm)	ROG (ppm)	Control Technology
10/2006 (SPPE) 08/2007 (ATC)	Niland Gas Turbine Plant	2.5	6.0	2.0	SCR & Dry-Low NO_x Burners; Oxidation Catalyst; Natural Gas fired.
04/2006 (AFC)	San Francisco Electric Reliablility Project	2.5	4.0*	2.0	SCR & Water injection; Oxidation Catalyst; Natural Gas fired.
02/2004 (SPPE)	Modesto Electric Generation Project	2.5	6.0	2.0	SCR & Water Injection; Oxidation Catalyst; Natural Gas fired.
12/2004 (SPPE) 02/2005 (PTC)	Riverside Energy Resource Center	2.5	6.0	2.0	SCR & Water Injection; Oxidation Catalyst; Natural Gas fired.

* 3-hour average

Rule 1303 and Rule 2005: Modeling:
Modeling as required by SCAQMD Rules 1303 and 2005 was performed to demonstrate no unacceptable increase in ambient NO_2, CO, PM and SO_2 emission concentrations from facility operations. Detailed information regarding the modeling for this project can be found in Section 6.1.9 and Appendix 6.1-F and G.

Rules 1303, 1304 and 1309.1:

Potential annual emissions of CO, ROG and SO_X from the proposed equipment, combined with limits upon annual operating hours will be below the emission offsets threshold stipulated in Rule 1304(d)(2)(B) Table A. However, emission offsets will be required for PM_{10}, as the additional turbines at RERC will drive facility emissions above the limit of 4 tons/year (8000 lbs/yr). Emissions for PM_{10} must be offset at a ratio of 1.2 to 1.0 within the South Coast Air Basin, pursuant to Rule 1303(b)(2)(a).

Segregated based on type of operation, the additional turbines are expected to emit 20 lbs/day of PM_{10} during normal operation. Startups will yield 3.66 lbs/day and shutdowns will generate slightly more, at 4 lbs/day. Maintenance operations will contribute 2 lbs/day of PM_{10}. All of these calculations are based on a 30-day average and reflect the combined emissions from both proposed turbines. The modification to RERC will yield 29.7 lbs/day of PM_{10} (based on a 30 day average). Since these PM_{10} emissions must be offset at a 1.2 to 1.0 ratio, RERC will require 36 lbs/day of offsets.

RERC will use emission reduction credits from the Priority Reserve to offset to the required level for PM_{10}, pursuant to Rule 1309.1(b)(4)(A). Access to the Priority Reserve credits is based on a demonstration that the project meets the requirements set forth in Rule 1309.1(b)(5)(A)(iii). Specifically, the MICR from the combined units must be less than one in one million; the acute and chronic, non-cancer, risk hazard index from the combined units must be less than 0.5; and the cancer burden from the combined units must be less than 0.1. Table 6.1-41 shows the MICR, non-cancer Hazard Index and cancer burden of the proposed project.

In addition to the health risk demonstration, drawing credits from the Priority Reserve is dependent upon the combustion turbines being able to achieve mass emission rates of 0.060 lb/MW-hr of PM_{10} and 0.080 lb/MW-hr of NO_x, at full load (corrected to 59°F, 60% relative humidity, and 14.7 psi), except during startup and shutdown. In 2007, SCAQMD conducted source tests on the existing, identical LM6000 turbines at RERC. Their findings demonstrate that the proposed combustion turbines are capable of meeting the required emission rates for PM_{10} and NO_x as described in the rule. It should be noted that these findings are based on less than one year of peaking duty.

Based on GE specifications at ISO conditions, RPU intends to have the new turbines permitted at levels of 3.0 lb/hr of PM_{10} and 2.3 ppmv of NO_x. The NO_x emission rate is below the levels currently considered to be BACT. Furthermore, using these rates, the calculated emissions for the new LM6000 turbines at RERC are 0.06 lb/MW-hr of PM_{10} and 0.08 lb/MW-hr of NO_x at full load and at ISO conditions.

It must also be substantiated through the use of modeling that the 24-hour and annual impacts of total combined PM_{10} emissions do not exceed 5.0 $\mu g/m^3$ or 0.75 $\mu g/m^3$, respectively. Based on the modeling data collected for the RERC modification, the 24-hour impact of total PM_{10} emissions from the combined new equipment will be 0.36 $\mu g/m^3$. The annual impact will be 0.019 $\mu g/m^3$. Both of these impact levels are within the acceptable range of the rule requirements.

Finally, simple cycle electric generation facilities (EGF) must not operate more than 4000 hours each year. RERC will operate 1230 hours annually on a per turbine basis.

Based upon this analysis, the RERC modification is in compliance with respect to Rule 1309.1(b)(5)(A)(iii) and is eligible to draw emission reduction credits from the Priority Reserve.

Table 6.1-41 Priority Reserve Compliance Demonstration for RERC Units 3&4

	Eligibility Limits	Actual
Health Risk		
MICR:	$1x10^{-6}$	$1.06\ x10^{-7}$
Acute Hazard Index:	0.5	0.085
Chronic Hazard Index:	0.5	0.002
Cancer Burden:	0.1	0.00001
Emission Rates		
PM_{10}:	0.06 lb/MW-hr	0.06 lb/MW-hr
NO_x:	0.08 lb/MW-hr	0.08 lb/MW-hr
Emission Impacts		
24-Hour:	5.0 $\mu g/m^3$	0.36 $\mu g/m^3$
Annual:	0.75 $\mu g/m^3$	0.019 $\mu g/m^3$
Operation Restrictions		
Maximum Annual Operating Hours:	4000	1230

Rule 2005: RECLAIM Emission Offsets:

Offsets will be required in accordance with Rule 2005 for all potential NO_x emissions, including emissions from emergency equipment. At a minimum, RPU will secure adequate RECLAIM Trading Credits (RTCs) to offset the first year's operations prior to initiating operation of the Project. Offset purchases may be expedited if mandated by CEC as a mitigation measure to insure issuance of the small power plant exemption.

RPU will be required to purchase 13,720 RTCs to offset emissions from the new turbines during normal operating years, based upon proposed operations. For the first operating year, additional offsets will be required to offset increased emissions during turbine commissioning and to account for any operations that occur prior to CEMS certification tests in accordance with Rule 2012. Estimated first-year NO_x emissions are 30,120 pounds, due to the allocated 200-hour commissioning and CEMS certification period.

SCAQMD Regulation XIV

Rule 1401: New Source Review of Toxic Air Contaminants:
As required in SCAQMD Rule 1401, a detailed Tier IV health risk assessment was performed to demonstrate compliance with Rule 1401(d). The projected increase in cancer risk due to the project is 1.06×10^{-7}, which is significantly below the SCAQMD threshold of 1×10^{-6} for each permitted device. The acute and chronic health indices for the project are 0.085 and 0.002, respectively. These results are significantly below the SCAQMD standard of 1.0 for each permitted device. Detailed results of the health risk assessment are contained in Section 6.1.10 and Appendix 6.8-B.

SCAQMD Regulation XVII

Rule 1701: Prevention of Significant Deterioration (general):
The proposed Project does not result in emission increases in excess of those specified in SCAQMD Rules 1701 and 1702. For this reason, the Project does not qualify as a major modification at an existing major source. Total facility emissions are also below thresholds specified in Rule 1701. The facility also is not within 10 km of a class I area and is not expected to impact such an area by 1.0 $\mu g/m^3$.

SCAQMD Regulation XX

The proposed facility is subject to Regulation XX – RECLAIM. All NO_X emissions from the facility will be offset through the purchase of RTCs. The turbines are major RECLAIM sources and will be equipped with a CEMS in accordance with SCAQMD Rule 2012.

SCAQMD Regulation XXX

Rule 3001: Title V Permit Applicability:
Because potential emissions from the facility exceed major source thresholds specified in Rule 3001(a) and the proposed gas turbines are subject to 40 CFR 60, Subpart KKKK, the facility is also subject to Title V pursuant to Rule 3001. RERC currently operates under a Title V permit that will be modified in accordance with SCAQMD Regulation XXX to incorporate the new equipment and operations.

Acid Rain Permit Program
The proposed facility is subject to Part 72, Chapter I, Title 40 of the CFR, which is administered by SCAQMD through Regulation XXXI.

6.1.12 SCAQMD Environmental Justice

Localized Significance Thresholds:

Originally developed in response to environmental justice concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities, SCAQMD Localized Significance Thresholds (LSTs) represent the maximum emissions from a project that can comfortably be assumed to not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. LSTs are reflected as mass emission rate thresholds in lookup tables provided by SCAQMD. Impacts below a level of significance can be also be demonstrated by conducting an air quality impact analysis, so daily emissions above SCAQMD LSTs do not automatically indicate that local air quality impacts exceed a level of significance.

The use of LSTs for the RERC modification is based on its proximity to the nearest residence, which is located at the northeast corner of Jurupa Avenue and Acorn Street. It is approximately 150 meters to the south of the existing RERC property line and approximately 280 meters from construction activity. The five-acre LST look-up table in conjunction with the Metropolitan Riverside County SRA was used to determine the significance of the RERC project with respect to the local air quality and impact upon the nearest sensitive receptor. Table 6.1-42 shows the results of this analysis for both construction activities and operation, addressing emission levels of CO, NO_X, PM_{10} and $PM_{2.5}$.

Based upon the results of the analysis, CO and NO_X emission levels from construction activities and turbine operations, as well as PM_{10} and $PM_{2.5}$ from construction activities will be below screening level thresholds. PM_{10} and $PM_{2.5}$ emissions from plant operations exceed screening level thresholds, based upon a 24-hour per day operating schedule. Results of the ambient air quality analysis substantiate that even though potential daily emissions of PM_{10} and $PM_{2.5}$ exceed LSTs, the project does not result in ambient concentration levels that serve as the foundation for LSTs. The results of the assessment indicate that 24-hour average increases in ambient PM_{10} and $PM_{2.5}$ concentrations will be 0.36 $\mu g/m^3$, which is below the SCAQMD significance threshold of 10.4 $\mu g/m^3$. Results of the air quality impact assessment are summarized in Section 6.1.9.

Table 6.1-42 Emission Thresholds

Pollutant	Phase	LST @ 200m (Project location)	RERC Emissions (lbs/day)	Screening LST Demonstration Accomplished
CO	Construction Operation:	5,961	19.5 392	Yes
NO_x & NO_2	Construction Operation:	977	117 271	Yes
PM_{10}	Construction:	96	24.5	Yes
	Operation:	23	142.7	Ambient Concentration 0.036 µg/m^3 is less than 10.4 µg/m^3
$PM_{2.5}$	Construction:	31	10.2	Yes
	Operation:	8	142.7	Ambient Concentration 0.036 µg/m^3 is less than 10.4 µg/m^3

6.1.13 Summary and Conclusions

An evaluation was conducted to determine applicable air quality regulations affecting the construction and operation of the proposed Project. Toxic pollutant and criteria pollutant emission inventories were compiled for both the construction and operating phases of the Project. The inventories served as the foundation for detailed air quality impact assessments and health risk assessments. Based upon the results of the assessments, a regulatory conformity assessment was conducted. Results of the emission inventories and the various assessments were also compared with established thresholds for determining the significance of environmental impacts. Where warranted, mitigation measures attributed to regulatory compliance or to voluntary actions to be taken by the applicant are identified.

The results of the analyses contained in this report indicate that air quality impacts resulting from the proposed project can be adequately mitigated to levels and will be below established levels of significance. Table 6.1.43 includes CEC's environmental checklist for air quality impacts.

Table 6.1-43 Air Quality Environmental Impact Checklist

AIR QUALITY - Would the project:	Potentially Significant Impact	Less than Significant w/Mitigation	Less than Significant	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?			X	
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?			X	
d. Expose sensitive receptors to substantial pollutant concentrations?			**X**	
e. Create objectionable odors affecting a substantial number of people?			X	

6.1.14 References

California Climate Action Registry. 2007. General reporting protocol (including appendix h). March.

CARB. 2003. http://www.arb.ca.gov / adam.

CARB. 2000. Proposed risk management guidance for the permitting of new stationary diesel-fueled engines. Draft. August.

CARB. 1999. Proposed guidance for power plant siting and best available control technology. June 23.

CARB. 1997. Emission inventory criteria and guidelines report for the air toxics "hot spots" program, May 15.

CARB. 1989. Reference document for California statewide modeling guideline. April.

CARB. 2003. Air toxics hot spots program risk assessment guidelines, the air toxics hot spots program guidance manual for preparation of health risk assessment.

CARB. 2003. Hot spots analysis and reporting program user guide.

Midwest Research Institute. 1996. Improvement of specific emission factors (BACM Project No. 1): final report. March 29. Kansas City, Missouri.

Office of Environmental Health Hazard Assessment. 2000. Acute and chronic exposure levels developed by OEHHA as of May.

Office of Environmental Health Hazard Assessment. 1999. Hot spots unit risk and cancer potency values. June 9.

RTP Environmental Associates, Inc. 1997. California clean air act new source review. Raleigh, North Carolina.

SCEC. 2004. Permit application report for two 49.08mw simple cycle gas turbines at the Riverside Energy Resource Center. Orange, California.

South Coast Air Quality Management District. 2006. Methodology to calculate particulate matter (PM) 2.5 and PM 2.5 significance thresholds. October.

South Coast Air Quality Management District. 2003. Governing Board Hearing. Localized significance threshold methodology. October 13.

South Coast Air Quality Management District. 1993. California environmental quality act, air quality handbook.

United States Environmental Protection Agency. 2002. Exhaust and crankcase emission factors for nonroad engine modeling – compression-ignition. EPS420-P-02-016.

USEPA. 1995. Compilation of air pollution emission factors, AP-42 fifth edition, Volume I stationary point and area sources, Chapter 13.4 wet cooling towers, http://www.epa.gov/ttn/chief/ap42./

USEPA. 2000. Compilation of emission factors – gas turbines. AP-42. Revised July.

USEPA. 1987. Ambient monitoring guidelines for prevention of significant deterioration (PSD). *EPA-450j4-87-007*. May.

USEPA. Guideline on air quality models. 40 CFR 51, Appendix W.

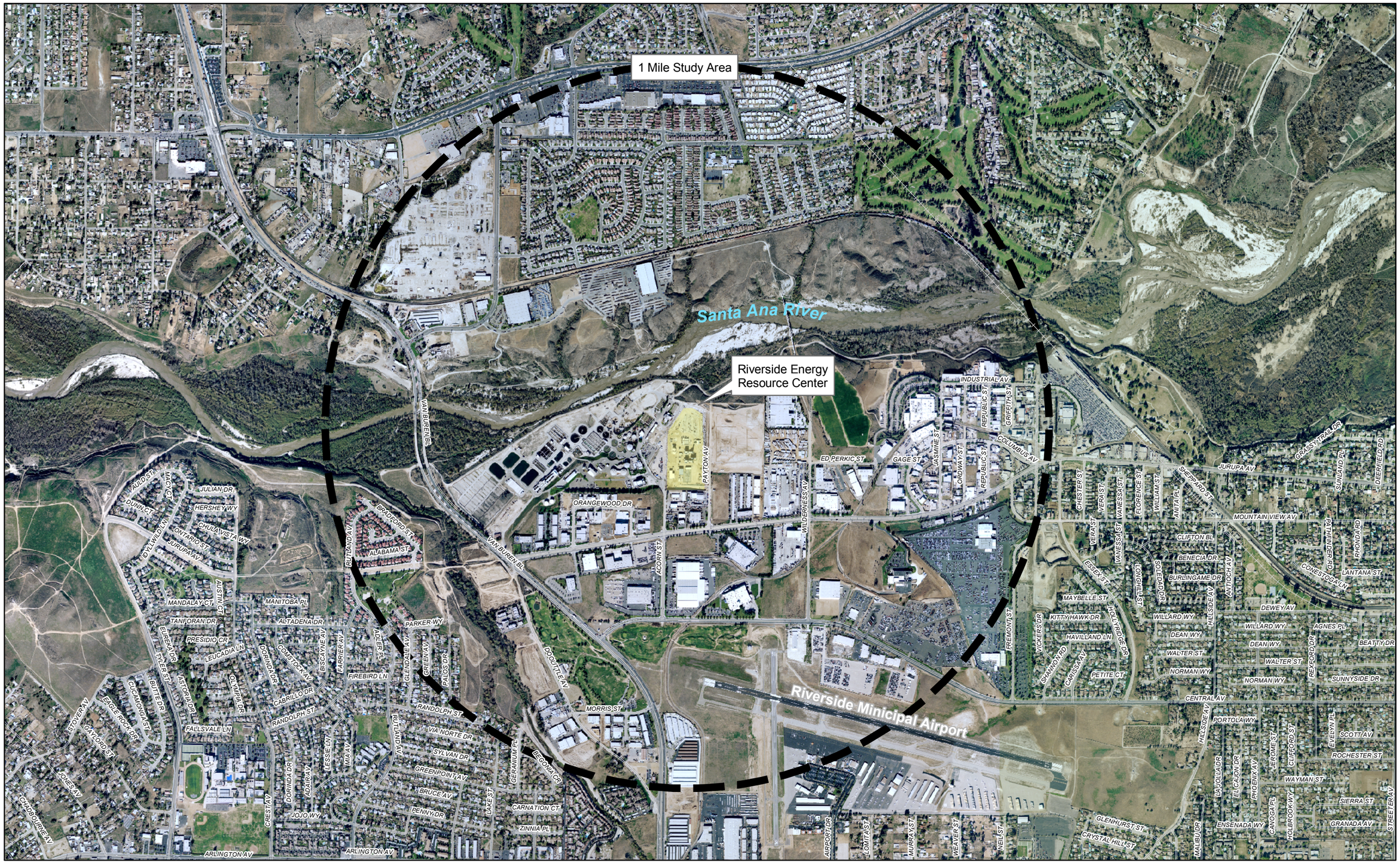
USEPA. 1995. User's guide for the industrial source complex dispersion model. *EPA-454/B-95-003a*

6.2 Land Use

6.2.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the RERC will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to land use related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified. Refer to Figure 6.2-1 which depicts the RERC project area and land use study area.



CITY OF RIVERSIDE PUBLIC UTILITIES

Riverside Energy Resource Center
RERC Units 3 & 4

Figure 6.2-1
Land Use Study Area

Scale 1:15,840
1" to 1320 ft.
Miles
0 0.5

POWER ENGINEERS

R:/113560/DD/Deliverable/RERC 3 & 4 Landuse Figure 6.2-1

RERC Units 3 & 4 - Landuse Figure 6.2-1

6.2.1.1 Site Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. The RERC Units 3&4 Project will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. RERC Units 3&4 and will occupy approximately 2.2 of the 16 acre site. An additional 2 acres are reserved for construction laydown. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

6.2.1.2 Site Zoning and Land use Designations

A. RERC Zoning (16 acre project area)

Title 19 is referred to as the Zoning Code of the City of Riverside, and was enacted based on the authority vest by the State of California, including but not limited to the State Constitution, Planning and Zoning Law, California Environmental Quality Act, and the California Health and Safety Code.

The Zoning Code is intended to provide the legislative framework to implement the goals and policies of the City of Riverside General Plan.

The project study area is currently zoned under General Zone Designations Chapter 19.130.010 A as Business and Manufacturing Park (BMP) Zone, one of four industrial zones. The BMP Zone was established to provide a district for low-intensity and low-impact industrial, office, and related uses. The site specific use is listed as Public Use of Public Property 19.365, and requires a Conditional Use Permit (CUP) 19.760 to develop.

The Development Standards for the BMP Zone reflect the minimum standards for the zone. Additional standards, regulations, and requirements for the zone can be located in chapter 19.130.040. The Project requires Design Review approval (19.710) in order to alter or enlarge existing buildings, or construct new signs or buildings. Other regulations applicable to the Project site as stated in section 19.130.060 include Title 16 Building and Construction Permits, and Title 17 Grading permits.

The general zone designations divide the City into zones that allow for the orderly, planned development of the City and to implement the General Plan. The base zones are assigned to every parcel to establish the primary type of use and the intensity of the land use permitted. The development regulations are specified for the particular use and intensity of use. An overlay zone is used to supplement the base zone for the purpose of establishing a special use or development regulations for a particular area of the City. In the event that the regulations of the overlay zone conflict with those of the base zone, the overlay zone will apply.

The Project is included in the Airport Protection Overlay Zone (AP). The AP Zone is divided into 6 separate Compatibility Zones. The Project s located in the C Compatibility

Zone or the Extended Approach/Departure Zone (19.170.020) in the map titled Compatibility Map for the Riverside Municipal Airport. Permitted Uses and related regulations for the AP/C zone are contained in Volume 1, Chapters 1-3 of the Riverside County Airport Land Use Compatibility Plan (ALUCP).

B. Site Land Use Regulations (project area)

The Project falls within the Riverside City Airport Neighborhood which abuts the Santa Ana River. A community level plan has not been developed as part of the General Plan for the Airport Neighborhood. Specific objectives and policies were developed for this neighborhood and are consistent with the proposed Project.

The land use designations assigned to the Airport Neighborhood place into concrete action the objectives and policies of the Land Use and Urban Design Element of the General Plan. The project site is designated as Business/Office Park (B/OP). The primary intent of the designation is to provide for research/development space, for laboratory and office space, and to support commercial and light industrial uses.

6.2.1.3 Surrounding Zoning & Land Use Designations (1 Mile Radius)

A. Surrounding City Zoning and Land Use Designations (southern study area)

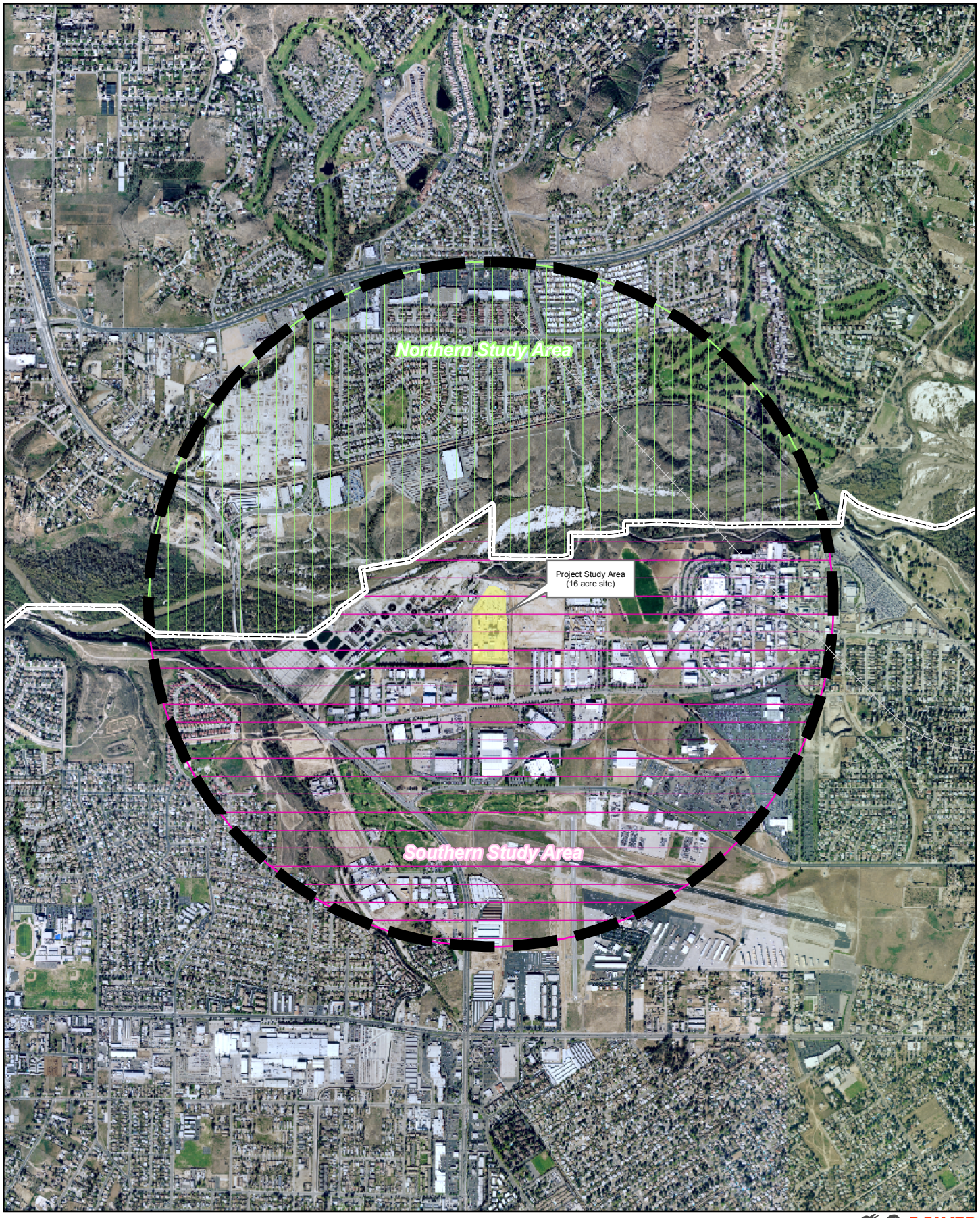
The one mile radius around the project site is divided almost evenly into the northern study area (County unincorporated area) and a southern study area (City of Riverside incorporated area). Refer to Figure 6.2-2, Northern/Southern Study Area.

A majority of the affected area in the City of Riverside is zoned Business and Manufacturing Park (BMP), General Industrial (I), or Airport Industrial (AIR). The Open Space and Park land is zoned as Public Facility (PF). The remainder of the affected area is zoned for residential uses in the R -1-7000 zone.

A majority of the affected area within the City limits is listed in the Land Use and Urban Design Element as non-residential uses. Three of the seven uses identified within the one mile radius of the project study area are Business/Office Park (B/OP), Industrial (I), and Public Facilities/Institutional (PF). The remainder of the affected area is listed as Medium Density Residential (MDR), Commercial (C), Open Space/Natural Resources (OS), and Private Recreation (PR). The B/OP uses are surrounded by PF on the south and west, and MDR and I on the east. All of the land uses in the affected area are found within the Airport Neighborhood.

B. Surrounding County Land Use Designations (northern study area)

The northern study area is zoned for open space and recreational uses along the Santa Ana River, with a large portion of the area zoned Specific Plan (SP) under the Mission De Anza Specific Plan #123. The remainder of the northern study area is zoned for industrial uses in support of the Business Park Policy Area (Riverside County Jurupa Area Plan), and medium density residential.



CITY OF RIVERSIDE
PUBLIC UTILITIES

Riverside Energy Resource Center
RERC Units 3 & 4

Northern/Southern Study Area
(1 mile radius)
Figure 6.2-2

POWER ENGINEERS

Scale 1:24,000
1" to 2000 ft.
Miles
0 0.5

R:\California\Riverside\PDF_printfiles\RERC 3 & 4 North-South Studyarea Fig 6.2-4

RERC Units 3 & 4 - Fig 6.2-4 2-28-08

The northern study area is separated from the City limits to the south by the Santa Ana River. Two county parcels separate the proposed Project from the Santa Ana River. The Santa Ana River Corridor Foundation Component of the Jurupa Area Plan is designated as Open Space, where as the land uses designations are divided into Water (W), Recreation (R), or Conservation (C). Approximately 25 percent of the County study area is comprised of Open Space type uses. The remainder of the County affected area is identified as having a Community Development Foundation which includes the land use designations Mixed Use, Light Industrial, Medium and Medium High Density Residential. Approximately 40 percent of the affected area is included in Mission de Anza Specific Plan #123.

The northern study area includes land in two of the eight County Policy Areas, including the Santa Ana River Corridor Policy Area (including policies JURAP 7.1 to 7.16), and the Riverside Municipal Airport Policy Area (including policy JURAP 9.1).

C. Proposed Changes in Land Use in the Surrounding City and County Area

No change-of-zone applications were identified within the City of Riverside portion of the southern study area.

Only two change-of-zone applications were found within the one mile Radius covering the unincorporated county PSA. Change of zone application CZ07312 covers the change of zone for a 20 acre parcel from the Manufacturing–Service Commercial (M-SC) zone to Specific Plan zoning, in order to allow for mixed use residential development. Change of zone CZ07276 covers the change of zone for an approximately 50 acre parcel zoned the M-SC zone to R-3 or general residential zone. A recent trend in the unincorporated county study area is for land developers to convert industrial parcels to medium and medium-high density residential projects.

6.2.2 Setting

6.2.2.1 Laws, Ordinances, Regulations and Standards

A. Federal

<u>Multi-Species Habitat Conservation Plan (MSHCP)</u>
The MSHCP serves as a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP), pursuant to Section (a) (1) (B) of the Federal Endangered Species Act of 1973, and as a Natural Communities Conservation Plan (NCCP) under the NCCP Act of 2001. The plan encompasses all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, including the jurisdictional areas of the Cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, and San Jacinto. The overall goal of the MSHCP is to conserve covered species and their habitats, including maintaining biological diversity and ecological processes while allowing for future economic growth within the MSHCP area.

The intent of the MSHCP is to ensure the survival of a range of plants and animals, and avoid the costs and delays of mitigating biological impacts on a project-by-project basis.

The MSHCP would allow the incidental take for development purposes of currently listed species and their habitat. The Plan also allows the incidental take of species that may be listed in the future.

The City of Riverside is a permittee of the MSHCP. The proposed Project is located within the Western Riverside County MSHCP Area and is required to comply with applicable provisions of the plan.

B. State

Warren–Alquist Act

The Warren-Alquist Act provides the authority to the California Energy Commission (CEC) for certifying all electrical transmission and thermal power plants of 50 megawatts or more in the State of California. The Small Power Plant Exemption (SPPE) process is implemented through PRC Section 25541, and California Code of Regulations (CCR) title 20, Chapter 5, Article 5. Under the SPPE process, CEC will not license the Project, but will be the lead agency pursuant to the California Environmental Quality Act (CEQA). The Project will be required to obtain all required permits, including local permits from the City of Riverside. To be eligible for the SPPE, the Project's impacts must be mitigated to levels that are less than significant.

C. County

Riverside County 2003 General Plan

The County of Riverside General Plan, adopted on October 7, 2003, describes uses and planning policies for unincorporated county lands. The 2003 General Plan is considered the blueprint for the Riverside County. The 2003 General Plan controls long term growth and development within the County. The General Plan acts as a constitution for both public and private development; the foundation upon which land use related decisions are made. The General Plan is meant to express the community's goals with respect to both human and natural environments, and to set forth policies and implementation measures to achieve these goals.

The General Plan is a part of the total Riverside County Integrated Project (RCIP). The RCIP is comprised of three parts: the Community Environmental Transportation Corridor Acceptability Process (CETAP), the Multiple Species Habitat Conservation Plan (MSHCP), and the umbrella General Plan which includes the Community Area Plans.

The 2003 Riverside County General Plan is administered by the county Transportation and Land Use Agency. The General Plan covers unincorporated County lands that are not within a Specific Plan or an Area Plan. The General Plan provides policy direction at two levels: 1) Countywide for the entire unincorporated portion of the County under Board of Supervisors' Authority; and 2) for 19 sectors of the County in the form of Area Plans. The intent of this tiered system of policy direction is to distinguish between policies that apply uniformly everywhere in unincorporated territory, and those that apply explicitly in distinct geographic areas. Area Plans in turn provides a more detailed policy direction.

The Countywide policy direction is captured in traditional topical elements as depicted in the California Government Code: Land Use, Circulation, Multipurpose Open Space (Open Space and Conservation as specified in the law), Safety, Noise and Housing. An additional optional element, Air Quality, also operates at the countywide level. Policies at this level apply to all Area Plans in addition to the localized policies contained in them, but do not have to be duplicated in the Area Plan documents.

Countywide Policies

- LU 14.2 Review all proposed projects and require consistency with any applicable airport land use compatibility plan as set forth in Appendix L of the General Plan and as summarized in the Area Plan's Airport Influence Area section for the airport in question.
- LU 14.7 Ensure that no structures or activities encroach upon or adversely affect the use of navigable airspace.
- LU 14.9 All development proposals within an Airport Influence Area will be submitted to the affected airport.

Riverside County Airport Land Use Compatibility Plan (ALUCP) - Adopted in 2004 and administered by the Airport Land Use Commission (ALUC)

The ALUC on October 14, 2004 adopted a plan called the Riverside County Airport Land Use Compatibility Plan which designates zones of airport-influence areas for 13 airports in Riverside County, and provides a series of policies and compatibility criteria to ensure that both aviation uses and the surrounding areas may continue to be compatible. The ALUC has two principal powers, including:

- Prepare and adopt an airport land use compatibility plan, which State law requires each local jurisdiction over the land uses within an ALUC planning area to modify its General Plan, and affected Specific Plans, to be consistent with the compatibility plan.
- Review plans, regulations, and other actions of local agencies and airport operators for consistency with the compatibility plan.

The 2004 compatibility plan includes compatibility criteria and maps for the influence areas of individual airports, including the Riverside Municipal Airport, and spells out the procedural requirements associated with the compatibility review of all development proposals.

RERC Units 1&2 were previously reviewed, including the impacts of their thermal plumes, and were found acceptable by the ALUC. The proposed Project is compatible with the 2004 ALUCP and complies with the objectives and policies of the ALUC.

2003 Jurupa Area Plan

The Santa Ana River Corridor separates the unincorporated county lands from the lands the incorporated lands within the city limits of the City of Riverside. The proposed

Project is separated from the unincorporated County lands to the north by two parcels identified in the Jurupa Area Plan as Mixed use and Open Space/Recreation.

The project study area is included within one of the eight "policy areas" designated on the Jurupa Area Plan Policy Area Map. Policy areas are portions of an area plan that contain special or unique characteristics that merit detailed attention and focused policies.

The RERC site is located within the Riverside Municipal Airport Influence Policy Area which has four associated safety zones, which are subject to regulations governing such issues as development intensity, density, height of structures and noise. The proposed Project is located adjacent to the Outer Safety Zone just north of the 60 CNEL airport noise contour. The following policy from the Jurupa Area Plan is for the Riverside Municipal Airport Influence Policy Area.:

JURAP 9.1

To provide for the orderly development of Riverside Municipal Airport and the surrounding area, comply with the Airport Land Use Compatibility Plan for Riverside Municipal Airport as fully set forth, as well as any applicable policies related to airports in the Land Use, Circulation, Safety and Noise Elements of the Riverside County General Plan.

The proposed Project complies with the policies of the 2003 Riverside County General Plan and those of the 2003 Jurupa Area Plan.

Riverside County 2008 General Plan Update
In the year 2008 Riverside County will start the General Plan update process. The process is expected to take from 24-36 months.

D. City

Riverside City 2010 General Plan
The 2010 General Plan was replaced in December of 2007 with the adoption of the new 2025 General Plan.

Riverside City 2025 General Plan
The 2025 General Plan foundation is anchored by newly adopted policies and objectives. An objective is an overall statement of community aim, and consists of a broad statement of purpose or direction. Each objective is followed by more definitive policy statements. Policies provide guidance to the City Council, Planning Commission, other boards and commissions, and to the City staff in their review of development proposals and related actions.

Circulation and Community Mobility Element

The Riverside Municipal Airport is situated on 451 acres of land, and is owned and operated by the City. The Airport operations are overseen by the City of Riverside Airport Commission. Applicable objectives and policies from the Circulation and Community Mobility Element are included below.

Objective CCM-11: Promote improved air transportation for Riverside in a manner that benefits the City.

Policy CCM-11.1: Protect flight paths from encroachment by inappropriate development using the Riverside County Airport Land Use Compatibility Plan to determine the consistency of proposed development.

Policy CCM-11.2: Limit building heights and land use intensifies beneath airport approaches and departure paths to protect public safety consistent with the Riverside County Airport Land Use Compatibility plan and all other applicable State and Federal regulations.

Policy CCM-11.7: Ensure environmental impacts such as noise, air quality, pollution, traffic congestion, and public safety hazards associated with continued operation of local airports are mitigated to the extent practicable.

The proposed Project complies with the objectives and policies of the Circulation and Community Mobility Element of the city of Riverside 2025 General Plan.

Land Use and Urban Design Element

The risk of aircraft crashes is an important consideration in planning around airports. In tandem with any aviation operation, "crash" zones for airports are a major safety issue. See LU-22 to LU-23 below.

Riverside Municipal and Flabob Airports involve six zones of airport influence areas and land use compatibilities, as identified in the Riverside County Airport Land Use Compatibility Plan adopted by the Airport Land Use Commission (ALUC) in October 2004. The Riverside County Airport Land Use Compatibility Plan designates zones of airport influenced areas for airports in Riverside County and proposes a series of policies and compatibility criteria to ensure that both aviation uses and surrounding uses may continue and are compatible.

The Land Use Policy Map in the 2025 General Plan, located in the Land Use and Urban Design Element section, was developed to avoid allowing intensive new uses within the airport-influenced areas. These policies are buttressed by supportive zoning regulations in the form of an Airport Protection Overlay Zone. Development controls include limiting development within areas subject to high noise levels and limiting the intensity and height of development within aircraft hazard zones.

Objective LU-1: Increase the performance of the Santa Ana River by providing better connections and increased recreational opportunities.

Objective LU-2:	Recognize and enhance the Santa Ana Rivers multiple functions: a place for natural habitat, a place for recreation and a conveyance for stormwater runoff.
Objective LU-3:	Preserve and protect significant areas of native wildlife and plant habitat, including endangered species.
Objective LU-4:	Provide an appropriate timing of development in accordance with the future land uses designated in this Land Use Element.
Objective LU-5:	Recognize Van Buren Boulevard as a significant parkway, linking neighborhoods along its path to the Santa Ana River, the Arlington Heights, Greenbelt, Victoria Avenue and the California Citrus State Historic Park.
Policy LU-15.1:	Utilize the intersection of Van Buren Boulevard and Victoria Avenue as a highly landscaped, visual gateway into the City.
Policy LU-15.2:	Enhance connections between Santa Ana River trails and Van Buren Boulevard.
Policy LU-15.3:	Balance the traffic carrying function of Van Buren Boulevard with goals to enhance neighborhood aesthetics, pedestrian/bicycle safety and the historic environments of Arlington Village and the Arlington Heights Greenbelt.
Objective LU-22:	Avoid land use/transportation decisions that would adversely impact the long-term viability of the March Air Reserve Base/March Inland Port, Riverside Municipal and Flabob Airports.
Policy LU-22.2:	Work cooperatively with the Riverside County Airport Land Use Commission in developing, defining, implementing and protecting airport influence zones around the MARB/MIP, Riverside Municipal and Flabob Airports and in implementing the new Airport Land Use Compatibility Plan.
Policy LU-22.3:	Work to limit the encroachment of uses that potentially pose a threat to continued airport operations, including intensification of residential and/or commercial facilities within identified airport safety zones and areas already impacted by current or protected airport noise.
Policy LU-22.4:	Adopt and utilize and Airport Protection Overlay Zone and the Riverside County Airport Land Use Compatibility Plan as it affects lands within the City of Riverside.

Policy LU-22.5: Review all proposed projects within the airport influence areas of Riverside Municipal Airport, Flabob Airport, or March Air Reserve Base/Inland Port Airport Safety Zones and Influence Areas for consistency with all applicable airport land use compatibility plan policies adopted by the Riverside County Airport Land Use Commission (ALUC) and the City of Riverside to the fullest extent the City finds feasible.

Policy LU-22.6: Review all subsequent amendments that the ALUC may adopt to the airport land use compatibility plan for Riverside Municipal Airport, Flabob Airport or March Air Reserve Base/March Inland Port Airport and either adopt the plan as amended or overrule the ALUC as provided by law (Government Code Section 65302.3).

Policy LU-22.7: Prior to the adoption or amendment of the General Plan or any specific plan, zoning ordinance or building regulation affecting land within the airport influence areas of the airport land use compatibility plan for Riverside Municipal Airport, Flabob Airport or March Air Reserve Base/Inland Port Airport, refer such proposed actions for determination and processing by the ALUC as provided by the Public Utilities Code Section 21670.

Policy LU-22.9: All development proposals within an airport influence area and subject to ALUC review will also be submitted to the manager of the affected airport for comment.

Objective LU-23: Enhance and ensure the long term viability of Riverside Municipal Airport by developing facilities that efficiently serve present and anticipated future needs and encouraging increased business and corporate usage.

Objective LU-24: Maximize the economic impact of Riverside's industrial land by careful use of industrial properties, giving priority to clean enterprises that yield large numbers of highly skilled high-paying jobs relative to site size.

Policy LU-24.1: Tailor zoning regulations for industrial and business/office park uses to ensure that future uses are in concert with the City's wider policy goals.

Objective LU-31: Attract high quality, job producing businesses to the industrial areas surrounding the Airport.

Policy LU-31.1: Target industries that would benefit from proximity to the Airport.

The proposed Project complies with the objectives and policies of the Land Use and Urban Development Element.

Public Safety Element

The Public Safety Element is an important component of the newly adopted 2025 City of Riverside General Plan. The policies and objectives listed below were developed to ensure a safe and healthy environment for the current and future citizens of the City.

Objective PS-4: Protect the community from hazards related to air and ground transportation.

Policy PS-4.1: Minimize the risk of potential hazards associated with aircraft operations at the Riverside Municipal Airport, March Air Base/March Inland Port and Flabob Airport through the adoption and implementation of the Airport Protection Overlay Zone and the Riverside County Airport Land Use Compatibility Plan.

Policy PS-4.2: When planning for development near airports, anticipate possible increases in airport activity and expansion of airport facilities and services and the effects these changes may have on public safety.

Policy PS-4.3: Encourage development in the vicinity of the Riverside Municipal Airport that would not cause land use conflicts, hazards to aviation or hazards to the public and that is in compliance with the Riverside County Airport Land Use Compatibility Plan for the airport.

Policy PS-4.4: Maintain open space adjoining the Riverside Municipal Airport, March Air Reserve Base/March Inland Port and Flabob Airport as required for safety for both the present runway configurations and for possible future expansion as identified in the Riverside County Airport Land Use Compatibility Plan and the Riverside Municipal Airport Master Plan.

Policy PS-4.5: Review the Riverside Municipal Airport Master Plan periodically to update operational and safety procedures, reflect State and Federal mandates, better utilize airport property and recommend land use capability standards for land surrounding the airport.

Policy PS-4.6: Ensure the development within airport influence areas is consistent with the Airport Protection Overlay Zone development standards and the Riverside County Airport Land Use Compatibility Plan.

Policy PS-4.7: Ensure compatible land uses near March Air Reserve Base/March Inland Port through participation of staff and elected officials in the adoption of the March Joint Land Use Study and the Riverside County Airport Land Use Compatibility Plan.

The proposed Project complies with each of the relevant policies and objectives of the Public Safety Element.

Air Quality Element

Applicable emergency conservation objectives and policies put forth in the Air Quality Element of the 2025 General Plan are listed below.

Objective AQ-5: Increase energy efficiency and conservation in an effort to reduce air pollution.

Policy AQ-5.1: Utilize source reduction, recycling and other appropriate measures to reduce the amount of solid waste disposed of in landfills.

The proposed Project is compatible with and complies with the city of Riverside Air Quality Element of the 2025 General Plan.

Open Space and Conservation Element

As stated in the text of the 2025 General Plan, "adequate and affordable energy is essential to Riverside's economic growth and overall quality of life. Energy powers transportation, machinery and appliances and provides lighting, heating and cooling".

Electrical service in the City of Riverside is provided by Riverside Public Utilities. Southern California Edison (SCE) serves electrical customers outside of the City limits, and a few isolated areas within Riverside that have been recently annexed. Natural gas is provided within the project study area by the Southern California Gas Company.

Objective OS-8: Encourage the efficient use of energy resources by residential and commercial users.

Policy OS-8.1: Support the development and use of non-polluting, renewable energy sources.

Policy LU-24.1: Tailor zoning regulations for industrial and business/office park uses to ensure that future uses are in concert with the City's wider policy goals.

Policy OS-8.2: Encourage incorporation of energy conservation features in the design of all new construction and substantial rehabilitation projects and encourage the installation of conservation devices in existing developments.

Policy OS-8.3: Encourage private energy conservation programs that minimize high energy demand and that use alternative energy sources.

Policy OS-8.4: Incorporate solar considerations into development regulations that allow existing and proposed buildings to use solar facilities.

Policy OS-8.5: Develop landscaping guidelines that support the use of vegetation for shading and wind reduction and otherwise help reduce energy consumption in new development.

Policy OS-8.6: Require all new development to incorporate energy-efficient lighting heating and cooling systems pursuant to the Uniform Building Code.

Policy OS-8.8: Encourage the use of clean burning fuels and solar energy for space and water heating purposes.

Policy OS-8.11: Support public education programs for City residents and businesses to provide information on energy conservation and on alternatives to non-renewable energy sources.

Objective OS-9: Encourage the efficient use of energy resources by the city of Riverside.

Policy OS-9.1 Encourage the most energy-efficient design for local government facilities and equipment consistent with reasonable rate of return and the recognition of the environmental benefits from energy conservation.

Policy OS-9.2 Evaluate and implement measures to improve energy efficiency in City operations, including efficient load management systems in City buildings and regular energy audits of City facilities and operations.

The proposed Project complies with the objectives and policies of the Open Space and Conservation Element of the 2025 General Plan.

Public Facilities and Infrastructure Element

Applicable energy conservation and development objectives and policies provided in the Public Facilities and Infrastructure Element of the 2025 General Plan are listed below.

Objective PF-6: Provide affordable, reliable and, to the extent practical, environmentally sensitive energy resources to residents and businesses.

Policy PF-6.1: Continue to support the development of green power and expand the use of green power in the City's energy portfolio.

Policy PF-6.2: Ensure that adequate back-up facilities are available to meet critical electric power needs in the event of shortages or temporary outages.

Policy PF-6.3: Promote and encourage energy conservation.

The proposed Project complies with the objectives and policies of the Public Facilities and Infrastructure Element of the 2025 General Plan.

Airport Redevelopment Project
Land associated with the Riverside Municipal Airport, including the project study area, is within a redevelopment project boundary, and is managed by the city of Riverside Development Department. Specifically, three separate parcels of land are identified for development opportunity surrounding the airport.

Redevelopment authority allows the City (through its Redevelopment Agency) to capture and reinvest property tax increments. Redevelopment authority will continue to be an important tool in achieving many of the objectives and policies of the Land Use Element of the 2025 General Plan).

6.2.2.2 Existing Sensitive Land Use

The proposed Project would be located within an area predominantly characterized by industrial and business park uses. However, one sensitive use was identified with the study area, the Indian Hills Elementary School.

There are three school districts within the study area: the Riverside Unified School District, the Alvord Unified School District, and the Jurupa Unified School District. The Indian Hills Elementary School is in the Jurupa Unified School District. The elementary school is located north of the proposed Project, across the Santa Ana River within the unincorporated lands of Riverside County.

The operation of the Indian Hills School will not be impacted by the development of the proposed Project because of the distance between the school and the Project and the natural barrier the Santa Ana River presents.

6.2.2.3 Parks and Recreation

No parks, recreation, or preservation areas would be impacted by the proposed Project. However, several such areas are located within the study area.

Immediately north of the proposed Project are unincorporated lands of Riverside County along the Santa Ana River. These lands are part of the Santa Ana River Corridor including the Hidden Valley Wildlife Area. A multi-use trail is located within this area and parallels the river.

Also located within the Santa Ana River Corridor through the Project study area, is the Juan Bautista de Anza National Historic Trail. The Long Range Interpretive Plan (LRIP) is the first step in the development of the trail's Comprehensive Interpretive Plan (CIP), which has become a National Park Service focus for managing the trail. This direction of comprehensive interpretation for the management of the trail evolved from the original Comprehensive Management and Use Plan (1996). Another component of the CIP is the Annual Implementation Plan, which outlines specific issues and projects identified in the LRIP that will be addressed during the current fiscal year.

6.2.3 Impacts

The following Table 6.2-1 CEQA Environmental Checklist identifies potential impacts to land use from the proposed Project. Following the checklist is a discussion of each potential impact.

Table 6.2-1 CEQA Environmental Checklist – Land Use

Environmental Checklist	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
LAND USE AND PLANNING - Would the Project:				
A. Physically divide an established community?				X
B. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
C. Conflict with any applicable habitat conservation plan or natural community conservation plan?			X	
RECREATION				
A. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
B. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X

6.2.3.1 Land Use and Planning

A. Division of an Established Community

The proposed Project would be located within an area of the City of Riverside currently in use for industrial related activities. The RERC site is owned by the City. The project site is adjacent to existing City utility facilities (RERC Units 1&2 and the RRWQCP). No new physical barriers would be created by the Project. The RERC is currently fenced from public access, and no existing roadways of pathways would be blocked.

B. Conflict with Land Use Plans or Policies

The current zoning of the parcels for the generation-site is B/OP. A conditional use permit

would be required for the Project's generation-site to comply with this zoning designation. The proposed Project was not found to be in conflict with either the City of Riverside or County of Riverside General Plan land use element of overall policies and objectives.

No significant impacts are expected from the proposed Project to existing land use plans or policies.

C. Conflict with Habitat or Natural Community Conservation Plans

Potential impacts relating invasive plant species and the burrowing owl under the Multiple Species Habitat Conservation Plan (MSHCP) have the potential to be significant. These potential impacts will be reduced to less than significant due to Project design measures specified in Section 6.3.1.2. of this application.

6.2.3.2 Recreation

A. Increased Use of Recreational Facilities

The proposed Project is not expected to result in the increase of population to the project area. Therefore, since the Project could sufficiently be accommodated by the project area labor force, no increase to existing recreational facilities would be expected, and no impacts would occur.

B. Construction of Recreational Facilities

The Project would not include recreational facilities or require the construction or expansion of existing recreational facilities. As described above, the proposed Project would not result in an increase in the area's population that would require new or expanded recreational facilities whose construction would in turn lead to an adverse physical effect on the environment. No impact would occur.

6.2.4 Agency Contacts

Agency	Contact
City of Riverside Planning Department	Douglas A. Darnell 3900 Main St., Third Floor Riverside, CA 92522 (951) 826-5219
Riverside County Airport Land Use Commission	John Guerin 4080 Lemon Street, 9th Floor Riverside, CA 92501 (951) 955-5132
Riverside County Planning Department	Matt Straite 4080 Lemon Street, 9th Floor Riverside, CA 92502 (951) 955-0545

6.2.5 References

City of Riverside. Airport Runways & Acreage.
http://www.riversideca.gov/airport/runway.htm

Department of the Interior, National Park Service. The Juan Bautista De Anza National Historic Trail, Arizona and California, Long Range Interpretive Plan. 2003.

City of Riverside. Riverside Municipal Code, Title 19 Zoning. August 9, 1968.

City of Riverside. City of Riverside General Plan 2010. September 13, 1994.

County of Riverside. County of Riverside General Plan. October 7, 2003.

Riverside, city of Riverside General Plan 2025.

6.3 Biological Resources

6.3.1 Introduction

Riverside Public Utilities (RPU) proposes to build and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RPU will develop, build, own and operate the facility. RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the RERC will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. Specifically, it is located at an elevation of approximately 221 m (724 feet) above mean sea level in the San Bernardino Meridian T2S, R5W, sec31 (Latitude/Longitude: 33.9604°N, 117.4417°W) on the U. S. Geologic Survey (USGS) Riverside West 7.5-minute Quadrangle, (1967 photorevised 1980) (Figure 6.3-1).

This section discusses potential impacts to biological resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations, and standards (LORS), the Project's setting and Project features and potential environmental impacts affecting these resources. Required permits and permitting agencies are also identified.

The project area is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), a comprehensive, multi-jurisdictional HCP focusing on conservation of species and their associated habitats in western Riverside County. Because of the Project's location within the MSHCP area, the following section also details analysis and findings related to compliance with the MSHCP.

6.3.1.1 Project Description

The RERC site was constructed between 2004 and 2006 following the CEC's approval of the RERC Application for Small Power Plan Exemption (04-SPPE-1). Existing facilities at the approximately 16-acre RERC site include RERC Units 1&2, an administration building, a switchyard, a stormwater infiltration basin, paved roads, parking areas, and equipment storage areas. In addition, because of mitigation requirements that resulted from the construction of RERC Units 1&2 and associated supporting structures, a burrowing owl mitigation area totaling approximately two acres was set aside within the RERC site. This mitigation area is located along the eastern and northern boundaries of the site. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

6.3.1.2 Project Environmental Protection Features

6.3.1.2.1 Burrowing Owls.

As construction of the backup Dispatch and Scheduling building could potentially impact the burrowing owl mitigation area, the Project will design the building so that it renders it useless as perch for diurnal raptors and will feel like a low topographic feature. The Project will construct the Scheduling & Dispatch building such that the rear wall serves as a retaining wall and then fill the space between the retaining wall and the earthen slope with appropriate soil and replace the artificial burrow that would be lost with two additional burrows within the mitigation area.

Artificial burrows that are within the burrowing owl mitigation area that are close to construction activities will be temporarily closed during the construction period. Additional burrows will be installed (two new burrows for each burrow closed). Burrows that were closed will be re-opened after construction is complete.

Focused surveys will be conducted within the habitats determined to be appropriate for burrowing owls during the breeding season, and will be conducted during appropriate weather and time of day. A pre-construction survey will also be performed in all appropriate areas to determine the presence of burrowing owls. This survey will be performed prior to and within 30 days of ground breaking activities. Finally, a qualified biologist will be retained and will monitor the Project weekly to determine possible movement of the burrowing owls and to ensure that the owls are not disturbed during construction. The biologist will have the authority to stop work to ensure the safety of the burrowing owls, and if burrowing owls are determined to be nesting, the biologist will consult with appropriate agencies to determine appropriate mitigation.

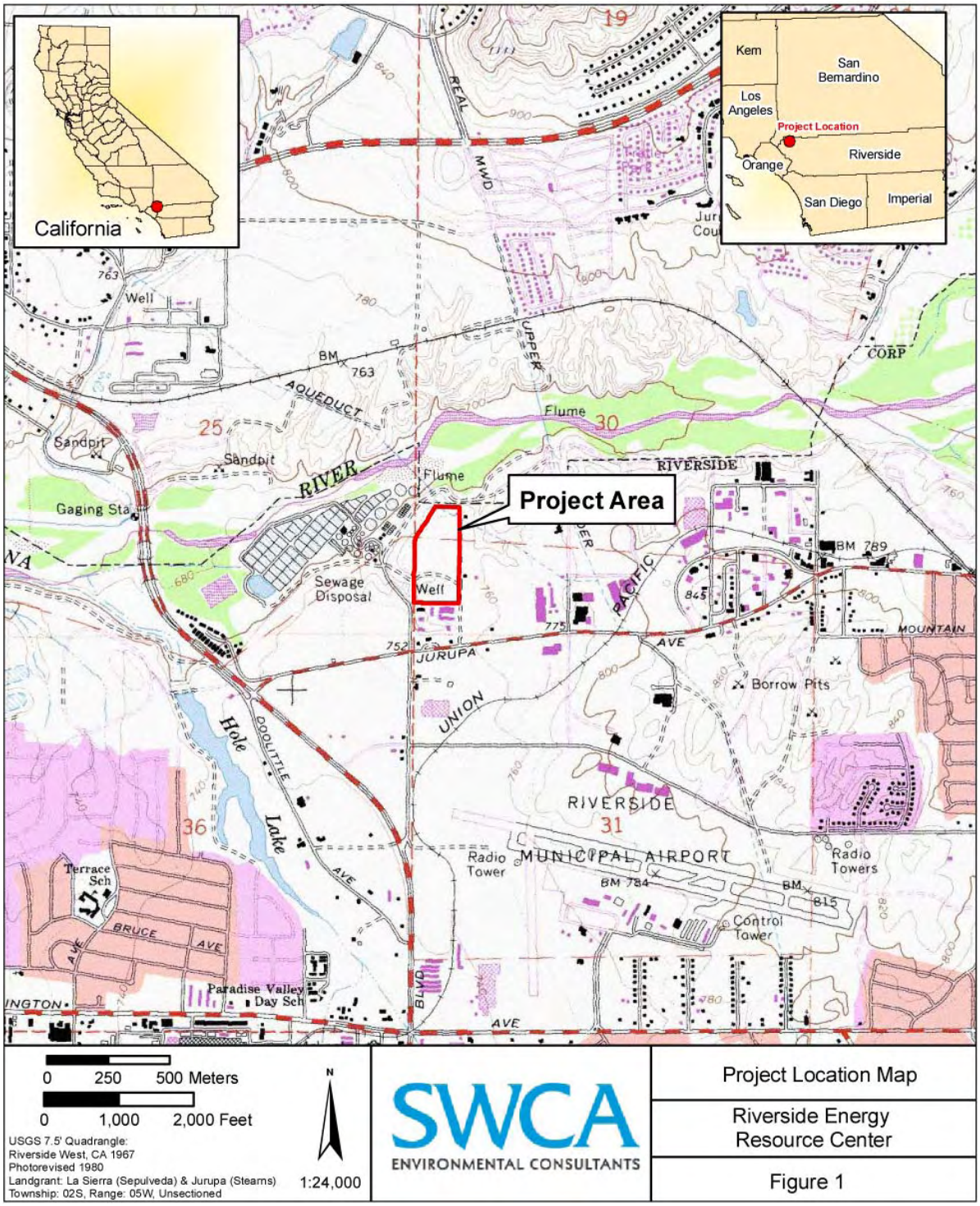
6.3.1.2.2 Nesting Raptor, Migratory and Native Avian Species.

Initial grading activities will be performed outside the nesting season (March 1 through June 30). If initial grading must be performed during nesting season, a qualified biologist will conduct a pre-construction survey. If protected bird species are found nesting on or adjacent to the project area, a qualified biologist will monitor the nests daily during all phases of construction.

6.3.1.2.3 Employee Education Program.

An employee education program, developed by a qualified biologist, will be developed and presented to all persons associated with Project construction.

Figure 6.3-1 Project Location Map



6.3.2 Laws, Ordinances Regulations and Standards

6.3.2.1 Federal

Federal Endangered Species Act (FESA; 16 USC 153 et seq.)

Applicants for projects that could result in adverse impacts to any federally listed species are required to mitigate potential impacts in consultation with the USFWS. Adverse impacts, defined as "take," are prohibited except under authorization through Section 7 or Section 10 consultation, and Incidental Take Authorization. During consultations, determinations are made regarding the proposed Project and its potential to jeopardize the continued existence of federally listed species, and reasonable and prudent mitigation measures required to avoid such 'jeopardy.' Mitigation is required for adverse impacts to any listed species or candidate species proposed for listing. Take, under Federal definition, currently includes actions that could result in "significant habitat modification or degradation" (50 CFR Section 17.3).

Candidate species are not protected under Federal Endangered Species Act (FESA). However, the USFWS advises project applicants that Candidate species could be elevated to listed status at any time, and should be regarded as species with special consideration.

The proposed Project is within the area covered by the MSHCP. The MSHCP includes compensation requirements for take of 146 special-status species and their habitat in accordance with ESA Section 10(a)(1)(B). The MSHCP also includes prescribed protection and mitigation measures approved by USFWS. Further information on the MSHCP is provided below.

Migratory Bird Treaty Act (MBTA 16 USC 703 to 711)

The MBTA prevents the take of all migratory birds, including their nests and eggs.

Bald and Golden Eagle Protection Act (16 USC 668)

This Act specifically protects bald and golden eagles from being killed or their eggs taken.

6.3.2.2 State

California Endangered Species Act (CESA; Fish and Game Code Section 2050 et seq.)

Species listed under the CESA cannot be taken or harmed, except under specific permit. As currently stated in the Act, "take" means to hunt, pursue, catch, capture, or kill or to attempt to do so. As stated above, the proposed Project is within the area covered by the MSHCP. The MSHCP also includes compensation requirements for take of state listed species and their habitat in accordance with CESA. The MSHCP also includes prescribed protection and mitigation measures approved by CDFG for sensitive species.

Fish and Game Code Sections 3511, 4700, 5050, and 5515

These Sections provide a provision for the protection of bird, mammal, reptile, amphibian, and fish species that are "fully protected." Fully protected animals may not be harmed, taken, or possessed.

Fish and Game Code Section 3503

This Section states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this Code or any regulation made pursuant thereto.

Fish and Game Code Section 3503.5

This Section provides protection for all birds-of-prey, including their eggs and nests.

Fish and Game Code Section 3513

This Section makes it unlawful to take or possess any migratory non-game bird as designated in the MBTA.

Fish and Game Code Sections 1900 et seq., or Native Plant Protection Act

This Section lists threatened, endangered, and rare plants so designated by the California Fish and Game Commission.

Title 14, California Code of Regulations, Sections 670.2 and 670.5

These Sections list animals designated as threatened or endangered in California. The CDFG designates species considered to be indicators of regional habitat changes, or candidate species for future state listing, as California Species of Concern (CSC). CSC does not have special legal status, but are used by the CDFG as a management tool when considering the future use of any land parcel.

California Fish and Game Code (Sections 1601 through 1607)

These Sections prohibit alteration of any lake or streambed, including intermittent and seasonal channels and many artificial channels, without execution of a Streambed Alteration Agreement through the CDFG. This applies to any channel modifications that would be required to meet drainage, transportation or flood control objectives of the Project.

California Environmental Quality Act (CEQA)

CEQA requires that a project's effects on environmental resources must be analyzed and assessed using criteria determined by the lead agency. CEQA defines a rare species in a broader sense than the definitions of threatened, endangered, or California Species of Concern (SC). Under this definition, CDFG can request additional consideration of species not otherwise protected.

Warren-Alquist State Energy Resources Conservation and Development Act

This act is a CEQA-equivalent process which gives statutory authority to the California Energy Commission (CEC).

6.3.2.3 Local Habitat Conservation Plans

Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)

The MSHCP is a comprehensive, multi-jurisdictional HCP focusing on conservation of species and their associated habitats in western Riverside County. The lead agency for implementation of the MSHCP is the County of Riverside (County). The MSHCP serves as an HCP pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act of 1973 (FESA), as well as a Natural Communities Conservation Plan (NCCP) under the NCCP Act of 1991. It is one of several habitat-planning efforts in southern California with a goal of maintaining biological and ecological diversity within the region.

The MSHCP allows for habitat loss from development within its boundaries when developers pay a mitigation fee to projects in designated habitat conservation areas. The MSHCP includes prescribed compensation guidelines, conservation strategies, and minimization measures to mitigate for potential project impacts to sensitive species and their habitats.

6.3.3 Environmental Setting

RERC is located in the southwestern California region within the south coast subregion. This subregion was previously dominated by coastal scrub and chaparral communities but has recently been urbanized, resulting in a great loss of undisturbed habitat (Hickman 1993). Specifically, the project area is located just south of the Santa Ana River and the Pedley Hills. The local climate is typical of a Mediterranean region with hot, dry summers and cooler, wetter winters. Temperatures range from daytime highs in the low 40s to low 100s degrees Fahrenheit to overnight lows in the mid 30s to low 90s degrees Fahrenheit. Average annual precipitation ranges from 12 inches per year in the coastal plain to 18 inches per year in the inland alluvial valleys, reaching 40 inches or more in the San Bernardino Mountains.

6.3.3.1 Regional Overview

The RERC site is located on a terrace overlooking the Santa Ana River, one of the largest river systems in southern California. The uplands surrounding the river corridor have been developed to a considerable extent, though other land uses (such as agriculture) and undeveloped areas exist within ten miles of the project area.

Santa Ana River Riparian Corridor

The Santa Ana River channel is located approximately 200 m (660 feet) north of the RERC site. The riparian corridor, which includes riparian habitats, extends to approximately 100 m (330 feet) north of the RERC site. In the vicinity of Riverside, the river flows perennially, and supports an extensive cottonwood-willow riparian forest. The Santa Ana River riparian corridor serves as an important wildlife corridor, and has been

designated MSHCP Core A, which consists of Prado Basin and the Santa Ana River. This southwest-to-northeast trending swath of land is composed largely of Public/Quasi-Public Lands owned by a variety of entities, but it also contains a small number of privately-owned lands. The Core also functions as a Linkage, connecting Orange County to the west with San Bernardino County to the north. Core A is constrained on all sides by existing urban development and agricultural use, and planned land uses surrounding Core A consist largely of high impact land uses such as city and community development. A number of habitats are associated with the Santa Ana River riparian corridor within ten miles of the project area, discussed below.

Riparian Stream

Riparian stream habitat (Anderson et al., 1976) consists of the immediate Santa Ana River stream channel where water flows under normal conditions. This habitat is surrounded by cottonwood-willow riparian forest, and is typically dominated by hydric plants including broad-leaved cattail (Typha latifolia) and hoary nettle (Urtica dioca ssp. holosericea). Additionally, this habitat is suitable for special-status fish species, including the Santa Ana sucker, thereby rendering it a sensitive habitat by CDFG and worthy of listing within the CNDDB.

Coast and Valley Freshwater Marsh

Coastal and valley freshwater marsh (Holland 1986; Element code 52410) occurs in areas of the Santa Ana River that are permanently flooded with slow moving or quiet freshwater. Dominant plants include tall, rooted aquatic monocots, such as cattails (Typha spp.), bulrushes (Scirpus spp.), rushes (Juncus spp.), and aquatic grasses. Floating and emergent unrooted aquatic plants (e.g., Polygonum spp., Potamogeton spp.) are common associates (Holland 1986). Within the vicinity of the project area, this habitat occurs in small ponded areas alongside the Santa Ana River.

Arundo/Riparian Forest

Arundo/riparian forest is dominated by non-native giant reed (Arundo donax) but also may contain emergent shrubs and trees (Sawyer and Keeler-Wolf 1995) such as arroyo willow (Salix lasiolepis) and mulefat (Baccharis salicifolia).Giant reed damages bridges, clogs waterways, provides marginal wildlife habitat, interferes with flood control, out competes native species, becomes dominant following major flood events, and is a large obstacle to endangered species recovery. Within the vicinity of the project area, this habitat was identified in patches along the Santa Ana River, including just south of the Van Buren Avenue Bridge.

Mulefat Scrub

Mule fat scrub (Holland 1986; Element Code 63310) consists of a depauperate, tall, herbaceous riparian scrub strongly dominated by mule fat (Baccharis salicifolia). This early seral community is maintained by frequent flooding which maintains the vegetation in this seral state and prevents succession into a cottonwood or sycamore dominated riparian forest or woodland. It occurs in intermittent stream channels with fairly coarse substrate and moderate depth to the water table along intermittent streams and near larger

rivers. Within the vicinity of the project area, this habitat was identified along the Santa Ana river corridor.

Southern Riparian Scrub

Southern riparian scrub (Holland 1986; Element Code 63900) consists of a mid-successional stage community that typically matures into riparian forest. Riparian forest can revert to riparian scrub through disturbances or frequent flooding events. Riparian scrub communities, which are dominated by an overstory of tree and large shrub species including several species of willows (Salix spp.), are distributed along river floodplains. Within the vicinity of the project area, this habitat was identified along the Santa Ana river corridor. This habitat is considered rare by CDFG and worthy of listing within the CNDDB.

Southern Cottonwood Willow Riparian Forest

Southern cottonwood willow riparian forest (Holland 1986; Element Code 61330) consists of tall, open, broadleaf winter-deciduous riparian forests dominated by Fremont cottonwood (*Populus fremontii*) trees and several species of willow (*Salix* spp.) that occur along perennially wet stream reaches of the Transverse and Peninsular ranges, from Santa Barbara County south to Baja California Norte and east to the edge of the deserts. Mature cottonwood trees form a continuous overstory, while understory vegetation usually consists of shrubby willows. It occurs in sub-irrigated and frequently overflowed lands along rivers and streams. The dominant species require moist, bare mineral soil for germination and establishment. Through disturbances or frequent flooding events, this forest type can revert to riparian scrub dominated by mulefat (*Baccharis salicifolia*). This habitat primarily occurs on riverwash soils within the Santa Ana River in the vicinity of the project area. It is considered rare by CDFG and worthy of listing within the CNDDB.

Southern Willow Scrub

Southern willow scrub (Holland 1986; Element Code 63320) is composed of dense, broad-leafed, winter-deciduous riparian thickets dominated by several willows (*Salix* spp.), with scattered emergent Fremont cottonwood (*Populus fremontii*) and western sycamore (*Platanus racemosa*). Most stands are too dense to allow much understory development. Soils are typically composed of loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. Vegetation within this habitat type includes arroyo willow (*Salix lasiolepis*), Fremont cottonwood, mulefat (*Baccharis salicifolia*), Mexican elderberry (*Sambucus mexicana*), streamside monkeyflower (*Mimulus guttatus*), and stinging nettle (*Urtica dioca*). Within the vicinity of the project area, this habitat has been identified 7.3 miles east of the project area adjacent to Sycamore Canyon Wilderness Park and likely occurs in natural drainages leading to the Santa Ana River (T. Cummins, personal observation). This habitat is considered rare by CDFG and worthy of listing within the CNDDB.

Upland Habitats

Riversidean Coastal Sage Scrub

Riversidean sage scrub (Holland 1986; Element Code 32700) occurs on xeric sites such

as steep slopes, severely drained soils, or clays that release stored soil moisture only slowly. In western Riverside County, this habitat type occurs from the eastern slopes of the Santa Ana Mountains to elevations in the San Jacinto Mountains less than 5,000 feet. Vegetation is characterized by low-statured, aromatic, drought-deciduous shrub and subshrub species. Within the project area, Riversidean sage scrub species composition is dominated by California buckwheat (*Eriogonum fasciculatum*) and California sagebrush (*Artemisia californica*). Other perennial species which are common, but not dominant, include black sage (*Salvia mellifera*), coast cholla (*Opuntia prolifera*), and wild cucumber (*Marah macrocarpus*). Annual species commonly observed within the Riversidean sage scrub habitat in the project area included Rancher's fireweed (*Amsinckia menziesii*), phacelia (*Phacelia* sp.), turkey mullein (*Eremocarpus setigerus*), and a dense understory of non-native grasses and forbs. Within the vicinity of the project area, this habitat occurs scattered throughout patches of open space among nonnative grasslands in upland areas adjacent to the Santa Ana River, and on several undeveloped hills within ten miles of the project area. This habitat is considered rare by CDFG and worthy of listing within the CNDDB.

Nonnative Grasslands

Non-native grassland vegetation (Holland 1986; Element Code 42200) consists of open fields of non-native pasture grasses and weedy forbs. Germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer-fall dry season, persisting in the seedbank as seeds. These annual grasslands have replaced native habitats of perennial bunchgrasses and forbs. Plant species that dominate this community include brome grasses (*Bromus* spp.), tocalote (*Centaurea melitensis*), tumbleweed (*Salsola tragus*), red-stemmed filaree (*Erodium cicutarium*), and black mustard (*Brassica nigra*). Within the vicinity of the project area, this habitat occurs in large open areas among coastal scrub, and at sites that have been previously disturbed by grazing, fire, or agricultural activities.

Human Modified Habitats

Urban or Built-up Land

Urban or built-up land is comprised of areas of intensive use with much of the land covered by structures. Included in this category are cities, transportation, power, and communications facilities, and areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from urban areas. These areas are characterized by buildings, asphalt, concrete, suburban gardens, and a systematic street pattern (Anderson et al. 1976). Urban or built-up land was identified within, immediately adjacent to, and throughout the vicinity of the project area, and represents the most common habitat type in the project area vicinity.

Agricultural Land

Agricultural lands include both irrigated (for small grains) and non-irrigated (for wheat) tilled fields and orchards. Aside from crop species, vascular plant species associated with these areas typically include Johnson grass (*Sorghum halapense*), Canadian horseweed

(*Conyza canadensis*), lamb's quarters (*Chenopodium album*), cocklebur (*Xanthium strumarium*), bermudagrass (*Cynodon dactylon*), and common bindweed (*Convolvulus arvensis*). Within the vicinity of the project area, agricultural lands occur approximately five miles to the south near State Route 91, with other agricultural fields scattered throughout the vicinity.

Ruderal

Ruderal vegetation is characteristic of areas disturbed by human activities such as agriculture, construction, or other land clearing activities and is common throughout much of California. Vegetation within ruderal habitats is dominated by highly adaptive and invasive exotic species with a depauperate native species component. Common species include redstem filaree (*Erodium cicutarium*), black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), cheeseweed (*Malva parviflora*), smilograss (*Piptaherum miliaceum*), and golden crownbeard (*Verbesina encelioides* ssp. *exauriculata*). This habitat is scattered throughout the vicinity of the project area.

6.3.3.2 Project Area and Vicinity

Prior to its construction, the entire RERC project area had been previously disturbed during its use as a borrow area for the Tequesquite Landfill located approximately 4 km to the east. During borrow activities, up to 5 m of soil and geologic material was removed from the eastern portion of the parcel, with less removed from the western portion nearer the existing WQCP. As such, the elevation of the parcel was substantially lowered. During its use as a borrow area, the entire site was disturbed by heavy grading and excavating equipment. Naturally occurring boulders that apparently had originally been under the surface were removed and stockpiled in about six large groups and six smaller groups located throughout the site. The large boulder piles (subsequently removed) were as much as 10 to 15 feet in height above the surrounding substrate, with the smaller piles about 3 or 4 feet in height. The boulder piles provided habitat for a variety of wildlife species including burrowing owl (*Athene cunicularia*), Pacific chorus frog (*Pseudacris regilla*), desert cottontail rabbits (*Sylvilagus auduboni*), and side-blotched lizards (*Uta stansburiana*) (Arnold and Tuma 2004; Tuma and Cummins 2007).

Because burrowing owls were observed on the property prior to its development, one of the CEC's Conditions of Exemption for approval of the RERC Units 1&2 project included providing an on-site burrowing owl mitigation area along the slopes in the eastern and northern portions of the RERC. The mitigation included the installation of artificial burrows and revegetation of the slopes with a diversity of native plant species, including those found in native Riversidean coastal sage scrub and grassland communities, in order to encourage burrowing owls and other wildlife species (including a prey base for burrowing owls) to use the area (Tuma and Cummins 2007). The remainder of the RERC project area contains structures associated with the power plant, paved access roads and parking lots, equipment storage areas overlain by gravel, and landscaped areas.

Habitats immediately adjacent to the RERC project area include a combination of developed areas and undeveloped upland habitats. The City's Riverside Regional Water

Quality Control Plant (RRWQCP) is adjacent to the western boundary of the project area. To the north lies a ruderal, north-facing hillside overlooking the Santa Ana River. A paved vehicle storage lot is located along the eastern boundary and industrial warehouses exist to the south. Detailed descriptions of the vegetation communities and habitats within and immediately adjacent to the RERC project area are provided in the Results section of this report.

6.3.4 Methods

6.3.4.1 Literature and Database Search

Project biologists reviewed existing sources of information regarding the occurrence of special-status species, and assessed the potential for occurrence of these species within the project area. Special-status species are plants and animals in one or more of the following categories.

- Habitats considered rare and worthy of special consideration by CDFG and acknowledged by CNDDB (*List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database*, September 2003)
- Species listed or proposed for listing as threatened or endangered under FESA (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under FESA (67 FR 40657, June 13, 2002).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations 670.5).
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380).
- Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- Plants considered by the CNPS to be “rare, threatened, or endangered in California” (Lists 1B and 2 in California Native Plant Society Inventory of Rare and Endangered Plants 2007).
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in California Native Plant Society Inventory of Rare and Endangered Plants 2007), which may be included as special status species on the basis of local significance or recent biological information.
- Animal species of special concern as listed by CDFG (2007).
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Species that are “covered” under the MSHCP, including listed species, “Narrow Endemic Species,” or other sensitive species.

The following sources of information were consulted prior to conducting the field survey:

- California Natural Diversity Database (CNDDB) (2008) for the Riverside West U.S. Geological Survey 7.5-minute quadrangle and the eight surrounding quadrangles in the project vicinity including: Fontana, San Bernardino South, Riverside East, Steele Peak, Lake Matthews, Corona South, Corona North, and Guasti.
- California Native Plant Society's (CNPS) 2007 online Inventory of Rare and Endangered Plants of California for the Riverside West U.S. Geological Survey 7.5-minute quadrangle (USGS Quad) and the eight surrounding quadrangles in the project vicinity including: Fontana, San Bernardino South, Riverside East, Steele Peak, Lake Matthews, Corona South, Corona North, and Guasti.
- U.S. Fish and Wildlife Service, Carlsbad Fish & Wildlife Office Endangered and Threatened Species List (Riverside County).
- Interactive Species Map for Western Riverside County (http://ecoregion.ucr.edu/maps.asp) for a list of sensitive species within the vicinity (within 5 kilometers) of the Project. This species list includes observations of MSHCP-covered species.

6.3.4.2 Field Visit

A reconnaissance-level field survey was conducted of the RERC project area and adjacent lands within 150 m (500 feet) to identify and characterize the vegetation types and assess wildlife habitats. In addition habitat assessments were performed for several MSHCP-covered species, per MSHCP requirements. The project area was also examined in order to identify any other sensitive biological issues not covered under the MSHCP. Methods employed for this survey are discussed in detail below.

Species Inventories

General Botanical Inventory

A general botanical inventory was conducted during survey of the project area. All plant species observed during the surveys were identified in the field and recorded in field notes. Specimens that could not be readily identified in the field were collected and identified in a laboratory. A botanical inventory was compiled including common and scientific names, habitats in which species were observed, estimated population size, and wetland indicator status. Scientific nomenclature and common names follow Hickman (1993). The locations of any special-status plant species encountered during the survey were mapped on the field map, recorded using a handheld GPS unit, and other information pertinent to the CNDDB field survey data form was recorded in field notes.

General Wildlife Inventory

A general wildlife inventory was conducted during survey of the project area. All wildlife species and their sign that were observed during the surveys were identified in the field and recorded in field notes. Surveys for invertebrate wildlife species were generally opportunistic in nature, and included making observations of flying and crawling invertebrates encountered during the surveys. No insect collecting was performed during

field surveys and insects observed were not identified below family level. No surveys for fish were conducted, as no wetland habitats were located within the project area or its immediate vicinity. Surveys for reptiles and amphibians were conducted through visual identifications of individuals active on the ground surface. Searches for fossorial or semi-fossorial reptiles and amphibians were conducted by carefully overturning cover sites, such as rocks, logs, and debris; inspecting the ground surface beneath the cover sites; and carefully replacing the cover site to its original location, taking precautions not to crush wildlife in the process. Bird surveys were conducted outside of the nesting season. Birds were identified by sight and sound. Surveys for mammals included searching for individuals and identifying diagnostic sign, including scat, tracks, dust bowls, burrows, bones, and wildlife trails. The location(s) of any special-status wildlife species was mapped on the field map and information pertinent to the CNDDB field survey data form was recorded in field notes.

Vegetation Community Characterization

During the survey, the RERC project area was walked, and vegetation communities were characterized. The purpose of this survey was to identify vegetation, land cover types, and any habitats, including riparian areas and vernal pools, with the potential to support sensitive wildlife species.

Vegetation types and land cover types were recorded on aerial photographs and described in field notes. Natural vegetation communities were described using the California List of Terrestrial Natural Communities (CDFG 2003). When possible, Holland (1986) and Sawyer and Keeler-Wolf (1995) equivalents were assigned. Plant nomenclature followed *The Jepson Manual of Higher Plants of California* (Hickman 1993).

MSHCP-covered Species Habitat Assessments

A check of the Riverside County Integrated Plan (RCIP) MSHCP Conservation Summary Report Generator (http://www.tlma.co.riverside.ca.us/gis/rciprepgen.html) for Assessor's Parcel Numbers 189-120-001, 189-120-002, and 189-150-001 determined that the project area is located within the overlays for four species, including burrowing owl (*Athene cunicularia*), San Diego ambrosia (*Ambrosia pumila*), Brand's phacelia (*Phacelia stellaris*), and San Miguel savory (*Satureja chandleri*). The MSHCP requires that habitat assessments be performed for these species, as well as for other MSHCP-covered species, including least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), western yellow-billed cuckoo (*Coccyzus americanus occidental*), California linderiella (*Linderiella occidentalis santarosae*), Riverside fairy shrimp (*Streptocephalus wootoni*), and vernal pool fairy shrimp (*Branchinecta lynchi*).

Burrowing Owl Habitat Assessment

Project biologists conducted a walkover of the RERC project area and adjacent lands to ascertain the presence/absence of burrowing owl habitat. This survey was performed using guidelines for Step I Habitat Assessment as recommended in the revised burrowing owl survey instructions for the MSHCP (County of Riverside 2006; Appendix 6.3-A), which rely heavily on survey methodology developed by the California Burrowing Owl

Consortium (1993) and were approved by the CDFG (1995). Standard field methods included walking transects spaced at no more than 30 meters across the entire property and visually inspecting the vegetation, topography, and presence or absence of potential burrows (rodent burrows, boulders, berms, and concrete or asphalt debris piles). If burrowing owl habitat was identified within the project area, then adjacent lands within 150 meters (500 feet) of the project site were also surveyed for the presence of burrowing owl habitat. Although the purpose of the survey was not to look for burrowing owls, the locations of any burrowing owls or their sign observed on the project were documented with photographs, field notes, and global positioning system (GPS) technology.

Other MSHCP-covered Species Habitat Assessments

During the habitat characterization, Project biologists assessed the presence or absence of appropriate habitat for other MSHCP-covered species, including San Diego ambrosia, Brand's phacelia, San Miguel savory, least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, California linderiella, Riverside fairy shrimp, and vernal pool fairy shrimp. This included a characterization of the biological conditions within the project area, and an assessment of whether the habitats within the project area provided appropriate habitat for these species.

Habitat Assessments for Other Special-status Species

During field survey, the RERC project area was evaluated for its potential to support other special-status plant and wildlife species not covered under the MSHCP that are known or expected to occur in the region, as indicated during the database and literature reviews. The occurrence potential of special-status species was evaluated according to the habitat type and quality within the study area. For special-status plant species, occurrence potential was based upon vegetation community types, vegetation structure, degree of disturbance, and other noteworthy indicators. For special-status wildlife species, occurrence potential was assessed based on parameters such as quality of food resources, the presence of suitable nesting/aestivating/denning habitat, and other noteworthy parameters. Subsequent recommendations for focused protocol surveys for special-status species during appropriate times of year were based on these assessments.

6.3.4.3 CDFG Consultation

During the design phase of the Project, RPU and project engineers and biologists consulted to determine whether the proposed project design would result in potential impacts to the burrowing owl mitigation area. Project biologists determined that the majority of the proposed project design would not impact the existing burrowing owl mitigation area. However, the proposed Dispatch and Scheduling building, consisting of a one-story building approximately 40 feet wide and 95 feet long, would be positioned adjacent to the existing burrowing owl mitigation area. Positioning the structure in close proximity of the burrowing owl mitigation area would likely render the adjacent mitigation area unusable by burrowing owls, as it could 1) provide a perching structure for diurnal raptors that prey on burrowing owls, and 2) detract from the openness that currently characterizes the space of the power plant grounds directly adjacent to the mitigation area, a feature that contributes to the site's attractiveness to burrowing owls.

Two to three burrows would be affected in this manner.

Project applicant developed a building design concept and construction plan that will mitigate these potential impacts to the burrowing owl mitigation area and any burrowing owls that inhabited the area. The Project developed a building design and earthen slope design that 1) renders it useless as a perch for diurnal raptors, and 2) creates the "feel" of a low topographic feature, rather than a building. This would be accomplished by 1) constructing a retaining wall along the side of the building that faces the burrowing owl mitigation area, 2) filling the space between the retaining wall and the existing slope of the mitigation area with soil of an appropriate type, then shaping the area to allow for drainage, and planting it with native plant species similar to the species composition currently used in the burrowing owl mitigation area, and 3) replacing the artificial burrow that would be lost during this process with two additional burrows within the mitigation area, per CDFG requirements. This proposed design would maintain the acreage within the burrowing owl mitigation area, result in additional artificial burrows, discourage raptors from perching on and hunting from the roof of the proposed building, and maintain the openness in front of the mitigation area by incorporating the roof of the building as part of the open space in front of the mitigation area..

Subsequent to the building conceptual design being completed, the Project met with CDFG personnel at the project site on January 3, 2008 to discuss the proposed plans. CDFG indicated their concurrence with the proposed approach. A letter regarding the issue from Leslie MacNair, biologist with CDFG, is presented in Appendix 6.3-D.

6.3.4.4 Assessment of Special-status Species Occurrence Potential

Following the database searches and field survey, an assessment was made the potential for occurrence for special-status species within the project area and its immediate vicinity. This consisted of assessing the biological conditions within the project area and its immediate vicinity and the known occurrences of special-status species within the general vicinity of the project area (9-quad area). During the assessment, each species was assigned to one of the following categories:

Present: Species is known to occur within the project area, based on recent (within last 20 years) records, and/or was observed within the project area during the field survey(s).

May occur: Species is known to occur in the vicinity of the project area (based on CNDDB or other records within 10 miles and/or based on professional expertise specific to the project area or species), and there is suitable habitat within the RERC project area. Alternatively, there is suitable habitat within the project area and the RERC project area limits are within the known range of the species. For avian species, a distinction was made between occurrence potential on the project area as a forager, nester, and/or transient.

Not likely to occur: Species is known to occur in the vicinity of the RERC project area (within ten miles); however, there is poor quality or marginal habitat in the project area.

If the species occurs at the project area, it would likely be as a migrant, and the species is not likely to reproduce (breed or nest) within the project area due to a lack of suitable habitat or because the project area is outside of their known breeding range.

Absent: There is no suitable habitat for the species within the RERC project area, or the project area is located outside of the known range of the species. Alternatively, a species was surveyed for during the appropriate season with negative results for species occurrence.

6.3.4.5 Assessment of Other Sensitive Biological Resources

The RERC project area was also evaluated to determine whether habitat existed for other sensitive biological resources, including nesting birds and potential wetlands and other potentially jurisdictional habitats. During this evaluation, project biologists searched the project area for bird nests and nesting habitat, and streams or other wetlands.

6.3.4.6 Impact Analysis

In support of the environmental analyses required by the CEC for CEQA compliance, potential impacts to biological resources were assessed, including special-status species, within the project area. The assessment included identification of potentially significant impacts based on the CEQA thresholds from of the CEQA Guidelines. Project features were designed to protect wildlife species in this analysis. Thresholds used in analyzing impacts resulting from the proposed project include the following:

- Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS?
- Would the Project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?
- Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?
- Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

6.3.5 Results

6.3.5.1 Special-status Species Database Search

A list of special-status species known to occur within the 9-quad area surrounding the RERC project area was generated from several sources, including the CNDDB, the CNPS 2007 online *Inventory of Rare and Endangered Plants of California*, the Carlsbad Fish and Wildlife Office's Endangered and Threatened Species List, and the Interactive Species Map for Western Riverside County. A total of 141 special-status species were identified within this search area, including: 51 plants, 7 invertebrates, 3 fish, 3 amphibians, 13 reptiles, 39 birds, and 17 mammals. In addition, nine sensitive habitats were identified in the search area (Appendix 6.3-B).

6.3.5.2 Field Survey

The RERC project area was visited on January 9, 2008 between 10:00 and 11:45 a.m. Conditions at the project area during the survey were overcast and calm with an average temperature of 55°F (13°C).

Species Inventories

A total of 55 plant and six wildlife species were observed during the current survey (Appendix 6.3-C). Included in Appendix 6.3-C are plant and wildlife species observed and/or expected to occur within the project area, and within 1 mile of the project area, based upon previous work in the area (Arnold and Tuma 2004; Tuma and Cummins 2007; LSA 2007; and personal observations by M. Tuma between 2004-2007). The total number of species observed and expected to occur within 1 mile of the project area includes 87 plant and 84 wildlife species (Appendix 6.3-C).

Habitat Characterization

The RERC project area contains four habitat types: burrowing owl mitigation area (coastal scrub and grassland), urban or built up land, transitional bare areas, and ruderal habitats (Table 6.3-1). Habitats identified on adjacent lands (within 150 m) include: ruderal, southern cottonwood willow riparian forest, upland habitat, and urban or built-up lands which include industrial areas, a parking lot, and the WQCP facilities. These habitat types are discussed in detail below and are depicted in Figure 6.3-2.

Table 6.3-1 Biotic Habitats within the RERC Project Area

Habitats	Acres
Burrowing Owl Habitat Mitigation Area	2
Urban or Built-up Land	8.4
Transitional Bare Areas	5
Ruderal	0.6
Total	**16**

Burrowing Owl Mitigation Area

The burrowing owl mitigation area consists of a total area of approximately two acres, located along the eastern and northern borders of the plant site (Figure 6.3-2; Figure 6.3-3). The areas within a 30 foot perimeter of each of the six artificial burrows has previously been seeded with a mix of local native grassland forb and grass species as part of the planned mitigation for RERC Units 1&2. The remaining areas have been planted and seeded with both Riversidean sage scrub and grassland species. Dominant Riversidean sage scrub species installed into the revegetated area includes California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemesia californica*), coat prickly-pear (*Opuntia littoralis*), and brittlebush (*Encelia farinosa*). Dominant grassland species within this habitat include purple needlegrass (*Nassella pulchra*), rancher's fireweed (*Amsinckia menziesii*), and tidy tips (*Layia platyglossa*). One special status plant species, snake cholla (*Opuntia californica* var. *californica*), was installed into the mitigation area (n=5). Snake cholla is a stem succulent cactus, which blooms between April and May and is listed by the CNPS as a 1B.1 plant, making it eligible for protection under CEQA. It occurs in chaparral and coastal sage scrub at elevations between 100 and 500 feet. Plants installed into this area are noted in the project area's botanical inventory (Appendix 6.3-C).

Wildlife observed during the survey mourning dove (*Zenaida macroura*) and western fence lizard (*Sceloperous occidentalis*). Wildlife species that are likely to occur within the project area include American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), and house finch (*Carpodacus mexicanus*). Additionally, burrowing owls have been observed foraging throughout the habitat and temporarily residing in the artificial burrows (Tuma and Cummins 2007).

Figure 6.3-2 Habitat Types

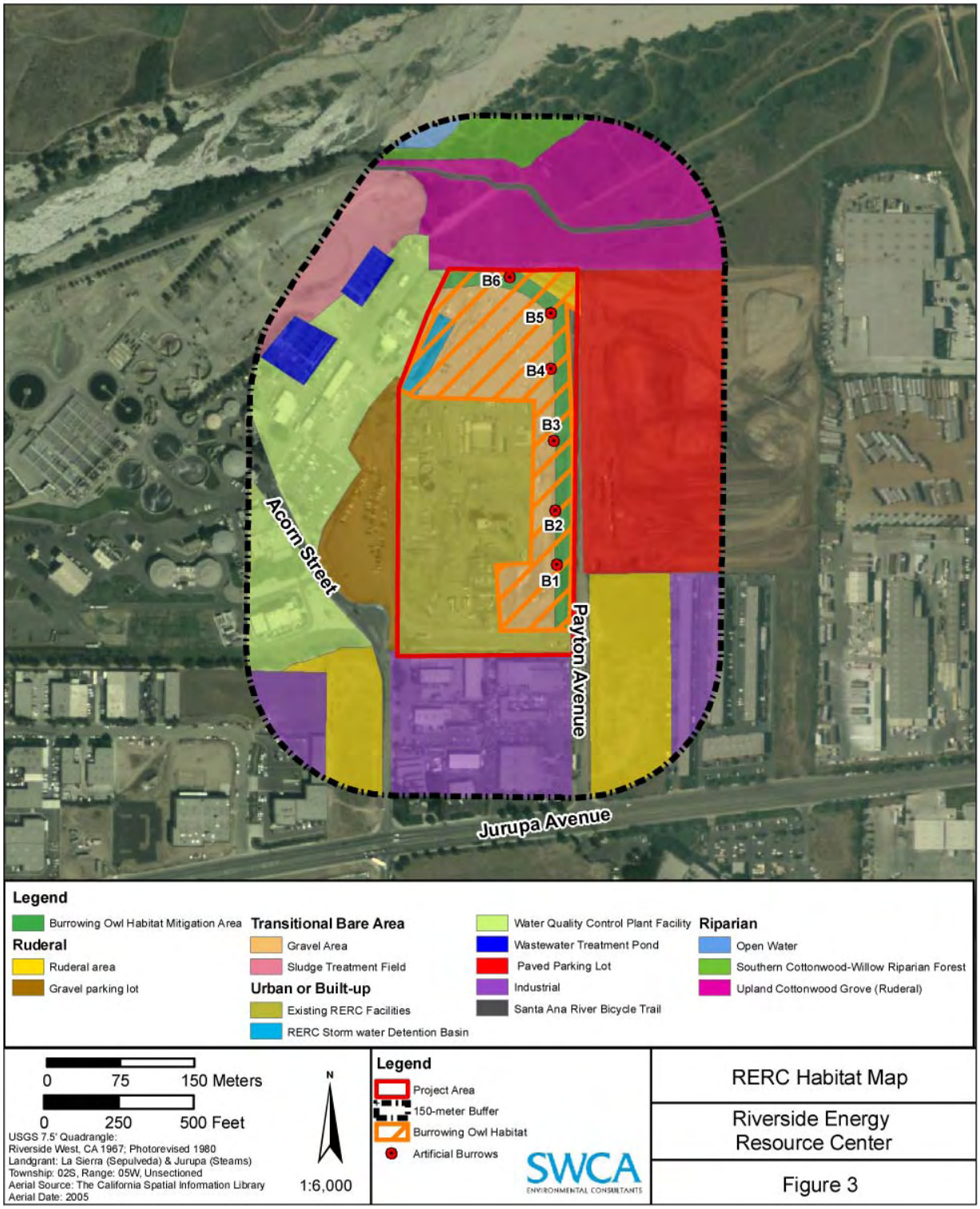


Figure 6.3-3 View slope bank used for burrowing owl habitat mitigation area.

Urban or Built-up Land

Urban or Built-up Land is comprised of areas of intensive use with much of the land covered by structures. Included in this category are cities, transportation, power, and communications facilities, and areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from urban areas. These areas are characterized by buildings, asphalt, concrete, suburban gardens, and a systematic street pattern (Anderson et al. 1976). Urban or built-up land was identified throughout much of the southern portion of the RERC project area, encompassing approximately nine acres (Figure 6.3-4). This habitat encompasses all existing RERC Units 1&2 facilities including all buildings and associated landscaping, parking lots, a storm water runoff detention basin, Units 1 and 2, roads, and other structures associated with the facility. Landscape vegetation consists of regularly irrigated ornamental groundcover, shrub, and tree species including Mexican Fan Palm (*Washingtonia robusta*). All other areas within this habitat were covered with pavement, structures, or gravel.

Transitional Bare Areas

Transitional bare areas are defined as areas which are in transition from one land use activity to another (Anderson et al. 1976). Transitional bare areas encompass five acres

and are located within the northern and southeast portions of the site, adjacent to the burrowing owl mitigation area (Figure 6.3-2; Figure 6.3-4). The proposed Project, including the back-up dispatch and scheduling building and RERC Units 3&4, will be built in these areas. These areas were covered with crushed rock and were lacking vegetation, aside from a few opportunistic species such as redstem filaree (*Erodium cicutarium*), black mustard (*Brassica nigra*), and tree tobacco (*Nicotiana glauca*). Wildlife species commonly found in this habitat include western fence lizard, foraging raptors, and killdeer, which may nest there.

Figure 6.3-4 View of gravel area (transitional bare area - foreground) and existing RERC facilities (urban or built-up habitat - background).

Ruderal

Ruderal habitats are highly disturbed or modified habitats dominated by opportunistic and often invasive species. Although ruderal habitat is not pristine, it does provide some limited wildlife value by serving as food and cover for insects, reptiles, small mammals, songbirds, and raptors. Ruderal habitat identified within the project area included a small underground pipeline station located in the northeast corner of the project area, and a storm water detention basin in the northwest corner of the RERC project area (Figure 6.3-2; Figure 6.3-5). In total, these ruderal areas encompass 0.6 acres of habitat within the project area. In the northeastern portion of the project area, this habitat type was

dominated by brome grasses (*Bromus* spp.) and black mustard. In the storm water detention basin, species ruderal species included brome grasses and red-stemmed filaree. Wildlife expected to occur within these habitats includes California ground squirrel (*Spermophilus beecheyi*), western fence lizard, and mourning dove. Additionally, burrowing owls may nest and forage within these habitats.

Habitats on Adjacent Lands (Within 150 m)

Southern Cottonwood Willow Riparian Forest

Southern cottonwood willow riparian forest occurs along rivers and streams, and is characterized by tall, open, broadleaf winter-deciduous trees, dominated by cottonwood (*Populus* spp.) and several species of willow (*Salix* spp.). Understories characteristically contain shrubby younger willows (*Salix* spp.) (Holland 1986). Soils are typically composed of loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. This habitat is considered rare and worthy of special consideration by CNDDB (CDFG 2003). The project area is located just south of the Santa Ana River, a major riparian corridor that supports an extensive southern cottonwood-willow riparian forest. This habitat is located 325 feet (100 m) north of the project area and is dominated by a dense overstory of Fremont's cottonwood (*Populus fremontii*) and arroyo willow (*Salix lasiolepis*) (Figure 6.3-2; Figure 6.3-5). Giant reed (*Arundo donax*), a highly invasive riparian species, was also observed within this habitat. A mature red-tailed hawk was observed foraging within this habitat during the field survey. This riparian habitat supports suitable foraging and nesting habitat for least Bell's vireo, southwest willow flycatcher, and western yellow-billed cuckoo, all of which have been observed nesting and foraging within the Santa Ana River riparian corridor, although none were observed during the field survey which was conducted outside of the breeding season.

Figure 6.3-5 View from northeast corner of the project area of ruderal habitat (foreground) and Santa Ana River riparian habitats (open water and southern cottonwood willow riparian forest).

Ruderal

Ruderal habitat identified within adjacent lands included a large recently tilled field southeast of the project area along Payton Avenue and a cleared field with some concrete-debris piles located southwest of the project area along Acorn Street (Figure 6.3-2; Figure 6.3-6). This habitat type was dominated by brome grasses (*Bromus* spp.) and black mustard. Other species observed there included tree tobacco, turkey mullein (*Eremocarpus setigerus*), tocalote (*Centaurea melitensis*), tumbleweed (*Salsola tragus*), and red-stemmed filaree. Wildlife expected to occur within this habitat includes California ground squirrel (*Spermophilus beecheyi*), western fence lizard, and mourning dove. Additionally, burrowing owls may nest and forage within this habitat.

Figure 6.3-6 View of recently disked ruderal habitat along Payton Avenue.

Upland Cottonwood Habitat (Ruderal)

Upland cottonwood habitat associated with the Santa Ana River was identified to the north of the project area. This habitat was characterized by scattered Fremont cottonwood trees and ruderal groundcover. Native plant species identified within this habitat include western sycamore (*Platanus racemosa*), California buckwheat, and mulefat (*Baccharis salicifolia*). Ruderal species identified within this habitat include black mustard, redstem filaree, brome grasses (*Bromus* spp.), and tree tobacco (Figure 6.3-2). A mature red-tailed hawk (*Buteo jamaicensis*) was observed circling above this habitat. Due to the sparse structure composition of riparian vegetation, this habitat does not support suitable habitat for nesting least Bell's vireo, southwestern willow flycatcher, or yellow-billed cuckoo.

Urban or Built-up Lands

Urban or built up lands identified adjacent to the RERC project area included: RRWQCP facilities, RRWQCP wastewater treatment ponds, a paved parking lot, industrial facilities (Figure 6.3-7), and the Santa Ana River Bicycle Trail (Figure 6.3-2). Aside from minimal landscaping around buildings, vegetation identified within these areas included a few opportunistic species including tree tobacco and redstem filaree. Wildlife observed in these areas included house sparrow (Passer domesticus) and mourning dove.

Figure 6.3-7 Industrial areas along Payton Avenue.

6.3.5.3 MSHCP-covered Species Habitat Assessments

Burrowing Owl Habitat Assessment

Portions of the RERC project area support suitable habitat for burrowing owl. This includes the burrowing owl habitat mitigation area, the gravel lot adjacent to the burrowing owl mitigation area, and a storm water retention basin (Figure 6.3-2). Though no burrowing owls were detected during the current survey, burrowing owls have been detected within the burrowing owl mitigation area utilizing four of the six artificial burrows (Burrows 1, 2, 3, and 5), and foraging throughout the mitigation area (Tuma and Cummins 2007; M. Tuma, personal observation 2006-2007). Burrowing owls have also been observed within the gravel lot adjacent to the mitigation area, where they have taken refuge under small structures and within equipment stored there (M. Tuma, personal observation 2006-2007). The gravel lot in the northern portion of the RERC project area currently contains pipes and other items that could provide refugia for burrowing owls. A storm water detention basin in the northwest portion of the project area supports ruderal vegetation, and provides suitable habitat for burrowing owls. No California ground squirrels or their burrows were observed within the project area during the survey, though some activity by California ground squirrels within the mitigation area has been observed in the past (M. Tuma, personal observation, 2006-2007).

Suitable habitat for burrowing owl also exists within 150 meters of the RERC project area within the recently cleared ruderal fields along Payton Avenue and Acorn Street. Suitable burrowing owl habitat was also identified within a small area of ruderal habitat associated with a gas pipeline valve station immediately adjacent to the northeast corner of the project area (Figure 6.3-2).

San Diego Ambrosia, Brand's Phacelia, and San Miguel Savory Habitat Assessments

Suitable habitat for San Diego ambrosia, Brand's phacelia, and San Miguel savory were not identified within the RERC project area. San Miguel Savory occurs within chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland in rocky, gabbroic, or metavolcanic soils. Brand's phacelia occurs in coastal dunes and coastal scrub. San Diego ambrosia occurs in chaparral, coastal scrub, valley and foothill grassland, and vernal pool habitats.

Southwestern Willow Flycatcher, Least Bell's Vireo, and Western Yellow-billed Cuckoo Habitat Assessments

Suitable habitat for southwestern willow flycatcher, least Bell's vireo, and yellow-billed cuckoo, which includes dense riparian vegetation associated with open water, was not identified within the RERC project area. Habitat for these species occurs approximately 100 meters north of the project area in the southern cottonwood willow riparian forest along the Santa Ana River riparian corridor.

Vernal Pool Shrimp

No vernal pools that would support vernal pool shrimp species were identified within the project area.

6.3.5.4 Assessment of Special-status Species Occurrence Potential

Appendix 6.3-B provides a list of all special-status plant and wildlife species identified by the database search as occurring in the vicinity of the project area (within the 9-quad area). It also provides a description of typical habitat requirements, legal status, and an evaluation of the potential for occurrence within the project area. Below, we provide expanded descriptions for those species that were either present within the project area, or their occurrence potential was evaluated as "may occur" within the project area. The locations of known occurrences of special-status plant species and sensitive habitats within ten miles of the project area are presented in Figure 6.3-8; the locations for special-status wildlife species occurrences within ten miles are presented in Figure 6.3-9.

Figure 6.3-8 Special-status Plant & Sensitivity Habitat Species Occurrences

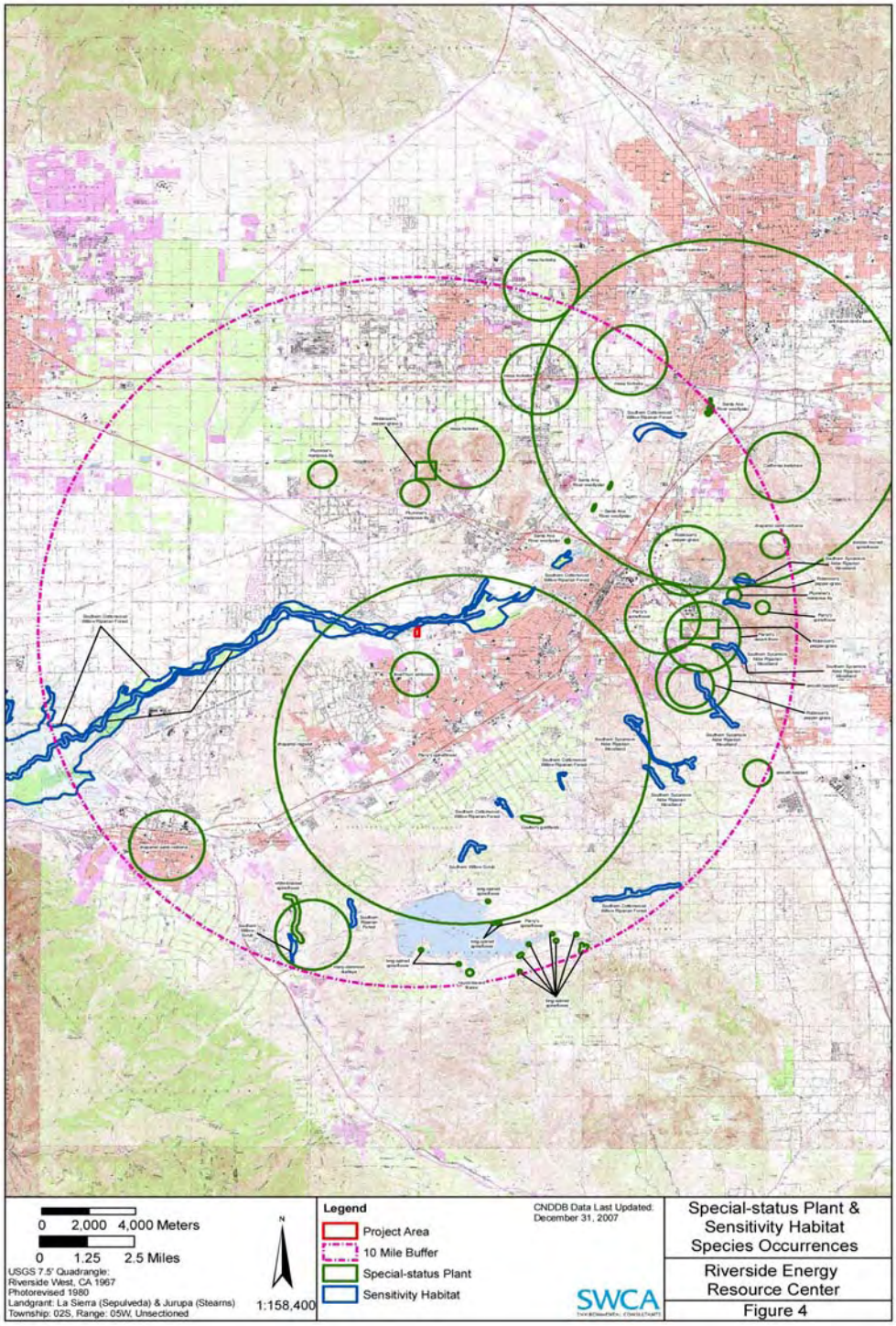
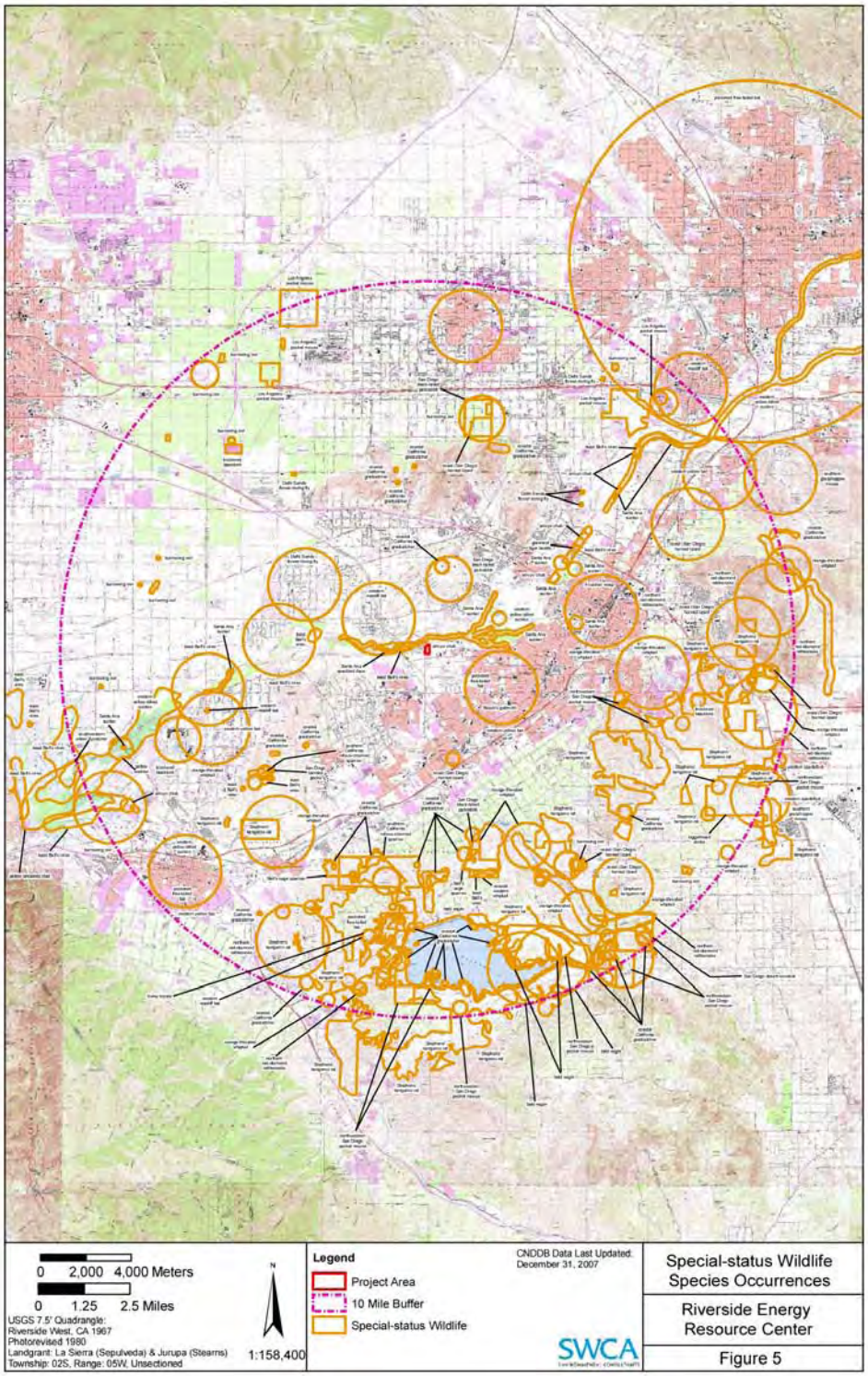


Figure 6.3-9 Special-status Wildlife Species Occurrences



Special-status Plants

During the field survey, habitats capable of supporting special-status plant species were evaluated within the study area. Based on the analysis provided in Appendix 6.3-B, the following species were eliminated from further consideration because 1) there is no suitable habitat within the project area AND there are no local records (within 10 miles) in the vicinity of the project area, and/or 2) the project area is outside of their known range. Alternatively, although there are records of these species within the project's vicinity (within ten miles), there is no suitable habitat within the project area to support the occurrence of these species. These species were assessed as "absent:"

- Chaparral sand-verbena
- Munz's onion
- San Diego ambrosia
- Marsh sandwort
- Horn's milk-vetch
- San Jacinto Valley crownscale
- Parish's saltscale
- Nevin's barberry
- Thread-leaved brodiaea
- Plummer's mariposa lily
- Intermediate mariposa lily
- Bristly sedge
- Payson's jewelflower
- Smooth tarplant
- Parry's spineflower
- Long-spined spineflower
- White-bracted spineflower
- California saw-grass
- Salt marsh bird's-beak
- Tecate cypress
- Slender-horned spineflower
- Many-stemmed dudleya
- Santa Ana River woollystar
- Round-leaved filaree
- California bedstraw
- Los Angeles sunflower
- Vernal barley
- Mesa horkelia
- California satintail
- Coulter's goldfields
- Southern California black walnut
- Heart-leaved pitcher sage
- Robinson's pepper-grass
- Parish's desert-thorn

- Pringle's monardella
- California spineflower
- California muhly
- Little mousetail
- Gambel's water cress
- Spreading navarretia
- Prostrate navarretia
- California orcutt grass
- Brand's phacelia
- Santiago Peak phacelia
- Parish's gooseberry
- Gambel's water cress
- San Miguel savory
- Rayless ragwort
- Salt spring checkerbloom
- Prairie wedge grass
- San Bernardino aster
- Woven-spored lichen
- Hidden Lake blue curls

Because of the highly modified condition of the RERC project area, no special-status plant species are expected to occur within the project area nor were any identified during the field survey.

Special-status Wildlife

During the field survey, habitats were evaluated for their potential to support special-status wildlife species. Based on the analysis provided in Appendix 6.3-B, the following species were eliminated from further consideration because (1) there is no suitable habitat within the project area or its immediate vicinity AND there are no local records (within 10 miles) in the vicinity of the project area, and/or (2) the project area is outside of their known range. Alternatively, although there are records of these species within the project area vicinity (within 10 miles), there is no suitable habitat within the project area or its immediate vicinity to support the occurrence of these species. These species were assessed as "absent:"

- California linderiella
- Riverside fairy shrimp
- Vernal pool fairy shrimp
- Greenest tiger beetle
- Delhi Sands flower-loving fly
- Busck's gallmoth
- Quino checkerspot butterfly
- Cuckoo wasp
- Arroyo chub

- Santa Ana speckled dace
- Santa Ana sucker
- Western spadefoot
- Arroyo toad
- California red-legged frog
- Western pond turtle
- California legless lizard
- San Diego banded gecko
- Granite spiny lizard
- Coastal rosy boa
- San Bernardino ringneck snake
- California mountain kingsnake
- Two-striped garter snake
- California red-sided garter snake
- Double-crested cormorant
- American bittern
- Black-crowned night heron
- Golden eagle
- Bald eagle
- Northern harrier
- Cooper's hawk
- Sharp-shinned hawk
- Swainson's hawk
- Ferruginous hawk
- Prairie falcon
- Mountain plover
- Western yellow-billed cuckoo
- Long-eared owl
- Short-eared owl
- Vaux's swift
- Downy woodpecker
- Williamson's sapsucker
- Southwestern willow flycatcher
- Least Bell's vireo
- California horned lark
- Tree swallow
- Coastal California gnatcatcher
- Swainson's thrush
- Nashville warbler
- Yellow warbler
- MacGillivray's warbler
- Wilson's warbler
- Yellow-breasted chat
- Lincoln's sparrow

- Tricolored blackbird
- Lawrence's goldfinch
- Yuma myotis
- Pallid bat
- Pocketed free-tailed bat
- California mastiff bat
- Long-tailed weasel
- American badger
- Bobcat
- Los Angeles pocket mouse
- Northwestern San Diego pocket mouse
- San Bernardino kangaroo rat
- Southern grasshopper mouse
- San Diego black-tailed jackrabbit
- Brush rabbit

Based on the analysis provided in Appendix 6.3-B, the following species were eliminated from further consideration either because: (1) there are no recent local records of their occurrence in the vicinity of the RERC project area, OR (2) although there are recent local records of their occurrence within the vicinity of the RERC project area, habitat within the RERC project area was determined to be to be marginal, limited, or otherwise unfavorable; OR (3) the project area does not likely provide suitable habitat for a sustaining population of this species. Additionally, avian species may have been eliminated from further consideration because, (1) they would use the project area only as a migrant; OR (2) they are not likely to be resident or reproduce there due to a lack of appropriate habitat or because the project area is outside of their known breeding range. These species were assessed as "not likely to occur:"

- Coast horned lizard
- Orange-throated whiptail
- Coastal whiptail
- Northern red-diamond rattlesnake
- Cactus wren
- Southern California rufous-crowned sparrow
- Bell's sage sparrow
- Coyote
- Stephens' kangaroo rat
- San Diego desert woodrat

Based on the analysis provided in Appendix 6.3-B, the following species have either been observed within the RERC project area, or their occurrence potential was assessed as "may occur" within the RERC project area due to the presence of suitable habitat and known local records in the project area vicinity. Brief species accounts for the following species are provided below:

- Turkey vulture
- White-tailed kite
- Burrowing owl
- Loggerhead shrike
- Western yellow bat

Turkey Vulture

The turkey vulture (*Cathartes aura*) is covered under the MSHCP. This large bird occurs throughout the Americas from southern Canada to Cape Horn, where it inhabits a variety of open and semi-open areas, including subtropical forests, shrublands, pastures, and deserts. The turkey vulture is a scavenger and feeds almost exclusively on carrion. It nests in caves, hollow trees, or thickets, generally raising two chicks each year, which it feeds by regurgitation. According to the Interactive Species Map for Western Riverside County, there are five recent observations of this species within five kilometers of the project area. This species has been observed foraging on carrion within the burrowing owl mitigation area. Though it may forage within the project area, there is no suitable nesting habitat there.

White-tailed Kite

The white-tailed kite (Elanus leucurus) is covered under the MSHCP, and is listed as a California Species of Special Concern and a California Fully Protected species. This species ranges throughout California, primarily along the coast and Central Valley. They require relatively open habitat for foraging, as well as trees (isolated or within stands) for nesting and roosting. Habitats with abundant prey populations (un-grazed or little grazed grasslands, agriculture, and grass dominated wetlands) support more kites. This small raptor species preys primarily on small rodents. According to the Interactive Species Map for Western Riverside County, there are four recent observations of this species within five kilometers of the project area. Though white-tailed kites may forage within the project area, there is no suitable nesting habitat there.

Burrowing Owl

The burrowing owl is covered under the MSHCP and is a California Species of Special Concern. Within California, this species occurs primarily in agricultural and grassland areas of interior and coastal valleys. They prefer dry, open, treeless grassland and desert scrubland, often in areas with little or no vegetation. Burrowing owls can also occupy and breed in highly modified habitats, including golf courses, airports, cemeteries, vacant lots in residential areas, and along shoulders of roadways. Typically, they occupy abandoned ground squirrel burrows. Breeding usually begins during March or April in southern California. Along coastal southern California, the distribution of the burrowing owl has been greatly reduced and localized due to loss of habitat through development.

Burrowing owls require large, open expanses of sparsely vegetated areas on gently rolling or level terrain, with an abundance of active small mammal burrows, particularly those of the California ground squirrel. The burrows of these rodents are a critical habitat feature for burrowing owls, as they modify and use squirrel (and other rodent) burrows

for refugia, roosting, and nesting. They sometimes use artificial features, such as pipes, culverts, and nest boxes in areas where squirrel burrows are scarce (Robertson 1929). Mammal burrows are modified and enlarged by the owls. One burrow is typically used for nesting; however, satellite burrows are usually found in the immediate vicinity of the nest burrow within the defended territory of the owl.

The burrowing owl is crepuscular, foraging at or near dawn and dusk. They hunt by using short flights, running along the ground, hovering, or by using an elevated perch from which prey is spotted. They are opportunistic foragers (Haug et al. 1993), and their prey includes invertebrates and small vertebrates (Thomsen 1971). Their diet is composed of a variety of foods, primarily mice (Peromyscus spp. and Microtus spp.) and beetles. Beetles are taken with more frequency; however, per biomass, Peromyscus mice are dominant, followed by Microtus mice (Marti 1974). Although they eat mostly insects and small mammals, burrowing owls also may take reptiles, birds, and carrion. During the breeding season, there are significant declines in the percentage of vertebrate prey in the diet and increases in the invertebrate prey (Haug et al. 1993).

Burrowing owls typically nest in modified burrows of California ground squirrels (or other small rodents); the burrows of badgers are used on occasion. The nest chamber is lined with excrement, pellets, debris, grass, and/or feathers; other times it is unlined. The male attracts a female to the burrow and defends the nest site by calling in front of the burrow. Breeding occurs from March through August, with a peak in April and May. Clutch size is 6 to 11 eggs, with an average of 7 to 9 eggs; clutch size may increase in more northerly populations (Bent 1938). The young emerge from the burrow at about two weeks and can fly by about four weeks (Zarn 1974). Martin (1973) reported that 95 percent of the young fledged in one population, with a mean reproductive success of 4.9 young per pair.

There are 11 recent records and one historic record of this species within ten miles of the project area (CNDDB 2008; Figure 6.3-9). According to the Interactive Species Map for Western Riverside County, there are seven historic observations of this species within five kilometers of the project area. Prior to the construction of RERC Units 1&2, an individual burrowing owl was observed occupying two burrows within a boulder pile within the project area in December 2003 (Arnold and Tuma 2004). To mitigate for loss of habitat resulting from construction, the burrowing owl habitat mitigation area was installed within the RERC project area. Since the installation of the burrowing owl habitat, RPU personnel and project biologists have observed burrowing owls foraging and temporarily residing within the habitat during the fall months of 2006 and 2007 (Tuma and Cummins 2007; Tuma, personal observation, November 2007). Burrowing owls may forage and nest in the burrowing owl mitigation area within the project area.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is covered under the MSHCP, and is listed as a California Species of Special Concern. This species is an uncommon but widespread resident of southern California. Loggerhead shrikes prefer open habitats interspersed with shrubs, trees, poles, fences, or other perches from which they can hunt. They are

primarily monogamous and are territorial throughout the year. Nests are built in densely-vegetated shrubs or trees, often containing thorns or near fences with barbs, which offer protection from predators and upon which prey items are impaled. There is one recent record within ten miles of the project area (CNDDB 2008; Figure 6.3-9). Additionally, according to the Interactive Species Map for Western Riverside County, there are 15 recent records within five kilometers of the RERC project area. There is suitable foraging habitat within the burrowing owl mitigation area, and this species may forage there, though is no suitable nesting habitat within the project area.

Western Yellow Bat

Western yellow bat (*Lasiurus xanthinus*) is a California Species of Special Concern. The western yellow bat has a primarily Mexican and Central American distribution, but extends into the southern portions of California, Arizona, and New Mexico, and into the western portion of Texas. Some populations may be migratory, although some individuals appear to be present year-round, even in the northernmost portion of the range. They may be expanding their range as a result of the increased usage of ornamental palms in landscaping. This species inhabits valley foothill riparian, desert riparian, desert wash, and palm oasis habitats and is primarily insectivorous. It roosts in trees, particularly palms, and is non-colonial. Pregnant females are known from late April through June, with lactation occurring during June and July. There are four recent records and one historic record within ten miles of the RERC project area (CNDDB 2008; Figure 6.3-5). Appropriate roosting habitat for this species exists within Mexican fan palm trees associated with the landscaping at the Payton Avenue entrance to the project area. Additionally, this species may forage over the project area.

6.3.5.5 Assessment of Other Sensitive Biological Resources

Sensitive Habitats

None of the habitats identified within the RERC project area are considered to be of high priority by CNDDB. However, the burrowing owl mitigation area within the project area is considered a special habitat, as it was designed to mitigate for the loss of burrowing owl habitat through development of the project area.

Jurisdictional Habitats

No jurisdictional habitats, including wetlands/waters, riverine/riparian, or vernal pool habitats, were identified within the RERC project area. The RERC project area is located 325 feet (100 m) south of the Santa Ana River riparian corridor.

Nesting Raptors, Migratory, and Native Avian Species

Appropriate nesting habitat for birds protected under the Migratory Bird Treaty Act and Fish and Game Codes 3503, 3503.5, and 3513 occurred over the majority of the project area, including gravel areas, landscaped areas within urban or built-up lands, and the burrowing owl mitigation area.

Wildlife Corridors

A wildlife corridor, also called a habitat linkage or landscape linkage, is a large patch of habitat connecting two or more larger areas of habitat that would otherwise be isolated from one another. Wildlife corridors promote gene flow, allow re-colonization of areas following catastrophic events such as fire, prevent the loss of large animals by linking suitable habitat areas, and help to ensure the survival of native species that cannot compete with more aggressive nonnative species in fragmented habitats.

The RERC project area is bordered to the east, south, and west by development, and to the north by the Santa Ana River. The RERC project area does not serve as a wildlife corridor since it does not link two or more open space areas.

6.3.6 Project Impact Analysis

This section assesses the potential for the Project to adversely affect sensitive biological resources present or with the potential to occur ('may occur') within the study area.

6.3.6.1 Sensitive Habitats

No sensitive habitats, as listed by CDFG (2003), were identified within the project area. Implementation of the project therefore will not result in the loss of sensitive habitats.

Burrowing Owl Mitigation Area

The majority of the proposed project design will not impact the existing burrowing owl mitigation area. The proposed Dispatch and Scheduling building, consisting of a one-story building approximately 40 feet wide and 95 feet long, will be positioned adjacent to the existing burrowing owl mitigation area. Positioning the structure in close proximity of the burrowing owl mitigation area would, absent specific project design characterizations, likely render the adjacent mitigation area unusable by burrowing owls, as it could 1) provide a perching structure for diurnal raptors that prey on burrowing owls, and 2) detract from the openness that currently characterizes the space of the power plant grounds directly adjacent to the mitigation area, a feature that contributes to the site's attractiveness to burrowing owls. Due to the project design there will be no significant impacts to the Burrowing Owl or its habitat under CEQA.

6.3.6.2 Wetlands and Other Potentially Jurisdictional Habitats

The Santa Ana River riparian corridor occurs beyond 100 m of the northern project area boundary. Impacts to wetlands and other potentially jurisdictional habitats are not expected to occur as a result of the Project.

6.3.6.3 Wildlife Corridors

Since the Project does not contain a wildlife corridor, project impacts on wildlife movement would be considered less than significant under CEQA. As well, the project area does not contain, nor is it directly adjacent to, any linkages connecting core areas, as defined by the MSHCP.

6.3.6.4 Urban-Wildlands Interface

According to the MSHCP, high quality riparian habitat within and along the edges of Core A must be maintained for special-status species such as southwestern willow flycatcher, yellow warbler, yellow-breasted chat, and western yellow-billed cuckoo, among others. The mechanism for maintaining the quality of Conservation Areas within the MSHCP plan area is detailed in the Guidelines Pertaining to the Urban/Wildlands Interface as specified in Volume I, Section 6.1.4 of the MSHCP. Specifically, projects must be designed in a manner that prevents or mitigates drainages (runoff), toxics, lighting, noise, and invasive species into adjacent Conservation Areas; provide barriers that prevent access by humans and their domestic animals into Conservation Areas; and prevent grading/land development to extend into Conservation Areas.

The Project is not expected to impact Core A either directly or indirectly. There will be no drainage runoff or toxics introduced into Core A during both the construction phase and operation phase of the Project. Because of the project area's distance from the edge of Core A and its lowered position within the borrow pit depression, lighting and noise produced by the construction and operation of the Project are not strong or loud enough to produce significant impacts. The Project will not require grading or development into Core A, and barriers would not be required. Although landscaped areas closest in proximity to Core A contain native plant species (within the burrowing owl mitigation area), the landscaping within the project area could result in the installation of landscape plants that are considered invasive species. This would be considered a violation of the MSHCP requirements regarding the Urban-Wildlands Interface, and would be considered a significant impact under CEQA.

6.3.6.5 Special-status Species

Special-status Plants

The entire RERC project area is highly modified and degraded. Aside from snake cholla, which was installed into the burrowing owl mitigation area by SWCA, no special status plant species were identified within the project area, nor are they expected to occur there. Since the snake cholla plants were installed into a portion of the burrowing owl mitigation area that will not be impacted by the proposed Project, impacts to this species are not expected to occur.

Narrow endemic plant species identified by the MSHCP online report generator, including San Diego ambrosia, Brand's Phacelia, San Miguel savory, were determined to be absent from the project area based on the lack of suitable habitat and/or no local records. No impacts to these species will occur as a result of the proposed Project.

Special-status Wildlife

Provided below is a discussion of impacts to wildlife species that were either present within the project area or that may occur there.

<u>Turkey Vulture, White-tailed Kite, and Loggerhead Shrike</u>

Turkey vultures, white-tailed kites, and loggerhead shrikes may forage within the project area, but they are not expected to nest there. Protection of the turkey under the MSHCP is intended for the nesting locations of this species. Likewise, the MBTA and Fish and Game Codes 3503, 3503.5, and 3513 protect the nests and young of each of these species. Because there is no nesting habitat for these species within the project area, the Project will not impact nests or young of these species. Though turkey vultures, white-tailed kites, and loggerhead shrikes may occasionally forage within the burrowing owl mitigation area within the project area, the construction and operation phases of the Project are not expected to impact the foraging behaviors of these species.

Burrowing Owl

Burrowing owls have been observed within the RERC project area before and after its development. The burrowing owl mitigation area, the gravel lot adjacent to the mitigation area, and the storm water retention basin provide suitable nesting and/or foraging habitat for this species. Because the burrowing owl could inhabit the RERC project area throughout the year (nesting season, post-nesting dispersal period, and winter season), construction associated with implementation of the Project could potentially impact burrowing owls that inhabit the project area. Since the burrowing owl mitigation area is to be maintained for perpetuity, operation of the Project is not expected to impact this species. Project design features will help protect the burrowing owls so that there will be no significant impacts to the burrowing owls.

As well, burrowing owls that inhabit appropriate burrowing owl habitat within 150 m of the project area could be impacted by the construction phase of the Project. Construction-generated noise and construction-related traffic have the potential to indirectly impact burrowing owls inhabiting ruderal areas identified along Payton Avenue, Acorn Street, and within a small area of ruderal habitat located northeast and adjacent to the project area.

Any impacts that disrupt the foraging and/or nesting of burrowing owls within or adjacent to the project area would be considered a violation of MSHCP requirements, as well as a significant impact under CEQA.

Western Yellow Bat

Western yellow bat may roost within palm trees in a landscaped area along Payton Avenue within the project area. Because the palm trees are in a portion of the project area that will not be disturbed, construction-related impacts to roosting western yellow bats are not expected. As well, though western yellow bats may forage over the project area, the construction of the Project is not expected to disrupt the foraging activities of this species. Operation of the Project is not expected to impact roosting or foraging western yellow bats.

Nesting Raptors, Migratory, and Native Avian Species

The construction activities associated with the proposed Project that result ground disturbance and/or the removal of vegetation could have both direct and indirect impacts

to actively nesting birds, including the nests of special status species. Direct project impacts would include the destruction of active nests, eggs, or young located within vegetation removed within the proposed project alignment. Indirect impacts would include noise and disturbance associated with the construction activities that cause birds in adjacent habitats to abandon their nests. Project features designed to protect nesting raptors, migratory, and native avian species will insure that there will be no significant impacts to these species.

6.3.7 Species Protection

6.3.7.1 Burrowing Owl Mitigation Area

As discussed previously, the proposed Dispatch and Scheduling building could potentially impact the burrowing owl mitigation area. To mitigate this impact the building will be designed to render it useless as a perch for diurnal raptors by filling the space between the building and earthen slope to maintain openness in front of two new artificial burrows to replace the existing artificial burrow that would be lost.

Artificial burrows within the burrowing owl mitigation area that are in close proximity to construction activities associated with the Project (equipment storage areas, laydown areas, or parking areas) will be temporarily closed during the construction period (expected to be less than one year) in order to eliminate construction-related impacts to burrowing owls or other wildlife that may inhabit the burrows. Additional temporary mitigation during the construction period will include installing additional artificial burrows (two for each that are temporarily closed) within appropriate portions of the mitigation area. Following the conclusion of construction activities, the burrows that were temporarily closed will be re-opened.

6.3.7.2 Urban-Wildlands Interface

In order to reduce potential impacts to Core A through the introduction of invasive species, the project proponent will avoid the use of plants within other landscaped areas within the RERC project area that are considered invasive under the MSHCP (Table 6.3-2).

Table 6.3-2 List of Plant Species that Will Not be Used in Landscaped Areas Within the Project Area

Botanical Name	Common Name
Acacia spp. (all species)	Acacia
Achillea millefolium	var. *millefolium* common yarrow
Ailanthus altissima	tree of heaven
Aptenia cordifolia	red apple
Arctotheca calendula	cape weed
Arctotis spp. (all species & hybrids)	African daisy
Arundo donax	giant reed or arundo grass
Asphodelus fistulosus	Asphodel
Atriplex glauca	white saltbush
Atriplex semibaccata	Australian saltbush
Carex spp. (all species*)	Sedge
Carpobrotus chilensis	ice plant
Carpobrotus edulis	sea fig
Centranthus ruber	red valerian
Chrysanthemum coronarium	annual chrysanthemum
Cistus ladanifer	(incl. hybrids/varieties) gum rockrose
Cortaderia jubata [*syn.C. Atacamensis*]	jubata grass, pampas grass
Cortaderia dioica [syn. *C. sellowana*]	pampas grass
Cotoneaster spp. (all species)	cotoneaster
Cynodon dactylon	(incl. hybrids varieties) Bermuda grass
Cyperus spp. (all species*)	nutsedge, umbrella plant
Cytisus spp. (all species)	Broom
Delosperma 'Alba'	white trailing ice plant
Dimorphotheca spp. (all species)	African daisy, Cape marigold
Drosanthemum floribundum	rosea ice plant
Drosanthemum hispidum	purple ice plant
Eichhornia crassipes	water hyacinth
Elaegnus angustifolia	Russian olive
Eucalyptus spp. (all species)	Eucalyptus or gum tree
Eupatorium coelestinum [syn. Ageratina sp.]	mist flower
Festuca arundinacea	tall fescue
Festuca rubra	creeping red fescue
Foeniculum vulgare	sweet fennel
Fraxinus uhdei	(and cultivars) evergreen ash, shamel ash
Gaura (spp.) (all species)	Gaura
Gazania spp. (all species & hybrids)	Gazania
Genista spp. (all species)	Broom

Botanical Name	**Common Name**
Hedera canariensis	Algerian ivy
Hedera helix	English ivy
Hypericum spp. (all species)	St. John's Wort
Ipomoea acuminata	Mexican morning glory
Lampranthus spectabilis	trailing ice plant
Lantana camara	common garden lantana
Lantana montevidensis [syn. *L. sellowiana*]	Lantana
Limonium perezii	sea lavender
Linaria bipartite	Toadflax
Lolium multiflorum	Italian ryegrass
Lolium perenne	perennial ryegrass
Lonicera japonica	(incl. ‘Halliana') Japanese honeysuckle
Lotus corniculatus	birdsfoot trefoil
Lupinus arboreus	yellow bush lupine
Lupinus texanus	Texas blue bonnets
Malephora crocea	ice plant
Malephora luteola	ice plant
Mesembryanthemum nodiflorum	little ice plant
Myoporum laetum	Myoporum
Myoporum pacificum	shiny myoproum
Myoporum parvifolium	(incl. ‘Prostratum') ground cover myoporum
Oenothera berlandieri	Mexican evening primrose
Olea europea	European olive tree
Opuntia ficus-indica	Indian fig
Osteospermum spp. (all species)	trailing African daisy, African daisy,
Oxalis pes-caprae	Bermuda buttercup
Parkinsonia aculeata	Mexican palo verde
Pennisetum clandestinum	Kikuyu grass
Pennisetum setaceum	fountain grass
Phoenix canariensis	Canary Island date palm
Phoenix dactylifera	date palm
Plumbago auriculata	cape plumbago
Polygonum spp. (all species)	Knotweed
Populus nigra italica	Lombardy poplar
Prosopis spp. (all species*)	Mesquite
Ricinus communis	Castorbean
Robinia pseudoacacia	black locust
Rubus procerus	Himalayan blackberry
Sapium sebiferum	Chinese tallow tree

Botanical Name	Common Name
Saponaria officinalis	bouncing bet, soapwart
Schinus molle	Peruvian pepper tree, California pepper
Schinus terebinthifolius	Brazilian pepper tree
Spartium junceum	Spanish broom
Tamarix spp. (all species)	tamarisk, salt cedar
Trifolium tragiferum	Strawberry clover
Tropaelolum majus	garden nasturtium
Ulex europaeus	prickly broom
Vinca major	Periwinkle
Yucca gloriosa	Spanish dagger
An asterisk (*) indicates some native species of the genera exist that may be appropriate.	
Sources: California Exotic Pest Plant Council, United States Department of Agriculture-Division of Plant Health and Pest Prevention Services, California Native Plant Society, Fremontia Vol. 26 No. 4, October 1998, The Jepson Manual; Higher Plants of California, and County of San Diego-Department of Agriculture.	

6.3.7.3 Special-status Species

The impact analysis determined that the proposed Project could impact one special-status species: burrowing owl. Additionally, the proposed Project could potentially impact the nesting activities of migratory and native avian species (including raptors) that nest within or immediately adjacent to the project area. Since the Project is located within the MSHCP plan area, adherence to MSHCP guidelines pertaining to these species will reduce potential impacts to a less than significant level under CEQA. The following guidelines will be implemented.

Burrowing Owl

Because suitable burrowing owl habitat was identified within and adjacent to the RERC project area, and because burrowing owls have been known to inhabit portions of the RERC project area, there exists the possibility that burrowing owls could inhabit these areas prior to and during implementation of the proposed Project. Construction activities could, therefore, potentially significantly impact the foraging and nesting activities of burrowing owls. Burrowing owl is covered under the MSHCP; therefore, measures prescribed in the MSHCP regarding mitigation of burrowing owl would appropriately reduce the potential project impacts to burrowing owls to a less than significant level. Based on MSHCP protocol, the Project will adhere to the following recommendations:

<u>Focused Surveys</u>

Per MSHCP requirements, focused surveys are required within habitats determined to be appropriate for burrowing owl in order to record burrow locations and determine whether burrowing owls inhabit the site. These habitats include the burrowing owl mitigation area, gravel lot adjacent to the mitigation area, storm water retention basin, ruderal habitats located along Payton Avenue and Acorn Street, and the small ruderal habitat in the northeastern portion of the project area. The focused surveys (MSHCP protocol Step II surveys, County of Riverside 2006) will include 1) a focused survey for burrows or

other burrowing structures that could be used by burrowing owl (Step II, Part A), and 2) focused surveys for burrowing owls over four separate visits (Step II, Part B). The focused surveys will be conducted during the breeding season (March 1 through August 30), and will be conducted during weather that is conducive to observing owls outside their burrows and their sign. The surveys will not be conducted within five days of rain, which could eliminate sign of burrowing owl. The surveys will be conducted in the morning one hour before sunrise to two hours after sunrise or in the early evening two hours before sunset to one hour after sunset. The survey visits will be adequately spaced apart in time, and will optimally occur during the peak of the breeding season (April and May) (L. MacNair, personal communication, 2008). Any burrowing owl sightings, occupied burrows, and burrows with owl sign will be recorded. Other details regarding the protocol for conducting burrowing owl surveys are provided in Appendix 6.3-A. Results of the burrowing owl focused surveys will be reported to the City of Riverside and the Regional Conservation Authority (RCA) Monitoring Program Administrator.

Pre-construction Survey

A pre-construction survey will be conducted in all appropriately identified burrowing owl habitat within and adjacent to the project area in order to determine the presence of burrowing owls. The pre-construction survey will be conducted prior to and within 30 days of ground-disturbing activities to ensure clearance of these areas, and to prevent take of burrowing owls.

Monitoring

During the construction phase of the Project, a qualified biologist will monitor the project area weekly to determine whether burrowing owls have moved into burrowing owl habitats within and adjacent to the project area in order to prevent disturbance to or take of burrowing owls. Should burrowing owls be detected during monitoring of the construction phase of the Project, the biologist will retain the authority to stop work within 150 feet of the area occupied by the owl(s). The biologist will monitor the project area daily upon discovery of a burrowing owl until the owl leaves the project area under its own accord, or until the owl has been removed from the project area using mitigation measures approved by the appropriate CDFG and USFWS personnel. If burrowing owls are determined to be nesting within the project area, mitigation recommendations would include those presented below (Section 5.3.2).

Mitigation

Should burrowing owls be detected during focused surveys, pre-construction surveys, or monitoring, mitigation may be required in order to prevent take of burrowing owls. Appropriate mitigation measures will be developed through consultation with the CDFG and USFWS personnel assigned to oversight of the MSHCP plan area.

Nesting Raptor, Migratory, and Native Avian Species

Grading or vegetation clearing within the RERC project area would likely impact any active non-raptor nests located on or within 150 feet, and active raptor nests located on or within 500 feet of the project area. In order to reduce these impacts to a less than

significant level initial grading activities associated with construction of the Project is planned to take place outside of the nesting season, which (under the MSHCP Construction Guidelines, Volume I, Section 7.5.3) occurs from March 1 through June 30. If initial project grading occurs outside of the nesting season, no further work is recommended. If initial project grading must occur during the nesting season, a qualified biologist will conduct a pre-construction nest survey on the project area and within 150 feet (for non-raptor nests) and 500 feet (for raptor nests) of the project footprint to identify any active nests that occur there. This survey will be carried out within one week of initiation of grading activities. If bird species protected under the MBTA or California Fish and Game Code Sections 3503, 3503.5, and 3513 are found nesting on or adjacent to the project area, a qualified biologist will monitor the nests daily during all phases of construction to ensure that the Project does not impact the nests. Grading will not be allowed within 150 feet of active non-raptor nests or 500 feet of active raptor nests until it has been determined by a qualified biologist that the chicks have fledged. Following fledging of the nestlings, the buffer area around the nest can be graded.

Once construction has been initiated, construction activities will likely occur over several months, and may extend into the avian nesting season. Though nest surveys and monitoring would not be required in this situation, should an active bird nest be discovered within or adjacent to the construction area, the Project will retain a qualified biologist to monitor the nest until it has been determined that the chicks have fledged.

6.3.7.4 Employee Education Program

An employee education training program will be presented to all individuals associated with the construction of the Project. The training will be developed by a qualified biologist and will consist of a brief overview of each of the sensitive biological resources within the project area and adjacent lands, including burrowing owl and its habitat as well as additional information on avoidance of nesting birds and procedures for the removal of snakes and other wildlife that should wander into the project area. Training will be administered to all construction personnel. Training will likely consist of a brief video that can be viewed by any employee entering the project site for the first time. Additionally, acknowledgement forms will be completed by all personnel receiving the training. These forms will be gathered and stored on-site.

6.3.7.5 CEQA Environmental Checklist

Table 6.3-3 provides the CEQA checklist questions that are used to assess the significance of potential impacts to biological resources.

Table 6.3-3 CEQA Environmental Checklist – Biological Resources

Biological Resources - Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less then Significant	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional regional plans, policies, or regulations, or by the CDFG or USFWS?			X	
b) Have a substantial adverse effect on any riparian habitat, or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG USFWS?				X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident, or migratory fish, or wildlife species, with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?			X	

6.3.8 References

Anderson, J. R., E. E. Hardy, J. T. Roach, and R. E. Witmer. 1976. A Land Use and Land Cover Classification System for Use with Remote Sensor Data. US Geological Survey Professional Paper 964, 28 pp.

Arnold, B and M. W. Tuma 2004. Biological Habitat Assessment for the Riverside Energy Resource Center Units 1 and 2 Project. Report on file, SWCA, Mission Viejo, CA

Bent, A. C. 1938. Life Histories of North American Birds of Prey. Part 2. U.S. National. Museum Bulletin 170. 482 pp.

California Burrowing Owl Consortium. 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. Unpublished Report 13 p.

California Department of Fish and Game (CDFG). 1995. Staff Report on Burrowing Owl Mitigation. Letter dated October 17, 1995, Department of Fish and Game. Sacramento, California. 10 pp.

California Department of Fish and Game (CDFG). 2003. List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database. Wildlife and Habitat Data Analysis Branch, Department of Fish and Game.

California Department of Fish and Game (CDFG). 2007. List of Special Animals Recognized by The California Natural Diversity Database. Biogeographic Data Branch, Department of Fish and Game.

California Energy Commission (CEC). 2007. Rules of Practice and Procedure & Power Plant Site Certification Regulations: Siting Regulations. CEC-140-2007-003. California Energy Commission. Sacramento, California. 148 pp.

California Native Plant Society (CNPS). 2007. Inventory of Rare and Endangered Plants (online edition, v7-07d). California Native Plant Society. Sacramento, CA. Accessed on Tue, Jan. 9, 2008 from http://www.cnps.org/inventory

California Natural Diversity Data Base (CNDDB) 2008. Rarefind 3.1. Sacramento, California.

County of Riverside. 2006. Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area. Environmental Programs Department. 4pp.

County of Riverside. 2008. Riverside County Integrated Plan (RCIP) Conservation Summary Report Generator (http://www.tlma.co.riverside.ca.us/gis/rciprepgen.html) for Assessor's Parcel Numbers 189-120-001, 189-120-002, and 189-150-001. Accessed Jan. 9, 2008

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). In The Birds of North America, No. 130 Edited by A. Poole and F. Gill. The Academy of Natural Sciences, Philadelphia and The American Ornithologists' Union, Washington, D.C.

Hickman, J. C. (ed.). 1993. The Jepson Manual. University of California Press, Berkeley, California.

Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game, Sacramento, California

LSA. 2007.General Biological Resources Report for MSHCP Compliance for the Toro Company Turf Expansion Project in the City of Riverside, Riverside County, California. LSA, Riverside, CA

Marti, C. D. 1974. Feeding ecology of four sympatric owls. Condor 76:45–61.

Martin, D. J. 1973. Selected aspects of burrowing owl ecology and behavior. Condor 75:446–456.

Robertson, J. M. 1929. Some observations on the feeding habits of the burrowing owl. Condor 31:38–39.

Sawyer, J. O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento, California.

Tuma, M. W. and T. K. Cummins. 2007. Biological Resources Monitoring for the Riverside Energy Resource Center in Riverside, Riverside County, California. Report on file, SWCA, South Pasadena, CA

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal airport. Condor 73:177–192.

Zarn, M. 1974. Habitat management series for unique or endangered species. Burrowing Owl, Report No. 11. Bureau of Land Management, Denver. 25 pp.

6.4 Cultural Resources

6.4.1 Introduction

Riverside Public Utilities (RPU) proposes to develop, build, own and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from RERC will be exported outside of the City.

The RERC Units 3&4 project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to cultural resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified.

6.4.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. The RERC Units 3&4 Project will consist of two additional aero-derivative combustion turbine generators with Emissions Control Modules (ECM), a two bay expansion of the on-site switchyard, plus two ancillary buildings. RERC Units 3&4 will be located immediately north of RERC Units 1&2 and will occupy approximately 2.2 of 16 acres. An additional 2 acres are reserved for construction laydown. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls with landscaping, installed per City of Riverside standards. The plant has paved roads and parking areas which will be extended to include RERC Units 3&4 and the new Dispatch & Scheduling Building. RPU will pave the main power block area and remaining areas will be covered with crushed rock.

If cultural resources are exposed, work will immediately cease in the vicinity of the resource and a qualified archeologist will evaluate the significance of the find. Additionally, a Native American representative, approved by the Soboba Band of Luiseno Indians and the Morongo Band of Mission Indians will be located on site to evaluate the interest of the band of Indians in the find. If human remains are found the County Coroner will be contacted to determine if the remains are human and if they are, the interested Native American tribes will be contacted.

Figure 6.4-1 shows the project location on the U.S. Geologic Survey (USGS) Riverside West, California, 7.5-Minute Quadrangle. The RERC facility is located just north of Jurupa Avenue between Payton Avenue and Acorn Street in the City of Riverside.

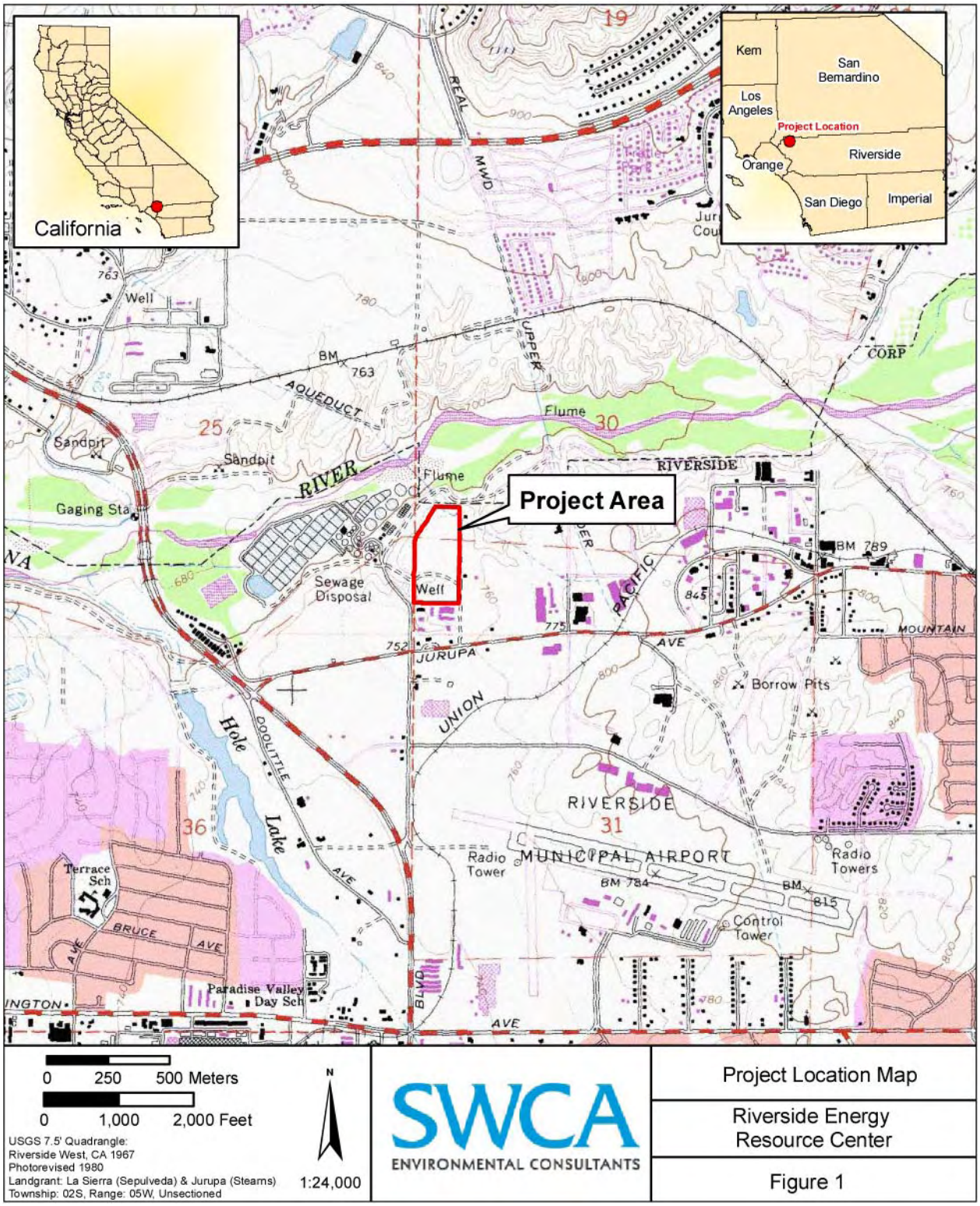


Figure 6.4-1 Project Location Map

The entire 16-acre RERC has been previously disturbed (Photograph 6.4-1). The site was used as a borrow area in the late 1990s for the 40-acre Tequesquite Landfill, which is located about 4 kilometers (2.5 miles) to the east and adjacent to the Santa Ana River (see Dillon 1995). Approximately 5 meters (16 feet) of topsoil and geologic material was removed from the southern portion of the project area, with less removed from the northern portion closer to the City of Riverside's RRWQCP. The ground surface of the project area thus is several meters below the original surface that existed prior to excavation of fill material for the landfill. During its use as a borrow area, the entire project area was disturbed by heavy grading and excavating equipment.

Photograph 6.4-1 Overview of the RERC project area, facing south, 2007.

6.4.2 Laws, Ordinances Regulations and Standards

6.4.2.1 Federal

Cultural resources are considered during federal undertakings chiefly under NHPA Section 106 (as amended) through one of its implementing regulations, 36 CFR 800 (Protection of Historic Properties), as well as NEPA. Properties of traditional religious and cultural importance to Native Americans are considered under NHPA Section 101(d)(6)(A). Other federal laws include the Archaeological Data Preservation Act of 1974, the American Indian Religious Freedom Act (AIRFA) of 1978, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1989, among others.

NHPA Section 106 (16 USC 470f) requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure or object that is included in or eligible for inclusion in the NRHP and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to reduce any impacts to an acceptable level. Significant cultural resources are those resources that are listed in, or are eligible for listing on the NRHP per the criteria listed at 36 CFR 60.4 below:

The quality of *significance* in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and that:

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or

B. Are associated with the lives of persons significant in our past; or

C. Embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

6.4.2.2 State

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources. If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Section 21083.2 (a), (b) and (c)). Section 21083.2 (g) describes a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

A *historical resource* is a resource listed in, or determined to be eligible for listing, in the CRHR (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5(a)(2)), or any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant (Section 15064.5 (a)(3)).

Public Resources Code Section 5024.1, Section 15064.5 of the Guidelines, and Sections 21083.2 and 21084.1 of the Statutes of CEQA were used as the basic guidelines for the cultural resources study. Public Resources Code Section 5024.1 requires evaluation of historical resources to determine their eligibility for listing on the CRHR. The purpose of the register is to maintain listings of the state's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing on the NRHP, enumerated above.

According to Public Resources Code Section 5024.1(c)(1–4), a resource is considered historically significant if it meets at least one of the following criteria:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2) Is associated with the lives of persons important in our past;
3) Embodies the distinctive characteristics of a type, period, region or method of installation, or represents the work of an important creative individual, or possesses high artistic values; or
4) Has yielded, or may be likely to yield, information important in prehistory or history.

Impacts to significant cultural resources that affect the characteristics of any resource that qualify it for the NRHP or adversely alter the significance of a resource listed on or eligible for listing on the CRHR are considered a significant effect on the environment. Impacts to significant cultural resources from the proposed Project are considered significant if the Project physically destroys or damages all or part of a resource, changes the character of the use of the resource or physical feature within the setting of the resource which contribute to its significance or introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

The disposition of burials falls first under the general prohibition on disturbing or removing human remains under California Health and Safety Code 7050.5. More

specifically, remains suspected to be Native American are treated under CEQA at Section 15064.5 and site language found at Public Resources Code Section 5097.98 that illustrates the process to be followed in the event that remains are discovered. If human remains are discovered during the construction of the Project, no further disturbance to the site shall occur and the Riverside County Coroner must be notified. If the coroner determines the remains to be Native American, the coroner shall notify the Native American Heritage Commission (NAHC) within 48 hours. The NAHC shall identify the person or persons it believes to be the Most Likely Descended (MLD) from the deceased. The MLD may then make recommendations as to the disposition of the remains.

6.4.2.3 Local

In 1969, the City of Riverside adopted Title 20 of the Municipal Code and created the Cultural Heritage Board. Title 20 is the primary body of local laws relating to historic preservation and essentially provides guidance on the City's cultural resources program process. The ordinance contains provisions for surveying, recording and designating historic resources; provides historic district design guidelines; and includes an historic resources inventory data-base; educational programs and a historic preservation plan (City of Riverside 2007).

The purpose of Title 20 (Section 20.05.010) is to "promote the public health, safety and general welfare by providing for the identification, protection … and use of improvements, buildings, structures … having special historical, archaeological, cultural, architectural, community, aesthetic or artistic value in the City.…" Subsection H states that one of the reasons for this is to "identify as early as possible and resolve conflicts between the preservation of cultural resources and alternative land use." Title 20 ensures that if a project conducted by the City threatens to impact a cultural resource listed as a landmark, structure of merit, or historic district, notice must be given to the Cultural Heritage Board so that recommendations can be made early in the decision-making process.

6.4.3 Setting

6.4.3.1 Environmental

The project area is located approximately 150 meters (492 feet) south of the Santa Ana River channel, about 8 kilometers (5 miles) northwest of downtown Riverside, and situated within Arlington Valley in the Santa Ana River watershed. The Santa Ana River watershed includes much of the Pomona, San Bernardino and San Jacinto Valleys, and receives water from the southern flanks of the San Gabriel and San Bernardino Mountains and the flanks of the several smaller hill ranges surrounding the Santa Ana River. Lake Elsinore is the only natural freshwater lake of any size within the watershed, and is located approximately 32 kilometers (20 miles) south of the project area. Elevations within the project area range from approximately 720 to 800 feet above mean sea level (msl).

Vegetation, where it exists at the project site, currently consists of a mosaic of non-native grasses and an early successional, disturbed stage of coastal sage scrub (herein referred to

as buckwheat scrub). The buckwheat scrub consists almost entirely of California buckwheat (*Eriogonum fasciculatum*). The non-native grassland is dominated by several species of introduced grasses and forbs, with a few native herb species also present.

Wildlife species common to the vegetation communities in the vicinity of the Project and available for exploitation by the local indigenous population would have included mule deer (*Odocoileus hemionus*), cottontail (*Sylvilagus auduboni*), jackrabbit (*Lepus californicus*), mice (*Perognathus* spp.), wood rats (*Dipodomys* spp.); California quail (*Callipepla californica*), dove (*Zenaidura macroura*), and birds associated with the marshes; and various types of reptiles, amphibians and insects. While antelope (*Antilocapra americana*) were barely noted by Euro-American settlers (Sleeper 1982), they were quite common in 1769 throughout the plains and valleys when the Portolá expedition traveled through the region, whereas deer were less common (Brown 2001:308, 325). Predators included mountain lion (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and fox (*Urocyon cineroargenteus*).

6.4.3.2 Prehistory

Numerous chronological sequences have been devised to understand cultural changes for various areas within southern California over the past century (Figure 6.4-2). Building on early studies and focusing on data synthesis, Wallace (1955, 1978) developed a prehistoric chronology for the southern California coastal region, which is still widely used today and is applicable to near-coastal and many inland areas, including western Riverside County. Four periods are presented in Wallace's prehistoric sequence: Early Man, Milling Stone, Intermediate, and Late Prehistoric. As noted by Moratto (1984:159), Wallace's (1955) synthesis lacked chronological precision due to the lack of absolute dates at the time of its creation, but remains generally valid today.

In addition to Wallace's classic summary, a regional synthesis developed by Warren (1968) will be referred to in the following discussion. This synthesis is supported by a larger archaeological database for southern California, which includes the advent and increased use of radiocarbon dating after the 1950s. Using the concepts of cultural ecology and cultural tradition, Warren (1968) proposed a series of six prehistoric traditions. Three of these traditions, the San Dieguito Tradition, Encinitas Tradition, and Campbell Tradition, correlate with Wallace's Early Man, Milling Stone, and Intermediate Periods. The Chumash Tradition, Takic Tradition (formerly "Shoshonean"), and Yuman Tradition are represented within Wallace's Late Prehistoric Period. As noted further, these ecologically-based traditions are applicable to specific regions within southern California.

Some revisions have been made to Wallace's 1955 synthesis using radiocarbon dates and projectile point assemblages (e.g., Koerper and Drover 1983; Mason and Peterson 1994; Koerper et al. 2002). The summary of prehistoric chronological sequences for southern California coastal and near-coastal areas presented below is a composite of information in Wallace (1955) and Warren (1968), as well as more recent studies, including Koerper and Drover (1983). The chronology formulated by Koerper and Drover (1983) is based on the

results of their excavations at a multi-component village site (CA-ORA-119-A) near the University of California, Irvine, in Orange County.

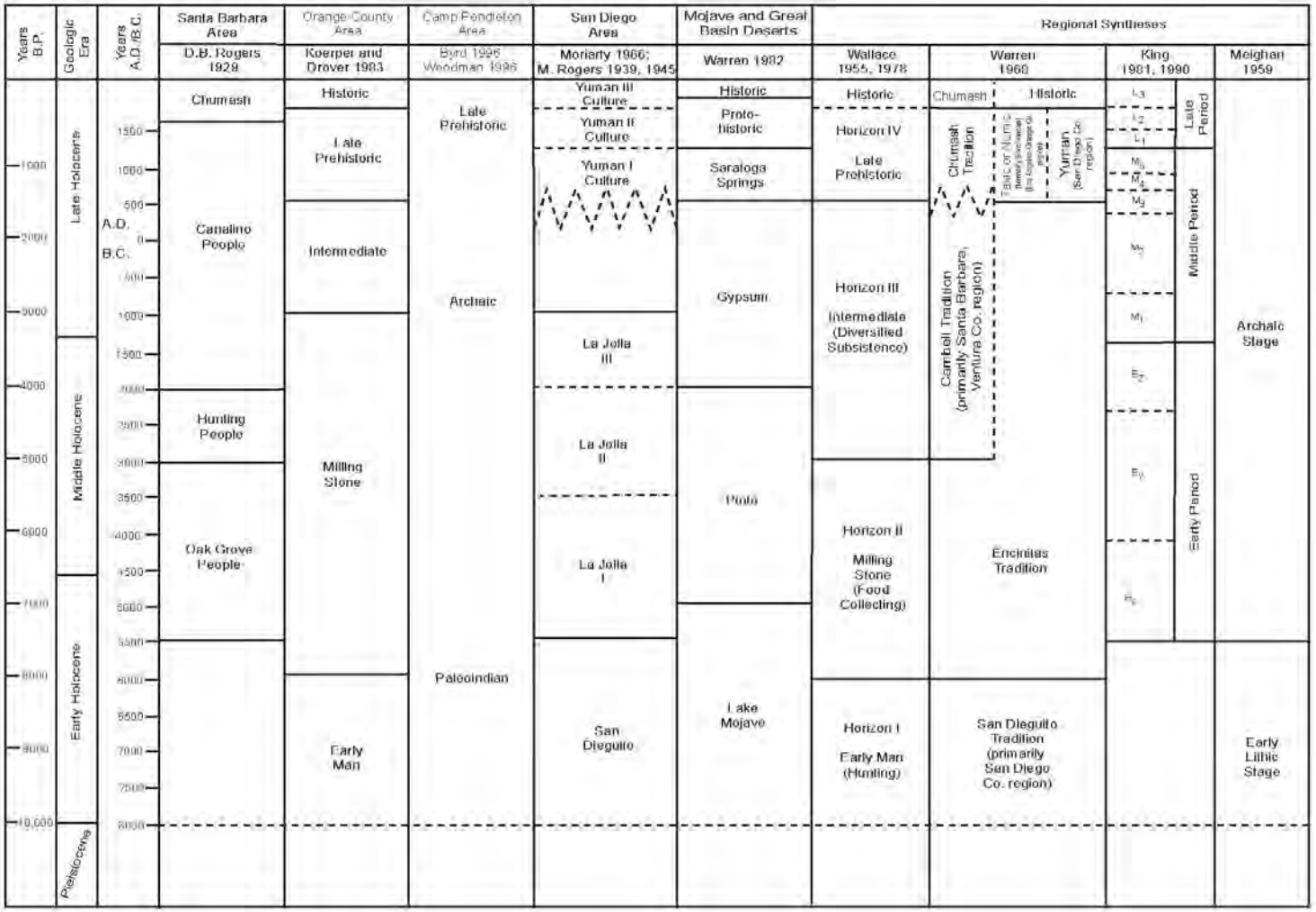


Figure 6.4-2 Cultural Chronologies for Coastal and Southern California

Early Man Period/San Dieguito/Paleo-Coastal (ca. 10,000–6000 B.C.)

When Wallace defined the Early Man Period in the mid-1950s there was little evidence of human presence on the southern California coast prior to 6000 B.C. Archaeological work in the intervening years has identified numerous older sites dating prior to 10,000 years ago, including ones on the coast and Channel Islands (e.g., Erlandson 1991; Johnson et al. 2002; Moratto 1984; Rick et al. 2001:609). The earliest accepted dates for occupation are from two of the northern Channel Islands, located off the coast of Santa Barbara. On San Miguel Island, Daisy Cave clearly establishes the presence of people in this area about 10,000 years ago (Erlandson 1991:105). On Santa Rosa Island, human remains have been dated from the Arlington Springs site to approximately 13,000 years ago (Johnson et al. 2002).

In what is now Orange County, there are sites dating to 9000–10,000 years ago (Macko 1998a:41; Mason and Peterson 1994:55-57; Sawyer 2006). Known sites dating to the Early Man Period are rare in western Riverside County. One exception is the Elsinore site (CA-RIV-2798-B) that has deposits dating as early as 6630 cal. B.C. (Grenda 1997:260).

Recent data from coastal and inland sites during this period indicate that the economy was a diverse mixture of hunting and gathering, with a major emphasis on aquatic resources in many coastal areas (e.g., Jones et al. 2002) and on Pleistocene lakeshores in eastern San Diego County (see Moratto 1984:90-92).

A Paleo-Coastal Tradition was proposed and recently referenced to highlight the distinctive marine and littoral focus identified within the southern California coastal archaeological record prior to the emergence of the Encinitis Tradition during the succeeding Milling Stone Period (Mason and Peterson 1994:57-58; Moratto 1984:104). At coastal sites, there is abundant evidence that marine resources such as fish, sea mammals, and shellfish were exploited during the Paleo-Coastal.

At near-coastal and inland sites, it is generally considered that an emphasis on hunting may have been greater during the Early Man Period than in later periods, although few Clovis-like or Folsom-like fluted points have been found in Southern California (e.g., Dillon 2002; Erlandson et al. 1987). In Riverside County, only one isolated fluted point has been identified on the surface of a site in the Pinto Basin in the central part of the county (Campbell and Campbell 1935; Dillon 2002:113). Common elements in many San Dieguito Tradition sites include leaf-shaped bifacial projectile points and knives, stemmed or shouldered projectile points (e.g., Silver Lake and Lake Mojave series), scrapers, engraving tools, and crescents (Warren 1967:174-177; Warren and True 1961:251-254). Use of the atlatl (spear-throwing stick) during this period facilitated launching spears with greater power and distance. Subsistence patterns shifted around 6000 B.C. coincident with the gradual desiccation associated with the onset of the Altithermal, a warm and dry period that lasted for about 3000 years. After 6000 B.C., a greater emphasis was placed on plant foods and small animals.

Milling Stone Period (ca. 6000–3000/1000 B.C.)

The Milling Stone Period of Wallace (1955, 1978) and the Encinitas Tradition of Warren (1968) are characterized by an ecological adaptation to collecting, and by the dominance of the principal ground stone implements generally associated with the horizontal motion of grinding small seeds; namely, milling stones (metates, slabs) and handstones (manos), which are typically shaped. Milling stones occur in large numbers for the first time, and are even more numerous near the end of this period. As testified by their toolkits and shell middens in coastal sites, people during this period practiced a mixed food procurement strategy. Subsistence patterns varied somewhat as groups became better adapted to their regional or local environments.

Milling Stone Period sites are common in the southern California coastal region between Santa Barbara and San Diego, and at many inland locations including the Prado Basin in western Riverside County and the Pauma Valley in northeastern San Diego County (e.g., Herring 1968; Langenwalter and Brock 1985; Sutton 1993; Sawyer and Brock 1999; True 1958). Wallace (1955, 1978) and Warren (1968) relied on several key coastal sites to characterize the Milling Stone Period and Encinitas Tradition, respectively. These include the Oak Grove Complex in the Santa Barbara region, Little Sycamore in southwestern Ventura County, Topanga Canyon in the Santa Monica Mountains, and at La Jolla in San Diego County. The Encinitas Tradition was proposed to extend into San Diego County where it apparently continued alongside the following Campbell Tradition, which occurred primarily in the Santa Barbara-Ventura County region beginning around 3000 B.C.

Of the numerous Milling Stone Period sites identified in the region, the most well known is the Irvine site (CA-ORA-64), which has occupation levels dating between circa 6000–4000 B.C. (Drover et al. 1983; Macko 1998b). Along coastal Orange County, Koerper and Drover (1983:11) mark the transition at the end of the Milling Stone around 1000 B.C., whereas Wallace's mid-1950s scheme has the period ending at 3000 B.C. Based on radiocarbon dates from the Newport Coast Archaeological Project (NCAP), Mason and Peterson (1994) propose a timeline for the Milling Stone similar to that advanced by Koerper and Drover (1983). The chronological schemes advanced for coastal Orange County also apply to many southern California near-coastal and inland areas, including much of western Riverside County.

During the Milling Stone Period and Encinitas Tradition, stone chopping, scraping, and cutting tools are abundant, and generally made from locally available raw material. Projectile points, rather large and generally leaf-shaped, and bone tools, including awls, are generally rare. The large points are associated with the spear, and probably with an atlatl. Items made from shell, including beads, pendants, and abalone dishes, are generally rare. Evidence of weaving or basketry is present at a few sites. Cogged stones and discoidals are often purposefully buried or "cached," and are found mainly in sites along the coastal drainages from southern Ventura County southward, with a few specimens inland at Cajon Pass, and in abundance at some Orange County sites (Dixon 1968:63; Moratto 1984:149). Kowta (1969) attributes the presence of numerous scraper-planes in Milling Stone sites to the preparation of agave or yucca for food or fiber. The

mortar and pestle, associated with the vertical motion of pounding foods, such as acorns, were introduced during the Milling Stone, but are not common.

Two types of artifacts that are considered diagnostic of the Milling Stone Period are the cogged stone and discoidal, most of which have been found within sites dating between 4000–1000 B.C. (Moratto 1984:149). The cogged stone is best described as a ground stone object that has variant forms of gear-like teeth on the perimeter, which is produced from a variety of materials. The function of cogged stones is unknown, but has been interpreted as ritualistic or ceremonial in nature (Eberhart 1961:367; Dixon 1968:64-65). Similar to cogged stones, discoidals are found in the archaeological record subsequent to the introduction of the cogged stone. Both discoidals and cogged stones have been found together at some Orange County sites, such as CA-ORA-83/86/144 (Van Bueren et al. 1989:772), CA-ORA-950 (Ron Bissell, personal communication 1999), and Los Cerritos Ranch (Dixon 1975 in Moratto 1984:150).

Koerper and Drover (1983) suggest that Milling Stone Period sites represent migratory settlement patterns of hunters and gatherers who used marine resources during the winter and inland resources the remainder of the year. More recent research indicates that residential bases or camps were moved to resources in a seasonal round (de Barros 1996; Koerper et al. 2002; Mason et al. 1997), or that some sites were occupied year-round with portions of the village population leaving at certain times of the year to exploit available resources (Cottrell and Del Chario 1981). Regardless of settlement system, it is clear that subsistence strategies during the Milling Stone Period included hunting of small and large terrestrial mammals, sea mammals, and birds; collecting shellfish and other shore species; extensive use of seed and plant products; the processing of yucca and agave; and nearshore fishing with barbs or gorges (Kowta 1969; Reinman 1964). As evidenced by the abundant milling equipment found at these sites throughout the region, the processing of small seeds was an important component of their subsistence practices.

Characteristic mortuary practices during the Milling Stone Period or Encinitas Tradition include extended and loosely flexed burials, some with red ochre and few grave goods such as shell beads and milling stones interred beneath cobble or milling stone cairns. “Killed” milling stones, exhibiting holes, may occur in the cairns. Reburials are common in the Los Angeles County area, with flexed burials oriented to the north common in Orange and San Diego Counties. Evidence of wattle-and-daub structures and walls have been identified at some sites in the San Joaquin Hills and Newport Coast area spanning all cultural periods (Mason et al. 1991, 1992, 1993; Koerper 1995; Strudwick 2004; Sawyer 2006).

Perhaps one unique trait of the Milling Stone Period, isolated to a small region of coastal Orange County, is the presence of a rudimentary ceramic industry involving the creation of fired clay effigies, figurines, and small crude thick-walled pottery vessels (Drover 1971, 1975; Drover et al. 1983; Macko 1998b; Sawyer and Koerper 2006). The figurines have been found at the Irvine site (CA-ORA-64) on Newport Bay, and a collapsed rockshelter site (CA-ORA-1405-B) within Muddy Canyon.

Intermediate Period (ca. 3000/1000 B.C.–A.D. 500/650)

Following the Milling Stone, Wallace's Intermediate Period and Warren's Campbell Tradition in Santa Barbara, Ventura, and parts of Los Angles Counties, date from approximately 3000 B.C.–A.D. 500 and are characterized by a shift toward a hunting and maritime subsistence strategy, along with a wider use of plant foods. The Campbell Tradition (Warren 1968) incorporates David B. Rogers' (1929) Hunting Culture and related expressions along the Santa Barbara coast. In the San Diego region, the Encinitas Tradition (Warren 1968) and the La Jolla Culture (Moriarty 1966; M. Rogers 1939, 1945) persist with little change during this time.

Temporal placement of the Intermediate is generally recognized as ranging between 3000 B.C. and A.D. 500 (Wallace 1955; Warren 1968). In Orange County, researchers have estimated the Intermediate Period began around 1000 B.C. and lasted until circa A.D. 650 (3000–1300 B.P.) (Koerper and Drover 1983:11; Mason and Peterson 1994). A more recent evaluation, based on some 1,300 calibrated radiocarbon dates from sites in Orange County, suggests a date of 1400 B.C. for the start of the Intermediate, marked by single-piece circular fishhooks and coinciding with the transition from the Middle to Late Holocene (Koerper et al. 2002:67–68). Another researcher sees the Intermediate, not as a cultural period, but as a transition between the Milling Stone and the later Late Prehistoric Period based on his investigations at sites in the Bonita Mesa area near upper Newport Bay (Peterson 2000). This idea may simply reflect a sub-regional or area specific trends at sites in and around Newport Bay rather than an accurate depiction of the cultural period dynamics in Orange County and the greater southern California region.

Although sites in the Prado Basin and Perris Reservoir area have cultural components that date to this period (Bettinger 1974:160; Grenda 1995:25), the Intermediate Period in western Riverside County is still not as well understood as it is in coastal areas (e.g., Van Bueren et al. 1986:11). The following discussion is thus mainly based on information gathered from coastal and near-coastal sites in southern California.

During the Intermediate Period, there is a pronounced trend toward greater adaptation to regional or local resources. For example, the remains of fish, land mammals, and sea mammals are increasingly abundant and diverse in sites along the California coast in the referenced region. Related chipped stone tools suitable for hunting are more abundant and diversified, and shell fishhooks become part of the toolkit during this period. Larger knives, a variety of flake scrapers, and drill-like implements are common during this period. Projectile points include large side-notched, stemmed, and lanceolate or leaf-shaped forms. Koerper and Drover (1983) consider Gypsum Cave and Elko series points, which have a wide distribution in the Great Basin and Mojave deserts between circa 2000 B.C.–A.D. 500, to be diagnostic of this period. Bone tools, including awls, are more numerous than in the preceding period, and the use of asphaltum adhesive is now common.

Mortars and pestles become more common during this period, gradually replacing manos and metates as milling stone implements. In addition, hopper mortars and stone bowls,

including steatite vessels, appear to enter the toolkit at this time. This shift appears to correlate with a diversification in subsistence resources. Many archaeologists believe this change in milling stones signals a shift away from the processing and consumption of hard seed resources to the increasing importance of the acorn (e.g., Glassow et al. 1988; True 1993). It has been argued that mortars and pestles may have been used initially to process roots (e.g., tubers, bulbs, and corms associated with marshland plants), with acorn processing beginning at a later point in prehistory (Glassow 1997:86) and continuing to European contact.

Characteristic mortuary practices during the Intermediate Period include fully flexed burials, placed face down or face up, and oriented toward the north or west (Warren 1968:2–3). Red ochre is common, and abalone shell dishes infrequent. Interments sometimes occurred beneath cairns or broken artifacts. Shell, bone, and stone ornaments, including charmstones, are more common than in the preceding Encinitas Tradition. Some later sites include Olivella shell and steatite beads, mortars with flat bases and flaring sides, and a few small points. The broad distribution of steatite from the Channel Islands and obsidian from distant inland regions, among other items, attest to the growth of trade, particularly during the later part of this period.

Late Prehistoric Period (ca. A.D. 500/650–A.D. 1769)

Wallace (1955, 1978) places the beginning of the Late Prehistoric around A.D. 500. In Orange County, the start of this period is recognized at a slightly later date, circa A.D. 650 (Koerper and Drover 1983; Mason and Peterson 1994). In all chronological schemes for southern California, the Late Prehistoric Period lasts until European contact occurred in A.D. 1769.

During the Late Prehistoric Period, there was an increase in the use of plant food resources in addition to an increase in land and sea mammal hunting. There was a concomitant increase in the diversity and complexity of material culture during this period, demonstrated by more classes of artifacts. The recovery of a greater number of small, finely chipped projectile points, usually stemless with convex or concave bases, suggests an increased utilization of the bow and arrow rather than the atlatl and dart for hunting. In Orange County, Cottonwood series triangular projectile points in particular are diagnostic of this period (Koerper and Drover 1983). Other items include steatite cooking vessels and containers, the increased presence of smaller bone and shell circular fishhooks, perforated stones, arrow shaft straighteners made of steatite, a variety of bone tools, and personal ornaments made from shell, bone, and stone. There is also an increased use of asphalt for waterproofing and as an adhesive.

During the Late Prehistoric, sites contain beautiful and complex objects of utility, art, and decoration. Ornaments include drilled whole Chione (venus clam) and drilled abalone. Steatite effigies become more common, with Pecten shell rattles common in middens. In Orange County, for example, pecten shell rattles are concentrated in the Late Prehistoric midden at CA-ORA-119A, and other time sensitive artifacts, including abalone ornaments and drilled Chione shells, are also present (Koerper and Drover 1983:19-20). Most of the rock art found today in the Chumash sphere is thought to date to this period.

Mortuary customs are elaborate, including cremation and interment, with abundant grave goods.

By A.D. 1000, fired clay smoking pipes and ceramic vessels begin to appear at some sites (Meighan 1954; Warren and True 1984). The scarcity of pottery in coastal and near-coastal sites implies ceramic technology was not well developed in that area, or that ceramics were obtained by trade with neighboring groups to the south and east. The lack of widespread pottery manufacture is usually attributed to the high quality of tightly woven and watertight basketry that functioned in the same capacity as ceramic vessels.

Another feature typical of Late Prehistoric Period occupation is an increase in the frequency of obsidian imported from the Obsidian Butte source in Imperial County, California. Obsidian Butte was exploited after circa A.D. 1000 after its exposure by the receding waters of Holocene Lake Cahuilla (Wilke 1978). A Late Prehistoric Period component of the Elsinore site (CA-RIV-2798-A) produced two flakes that originated from Obsidian Butte (Grenda 1997:255; Towner et al. 1997:224-225). Although about 16 percent of the debitage at the Peppertree site (CA-RIV-463) at Perris Reservoir is obsidian, no sourcing study was done (Wilke 1974:61). The site contains a late Intermediate to Late Prehistoric period component and it is assumed that most of the obsidian originated from Obsidian Butte. In the earlier Milling Stone and Intermediate Periods, most of the obsidian found at sites within Orange County and many inland areas came from northern sources, mostly the Coso volcanic field. This also appears to be the case within Prado Basin and other interior sites that have yielded obsidian (e.g., Grenda 1995:59; Taşkiran 1997:46). The presence of Grimes Canyon (Ventura County) fused shale at southern California archaeological sites is also thought to be typical of the Late Prehistoric Period (Demcak 1981; Hall 1988).

During this period, there is an increase in population size accompanied by the advent of larger, more permanent villages (Wallace 1955:223). Large populations and, in places, high population densities are characteristic, with some coastal and near-coastal settlements containing as many as 1,500 people. Many of the larger settlements were permanent villages, where people resided year-round. The populations of these villages may have also increased seasonally.

In Warren's (1968) cultural ecological scheme, the period between A.D. 500 and European contact is divided into three regional patterns. The Chumash Tradition is present mainly in the region of Santa Barbara and Ventura Counties; the Takic or Numic Tradition in the Los Angeles, Orange, and western Riverside Counties region; and the Yuman Tradition in the San Diego region. The seemingly abrupt changes in material culture, burial practices, and subsistence focus at the beginning of the Late Prehistoric Period are considered the result of a migration to the coast of peoples from inland desert regions to the east. In addition to the small triangular and triangular side-notched points similar to those found in the desert regions in the Great Basin and Lower Colorado River, Colorado River pottery and the introduction of cremation in the archaeological record are diagnostic of the Yuman Tradition in the San Diego region. This combination certainly suggests a strong influence from the Colorado Desert region.

In Los Angeles, Orange, and western Riverside Counties, similar changes (introduction of cremation, pottery, and small triangular arrow points) are considered the result of a Takic migration to the coast from inland desert regions. This Takic or Numic Tradition was formerly referred to as the "Shoshonean wedge" or "Shoshonean intrusion" (Warren 1968). This terminology, used originally to describe a Uto-Aztecan language group, is generally no longer employed in order to avoid confusion with ethnohistoric and modern Shoshonean groups who spoke Numic languages (Heizer 1978:5; Shipley 1978:88, 90). Modern Gabrielino/Tongva, Juaneño, and Luiseño in this region are considered the descendants of the prehistoric Uto-Aztecan, Takic-speaking populations that settled along the California coast during this period, or perhaps somewhat earlier.

6.4.3.3 Ethnography

The current RERC study area lies in the vicinity of several ethnographically known groups of Native Americans. The immediate study area was probably occupied ethnographically by the Serrano (King 2003: Fig. 1). To the west, the ethnographic group known as the Gabrielino or Tongva was located (Bean and Smith 1978a). The ethnographically known Cahuilla lived immediately to the east (Bean 1978) and the Luiseño to the southeast (Bean and Shipek 1978).

The language of all four groups was derived from the Takic family, part of the Uto-Aztecan linguistic stock, which can be traced to the Great Basin area (Driver 1969). Linguistic analysis suggests that at one time (probably before 500 B.C.) much of the southern California coastal region was populated by Hokan speakers who were gradually displaced by Takic speaking immigrants from the southern Sierra Nevadas and Great Basin area. The timing and extent of the migrations and their impact on indigenous peoples is not well understood.

Cahuilla

The RERC Units 3&4 project area lies in the vicinity of several ethnographically known groups of Native Americans. The immediate area was likely included within Cahuilla ethnographic boundaries (Kroeber 1925; Bean 1978:576), although recent research suggests the area may have been within Serrano territory (King 2003:Fig 1). Since several trade routes were in the vicinity of the Project, people from different indigenous groups likely visited the area on a fairly regular basis (Bean 1978:575). In addition to the Cahuilla, such groups would have included the Gabrielino or Tongva from the west (Bean and Smith 1978a), Luiseño from the southwest (Bean and Shipek 1978), and Serrano from the northeast (Bean and Smith 1978b; King 2003). The language of all four groups was derived from the Takic branch of the Uto-Aztecan linguistic family (Mithun 2001).

The name "Cahuilla" is possibly derived from a native word meaning a "master, boss" (Bean 1978:575). *'Ivi'lyu'atam* is the traditional term for the linguistically and culturally defined Cahuilla cultural nationality, and "refers to persons speaking the Cahuilla language and recognizing a commonly shared cultural heritage" (Bean 1972:85). It is thought that the Cahuilla migrated to southern California about 2000 to 3000 years ago, most likely from southern Sierra Nevada ranges of east-central California with other

related socio-linguistic groups (Takic speakers) (Moratto 1984:559). The Cahuilla settled in a territory that extended west to east from the present-day city of Riverside to the central portion of the Salton Sea in the Colorado Desert, and south to north from the San Jacinto Valley to the San Bernardino Mountains. While 60% of Cahuilla territory was located in the Lower Sonoran Desert environment, 75 percent of their diet from plant resources was acquired in the Upper Sonoran and Transition environmental zones (Bean 1978:576). The project area is within the northwestern portion of Cahuilla territory, among the Pass Cahuilla group of the tribe.

The Cahuilla language and its dialects are a branch of the Takic family of the Uto-Aztecan linguistic stock. It is very closely related to the Cupeño language, whose speakers are on their southern border. The Takic branch also includes the Juaneño/Luiseño (or Payomkawichum) tribal group located to the west in today's Orange and San Diego Counties, the Gabrielino (or Tongva) in Los Angeles County to the northwest, and the Serrano to the north. By contrast, the Chumash language, north of the Tongva in the Santa Barbara region, is not related to any other known Native American language family or stock, representing an origin quite different from that of the Cahuilla (Mithun 2001:304, 390). North of the Chumash and south of the Cahuilla are languages considered part of the Hokan linguistic stock, specifically the Salinan language along the central coast of California and the Yuman family of languages to the south (Mithun 2001:390, 539, 577–587). Takic speakers are thought to have migrated into the lands of these two populations and separated them.

The Cahuilla had three primary levels of socio-political organization (Bean 1978:580). The highest level was the cultural nationality, encompassing everyone speaking a common language. Next were the two patrimoieties of the Wildcats (*tuktum*) and the Coyotes (*'istam*). Every clan of the Cahuilla fell into one or the other of these moieties. The third basic level consisted of the numerous political-ritual-corporate units called sibs, or a patrilineal clan (Bean 1978:580). While anthropologists have designated groups of Cahuilla clans by their geographical location into Pass, Desert, and Mountain, suggesting dialect and ceremonial differences between these groupings (Strong 1929), these social and linguistic areas were more a result of proximity than actual social connections. In reality, there was a continuum of minor differences from one clan to the next. Lineages within a clan cooperated in defense, in community subsistence activities, and in religious ceremonies. While most lineages owned their own village site and particular resource area, much of the territory was open to all Cahuilla people.

Each lineage within a sib had a defined territory that, among the Cahuilla of the Coachella Valley desert, was formed around springs in mountain canyons and the alluvial fans that spread from these canyons out onto the desert floor. Villages in these canyons were occupied year-round. They were situated to take maximum advantage of natural resources such as climate, water, food, and materials. Individuals or groups would periodically leave the villages for gathering, hunting, visiting, or trading activities. The sibs and lineages would maintain formal associations among themselves for protection, for religious ceremonies, and help with large projects. The relationship between these groups was maintained through intermarriage and ceremonial reciprocity (Bean 1972).

Cahuilla villages were usually located in canyons or on alluvial fans near a source of accessible water such as springs or where large wells could be dug. Each family and lineage had their houses (*kish*) and granaries for the storage of food, and ramadas for work and cooking. There would often be sweat houses and song houses (for non-religious music). Each community also had a separate house for the lineage or clan leader. There was a ceremonial house, or *kíš ?ámnawet*, associated with the clan leader, where major religious ceremonies were held. Houses and ancillary structures were often spaced apart, and a "village" could spread out over a mile or two.

Each lineage had ownership rights to various resource collecting locations, "including food collecting, hunting, and other areas. Individuals also owned specific areas or resources, e.g., plant foods, hunting areas, mineral collecting places, or sacred spots used only by shamans, healers and the like" (Bean 1990:2). A variety of game was hunted, including mountain sheep, cottontail, jackrabbit, mice, and wood rats, as well as carnivores such as mountain lion, coyote, wolf, bobcat, and fox. Various birds were also consumed, including quail and dove, plus various types of reptiles, amphibians and insects.

The Cahuilla utilized over 200 desert and mountain plants (Bean and Saubel 1972). The most important food species included acorns, screwbean and honey mesquite, piñon nuts, prickly-pear cacti fruit and leaves, and yucca blossoms and stalks. Several hard seed plants, such as manzanita, sunflowers, sages, lemonade berry, wild rose; buckwheat; coyote gourd (calabazilla); fruits and berries; tubers; and greens were also gathered (Bean and Smith 1978a:538-539; O'Neil 2001). The amole tuber was used for tools and soap, and many types of greens were part of the diet, such as chenopodium, clover, Miner's lettuce, and white sage (Dale 1985). Native berry-producing plants in this region include toyon, grape, blackberry, and elderberry. The elderberry was also gathered for medicine and tool manufacture. Numerous additional plants were used for medicines, twine, basketry, ornamentation, tools, and religious ceremonies (O'Neil 2001).

This would have been a productive environment, well suited to a sophisticated hunting and gathering economy. Some studies (cf. Bean and Lawton 1993) suggest that aboriginal people in southern California managed the structure and productivity of this environment through a combination of controlled burning, selective harvesting and pruning, and occasional replanting, seed broadcast, and possibly limited irrigation. Such practices can be likened to those known for the Neolithic Revolution in other portions of the New World, Eurasia, and Africa. Human-induced burning, whether accidental or intentional for driving game or managing floral food and materials resources, may have influenced the development of fire-adapted plant associations over the past few thousand years. It has been variously suggested (e.g., Bean and Lawton 1993:37-42, 46-51; King 1993:296-298) that native burning helped create and maintain the park-like aspect of many California landscapes that was noted by early Spanish diarists, and which in places was still discernable as recently as the middle or late nineteenth century. The emphasis on fire suppression that began during colonial times and largely continues today may be partially responsible for the current broad distribution of brush and paucity of grasslands in areas

that looked quite different to European explorers and missionaries (Timbrook et al. 1993:129-134).

The Cahuilla had adopted limited agricultural practices by the time Euro-Americans traveled into their territory. Bean (1978:578) has suggested that their "proto-agricultural techniques and a marginal agriculture" consisting of beans, squash and corn may have been adopted from the Colorado River groups to the east. Certainly by the time of the first Romero Expedition in 1823-24, they were observed growing corn, pumpkins, and beans in small gardens localized around springs in the Thermal area of the Coachella Valley (Bean and Mason 1962:104). The introduction of barley and other grain crops gives positive evidence for the introduction of European plants via the mission or local Mexican rancheros. Despite the increasing use and diversity of crops, there is no evidence that this small-scale agriculture was anything more than a supplement to Cahuilla subsistence, and it apparently did not alter social organization (i.e., had no effect on the basic division of labor or create new social roles).

A wide variety of tools and implements were employed by the Cahuilla to gather and collect food resources. For the hunt, these included the bow and arrow, traps, nets, slings and blinds for hunting land mammals and birds, and nets for fish in Holocene-epoch Lake Cahuilla. Rabbits and hares were commonly brought down by the throwing stick, but communal hunts for these animals utilized tremendously large nets and clubs. Foods were processed with a variety of tools, including portable stone mortars, bedrock mortars and pestles, basket hopper mortars, manos and metates, bedrock grinding slicks, hammerstones and anvils, woven strainers and winnowers, leaching baskets and bowls, woven parching trays, knives, bone saws, and wooden drying racks. Food was consumed from a number of woven and carved wood vessels and pottery vessels. The ground meal and unprocessed hard seeds were stored in large finely woven baskets, and the unprocessed mesquite beans were stored in large granaries woven of willow branches and raised off the ground on platforms to keep it from vermin. Pottery vessels were made by the Cahuilla, and also traded from the Yuman-speaking groups across the Colorado River and to the south.

Pottery was introduced to the Cahuilla via trade from the Colorado River region during the Late Prehistoric period. The art of constructing pottery was later adopted by the Cahuilla, using the paddle and anvil technique. Typical culinary wares included a variety of jars, cooking vessels, and ladles. Ceramic pipes were also commonly manufactured and used. Ceramic ollas, typically large round pots with small necks, were used for storing seeds. Ollas were frequently cached in caves and rockshelters with foodstuffs sealed in to be used during hunting and gathering forays (Bean 1978:578–579).

By 1819, several Spanish mission outposts, known as *assistencias*, were established near Cahuilla territory at San Bernardino and San Jacinto, but interaction with Europeans was not as intense in the Cahuilla region as it was for coastal groups. The topography and lack of water also made the area less attractive to colonists than the coastal valley regions. By the 1820s, however, the Pass Cahuilla were experiencing consistent contact with the ranchos of Mission San Gabriel, while the individuals and families of the Mountain branch

of the Cahuilla were frequently employed by private rancheros and were also recruited to Mission San Luis Rey. The Romero-Pacheco Expedition during the winter of 1823 passed through the Coachella Valley in an unsuccessful attempt to establish a route from San Gabriel to Tucson via the upper Colorado River. They passed by the village of Toro with its great mesquite thickets on the north side and walk-in wells at the village site (Bean and Mason 1962:37). This scene has been identified as the village of *Pūichekiva*. Underground water supported the large stands of mesquite, the major plant resource for the local Cahuilla. The water was sufficiently close to the surface that the Cahuilla were able to excavate their unique stepped, walk-in wells, which reached a depth of 12–15 feet. As recorded by Blake when he described this same village complex in 1853, the water was used for household purposes and mesquite and crop irrigation (Bean et al. 1991:78). Crops included melons, squashes, corn, and barley.

By the 1830s, Mexican ranchos were located near Cahuilla territory along the upper Santa Ana and San Jacinto rivers, thus introducing the Cahuilla to ranching and an extension of traditional agricultural techniques. The Bradshaw Trail was established in 1862, and was the first major east-west stage and freight route through the Coachella Valley. Traversing the San Gorgonio Pass, the trail connected gold mines on the Colorado River with the coast. Bradshaw based his trail on the Cocomaricopa trail, with maps and guidance provided by local Native Americans. Journals by early travelers along the Bradshaw Trail told of encountering Cahuilla villages and walk-in wells during their journey through the Coachella Valley.

The continuing expansion of immigrants into the region introduced the Cahuilla to European diseases. The single worst recorded event was a smallpox epidemic in 1862-63. By 1891, only 1,160 Cahuilla remained within what was left of their territory, down from an aboriginal population of 6,000–10,000 (Bean 1978:583-584). By 1974, approximately 900 people claimed Cahuilla descent, most of who resided on reservations.

Between 1875 and 1891, the United States established ten reservations for the Cahuilla within their territory (Agua Caliente, Augustine, Cabazon, Cahuilla, Los Coyotes, Morongo, Ramona, Santa Rosa, Soboba, and Torres-Martinez) (Bean 1978:585). Four of the reservations are shared with other groups, including the Chemehuevi, Cupeño, and Serrano. The Cahuilla on the Morongo Reservation established the Malki Museum, a respected repository for artifacts and ethnographic knowledge that opened in 1965. In addition, the museum publishes books on Native American lifeways, as well as the Journal of California and Great Basin Anthropology.

6.4.3.4 History

Post-contact history for the state of California is divided into three periods: the Spanish Period, the Mexican Period, and the American Period. Each of these periods is briefly described below.

Spanish Period (1769–1822)

The first Europeans to observe what became southern California were members of the A.D. 1542 expedition of Juan Rodriguez Cabrillo. Cabrillo and other early explorers

sailed along the coast, and made limited expeditions into Alta (upper) California between 1529 and 1769. Spanish, Russian, and British explorers briefly visited Alta California during this nearly 250-year span. Eventual Spanish settlement of California in the spring of 1769 marked the devastating disruption of the indigenous cultures.

Gaspar de Portolá established the first Spanish settlement in Alta California at San Diego in 1769, and with Father Junipero Serra founded the first of 21 missions (Mission San Diego de Alcala) built by the Spanish and Franciscan Order between 1769 and 1823. Portolá continued north, reaching San Francisco Bay on 31 October, 1769. Pedro Fages, who sought a site for a mission, and Lt. Colonel Juan Bautista De Anza, a Spanish military officer from Tubac, Arizona, who surveyed an overland trail from the Mexican interior to San Francisco Bay, made later expeditions to Alta California in 1772 and 1774, respectively (Grunsky 1989:2–3). De Anza's diary provides the first recorded Euro-American entry into the region. De Anza later led a group of colonists and their livestock through the San Jacinto Valley and across the Santa Ana Narrows on their way to settle San Francisco Bay between 1775 and 1776. The Juan Bautista de Anza National Historic Trail—approved by Congress in 1990 and mapped by the National Park Service in 1996—and the National Millennial Trail (designated in 1999) both commemorate the trail as a heritage tourism automobile route (California Highways 2004).

The process of converting the local Native American population to Christianity through baptism and relocation to the mission grounds began in this region by the Franciscan padres at Mission San Juan Capistrano, which was established in 1776. People from the interior region were converted within ten years of establishing Mission San Juan Capistrano. Mission San Luis Rey was founded twenty years later, and as it grew and expanded its influence, it established ranchos east of San Juan Capistrano. This expansion created territorial conflicts with Mission San Juan Capistrano.

Mexican Period (1822–1848)

Mexico revolted against the Spanish crown in 1822. After the Revolution, all Spanish holdings in North America (including both Alta and Baja California) became part of the new Mexican republic. An era of extensive land grants began with the onset of the Mexican Period. Most of the land grants to Mexican citizens in California (*Californios*) were in the interior, and were granted to increase the population away from the more settled coastal areas where the Spanish concentrated their settlements. The Mexican Period is also marked by exploration by American fur trappers west of the Sierra Nevada Mountains.

American Period (1848–Present)

The Mexican–American War ended with the signing of the Treaty of Guadalupe Hidalgo in 1848, making California a territory of the United States. The discovery of gold in 1848 at Sutter's Mill near Sacramento and the resulting Gold Rush era greatly influenced the history of the state and the nation. The tens of thousands of people who rushed to the gold fields had a devastating impact on the lives of indigenous Californians, with the introduction and concentration of diseases, the loss of land and territory (including traditional hunting and gathering locales), violence, malnutrition, and starvation.

Thousands of settlers and immigrants continued to pour into the state, particularly after the completion of the transcontinental railroad in 1869. One year after discovering gold, nearly 90,000 people journeyed to the California gold fields. A portion of Captain John Sutter's Mexican land grant, known as *New Helvetia*, became the bustling Gold Rush boomtown of Sacramento. California became the 31st state in 1850 largely as a result of the Gold Rush. By 1853, the population of the state exceeded 300,000 and Sacramento became the state capital in 1854.

Riverside County formed 40 years later in 1893, created from portions of nearby San Bernardino and San Diego Counties. The City of Riverside, located on the Santa Ana River channel, is the county seat and was founded in 1870. Part of California's "Inland Empire," many Riverside County residents work in and commute to the greater Los Angeles metropolitan area.

Local History: City of Riverside

The first recorded Euro-American entry into the region surrounding the project area comes from Lt. Colonel Juan Bautista de Anza's 1774 expedition along an overland trail from the Mexican interior to San Francisco Bay. Following his initial mapping survey, de Anza led a group of more than 200 settlers and their livestock in 1775–1776 through the San Jacinto Valley and across the Santa Ana Narrows on their way to found a mission and presidio in San Francisco.

San Diego merchant Juan Bandini gained in 1838 a land-grant from the Mexican government that entitled him to a great extent of the Santa Ana River drainage, which he named Rancho Jurupa. A group of Euro-American investors in 1870 bought a substantial portion of the rancho, and then surveyed a 1-square-mile town site for their new colony that they named Riverside. They built irrigation canals to divert water from the Santa Ana River, supplying the water needed to found the modern California citrus industry (City of Riverside 2004).

As Riverside began to grow and develop into a larger city, the Atchison, Topeka & Santa Fe Railway extended the Chicago railroad's main line through Riverside in 1882, connecting Barstow with Los Angeles. The Southern Pacific Railroad extended a branch line to Riverside in 1892. Resulting from the influx of people and industry, Riverside County was formed in 1893 with Riverside as the county seat (Hansen and Mermilliod 2002).

Further expansion of California and western commerce in 1904 brought the San Pedro, Los Angeles & Salt Lake Railroad across the Santa Ana River and through Riverside to connect the thriving capitals of California and Utah. That year, a massive 984 foot long concrete viaduct across the Santa Ana's Anza Narrows was built by the "Salt Lake Route" (part of the Union Pacific Railroad [UPRR] after 1921, which it remains today) to gain access from the north bank into Riverside on the south side of the river. After completion, the bridge briefly held the title "largest concrete structure in the world" (National Park Service 1991). The railroad established a depot for "Jurupa" just south of the river (between present Jurupa Avenue and Mountain View Avenue), and in 1908 the

Riverside Land and Irrigation Company platted housing tracts around the railroad station. A handful of suburban-styled homes appeared by the 1920s in the area. The surviving 1910s and 1920s houses along Jurupa Avenue and Florence Street represent this early twentieth century attempt at Riverside suburban settlement.

Various efforts in the early twentieth century to dam, bridge, and utilize the Santa Ana River led to a number of structures that survive in various aspects of integrity along the river basin near the present project. A water ditch (part of CA-RIV-620) supplied cooling water to an early 1900s power plant located about 2 miles downstream, which meandered from a dam near the UPRR bridge west along the south river bank just north of the present project. The water ditch passed through granite boulders that had prehistoric grinding slicks. Several of these boulders survive (CA-RIV-620), but this water ditch has been obliterated in floods and later pipeline construction along the river. In the late 1930s the Metropolitan Water District (MWD) Colorado River Aqueduct's Upper Feeder crossed the Santa Ana River about 0.3 mile northeast of the present project, which is today carried on a 550-foot span (Site No. 33-16019) of three Pratt through trusses on concrete piers built circa 1950. A large sewer pipe installed in 1977 to connect wastewater collection northwest of Riverside with the treatment plant (see below) further disturbed the south bank topography adjacent to the project area. In 1999, installation of a natural gas pipeline that crossed the river and skirted the north boundary of the project area apparently obliterated an "aqueduct" shown on the 1967 USGS "Riverside West" quadrangle map (this aqueduct is apparently otherwise unrecorded). In 2000 fiber optic cable trenching further disturbed the riverbank area just north of the present project.

In 1942 the Riverside Regional Water Quality Control Plant (RRWQCP [P-33-13252]) was developed with federal Work Projects Administration (WPA) assistance as part of the New Deal (1933-1942), which reflected a post-Depression boom in Riverside and California in general. The New Deal offered unprecedented federal assistance during the Great Depression to state and local governments for construction of public works, recreation facilities, and other civic improvements; programs such as the WPA ended with recovery from the Depression and conversion of the economy to win World War II. The RRWQCP was constructed approximately 1.5 miles west of the railroad mainline, between Jurupa Avenue and the river at the north extreme of Acorn Street. The RRWQCP's subsequent expansions, doubling in capacity in 1953 and again in 1958, chronicle the intensity of the post-war population boom in Riverside (City of Riverside 2001). Following the end of World War II in 1945, the area between the old suburb of Jurupa and the RRWQCP began to develop beyond the early residential and farming examples near the Jurupa depot. Commercial and light industrial establishments dominated the area by the 1960s, served largely by a rail spur west from the UPRR mainline, trucks, and automobiles. This strip-development of Jurupa Avenue brought distinctive post-war commercial buildings such as the wartime-design Quonset hut at 6091 Jurupa Avenue. According to the County of Riverside webpage, this growth has continued to today with Riverside becoming the fastest growing city in California between 1980 and 1990.

6.4.3.5 Literature Search

A search of the California Historical Resources Information System (CHRIS) was conducted for the RERC Units 3&4 project area (Appendix 6.4-A). On December 20, 2007, the Eastern Information Center (EIC) provided a literature and archival records search pertaining to previously recorded cultural resources and investigations within a one-mile radius of the project area. A review was made of the National Register of Historic Places (NRHP), Archaeological Determinations of Eligibility (ADOE), and the Historic Property Directory (HPD). Pertinent portions of the USGS 1901 Elsinore, California 30-Minute and 1901 and 1942 Riverside, California 15-Minute Quadrangles were reviewed. The National Register Database for properties in the immediate vicinity of the project area was also reviewed.

Previous Cultural Resources Studies within 1 Mile

Thirty cultural resources studies and two general overview studies have been previously conducted within a 1-mile radius (project study area) of the project area (Table 6.4-1, Figure 6.4-3). Ten of these studies were conducted within 0.25 mile of the project area; the full-text of the associated reports is in Appendix 6.4-A. Four of these studies include a portion of the RERC project area, and are also available in Appendix 6.4-A. Therefore, a total of 14 cultural resources studies have been conducted within and including a 0.25-mile radius of the project area.

Table 6.4-1 Previously Conducted Cultural Resources Studies within 1 Mile of the project Area

Report #	Title	Author(s)	Includes Project Area?
RI-00031	The Arlington Channel Flood Control Project: Expected Impact on Archaeological Resources	Gardner, M. / 1971	No, general overview
RI-00117	La Loma-Mira Loma Transmission Line: Expected Impact on Archaeological Values	Wilke, P. / 1973	No, but within 0.25 mile
RI-00125	Letter Report: Archaeological Survey of Proposed Conveyance Alignments and Treatment Plant Site, Riverside, Rubidoux and Jurupa	Barker, J. / 1974	No, but within 0.25 mile
RI-00126	Environmental Impact Assessment: Archaeological Survey for the Proposed Sewage Pipeline Near Rubidoux, Riverside County, California	Lipp, D. / 1973	No, but within 0.25 mile
RI-00141	Archaeology of Proposed Additions to the Indian Hills Housing Development, City of Pedley, Riverside County, California	Schlanger, S. / 1974	No
RI-00269	Results of Surface Collection at CA-RIV-494, Riverside County, California	Lipp, D. / 1977	No
RI-00270	Environmental Impact Evaluation: Archaeological Survey for the Proposed Interceptor Facility to City of Riverside Water Quality Control Plant, Riverside County, California	Lipp, D. / 1977	No, but within 0.25 mile

Table 6.4-1 Previously Conducted Cultural Resources Studies within 1 Mile of the project Area

Report #	Title	Author(s)	Includes Project Area?
RI-01938	Archaeological Assessment of the Proposed Airport Industrial Storm Drain Project, EDA 850422-A, Riverside, California	Mack, J, / 1985	No
RI-02131	Archaeological Survey Report for Santa Ana River Bikeway Phase IIA Landscaping Project, City and County of Riverside, California	Love, B. / 1995	No, but within 0.25 mile
RI-02132	Historic Property Survey Report for Santa Ana River Bikeway Phase IIA Landscaping Project, City and County of Riverside, California	Love, B. / 1995	No, but within 0.25 mile
RI-02133	Negative Archaeological Survey Report: Santa Ana River Bikeway Phase IIA Landscaping Project	Love, B. / 1997	No, but within 0.25 mile
RI-02207	Environmental Impact Evaluation: An Archaeological Assessment of the Proposed Rubidoux Community Services District Wastewater Treatment Facilities, Riverside County, California	Parr, R. / 1988	No, but within 0.25 mile
RI-02307	Cultural Resources Survey, Upper Santa Ana River, California	Hampson, R. et al. / 1988	No, but within 0.25 mile
RI-03274	Cultural Resources Assessment, Parcel Map 21017, Pedley Area of Riverside County, California	Everson, D. et al. / 1991	No
RI-03395	Cultural and Biological Resources Assessment of Jurupa Avenue Extension, Approximately 1 Mile, City of Riverside, Riverside County, California	Jertberg, P., and Kirtland, K. / 1991	No
RI-03893	Archaeological Assessment of the Riverside Cogeneration Project on the Santa Ana River, Riverside County, California	Dillon, B. / 1995	Yes
RI-03959	A Phase I Cultural Resources Investigation of the Proposed Van Buren Golf Center, Located at Van Buren Boulevard and Central Avenue, City of Riverside, Riverside County, California	MeKenna, J. / 1996	No
RI-03979	Historic Property Survey Report: The Santa Ana River Trail Phase IIIB Bikeway Project, Riverside, California: A Joint Project of the County and City of Riverside	Alexandrowicz, S. et al / 1996	No
RI-03980	Historic Study Report: Identification of Cultural Resources Within The Santa Ana River Trail Phase IIIB Bikeway Project, Riverside, California: A Joint Project of the County and City of Riverside	Alexandrowicz, S. et al / 1996	No
RI-03981	Archaeological Survey Report: Identification of Cultural Resources within The Santa Ana River Trail Phase IIIB Bikeway Project, Riverside, California: A Joint Project of the County and City of Riverside	Alexandrowicz, S. et al / 1996	No
RI-03982	Historic Property Survey Report of the Santa Ana River Bike Trail Phase IIIB Project, City and County of Riverside, California	Love, B. / 1997	No

Table 6.4-1 Previously Conducted Cultural Resources Studies within 1 Mile of the project Area

Report #	Title	Author(s)	Includes Project Area?
RI-04404	Final Cultural Resources Inventory Report for the Williams Communications, Inc., Fiber Optic Cable System Installation Project, Riverside to San Diego, California Vol I-IV	Jones and Stokes Associates, Inc. / 2000	No
RI-04451	Cultural Resources Monitoring for the Tequesquite Landfill Well and Gasline Project, City of Riverside, County of Riverside, California	Alexandrowicz, S. / 1999	Yes
RI-04631	Phase I Cultural Resources Study of Four Vacant Parcels within the City of Riverside, Riverside County, California	Jones & Stokes / 2003	No
RI-04813	California Citrus Heritage Recording Project: Arlington Height Citrus Landscape, Gage Irrigation Canal, National Orange Company Packing House, Victoria Bridge, and Union Pacific Railroad Bridge	National Park Service, Historic American Engineering Record / 1993	No, general overview
RI-05325	Historic Property Survey Report: Van Buren Boulevard Bridge Replacement Class II Project	Goodwin, R. / 2002	No
RI-05900	Historical / Archaeological Resources Survey Report, Riverside Gateway Project, City of Riverside, Riverside County, California	Love, B. et al / 2002	No
RI-06277	Cultural Resources Inventory of 26.3 Acres, Assessor's Parcel Numbers 163-400-010, -012, 013, -014, -016, and -017, Riverside, Riverside County, California	Sander, J. / 2006	No
RI-06418	Historical / Archaeological Resources Survey Report, The De Anza Project, in the Community of Pedley, Riverside County, California	Tang, B. et al./ 2005	No
RI-06492	Cultural Resources Literature Review and Pedestrian Reconnaissance for the Proposed Riverside Energy Resource Center, Riverside County, California	Maxon, P., and Steely, J. / 2004	Yes
RI-07267	Historical / Archaeological Resources Survey Report: Assessor's Parcel Nos. 189-140-008 and -009	CRM TECH / 2007	No, but within 0.25 mile
NA	Cultural Resources Monitoring for the Riverside Energy Resource Center Project, City of Riverside, Riverside County, California	Sikes N. et al./ 2007	Yes

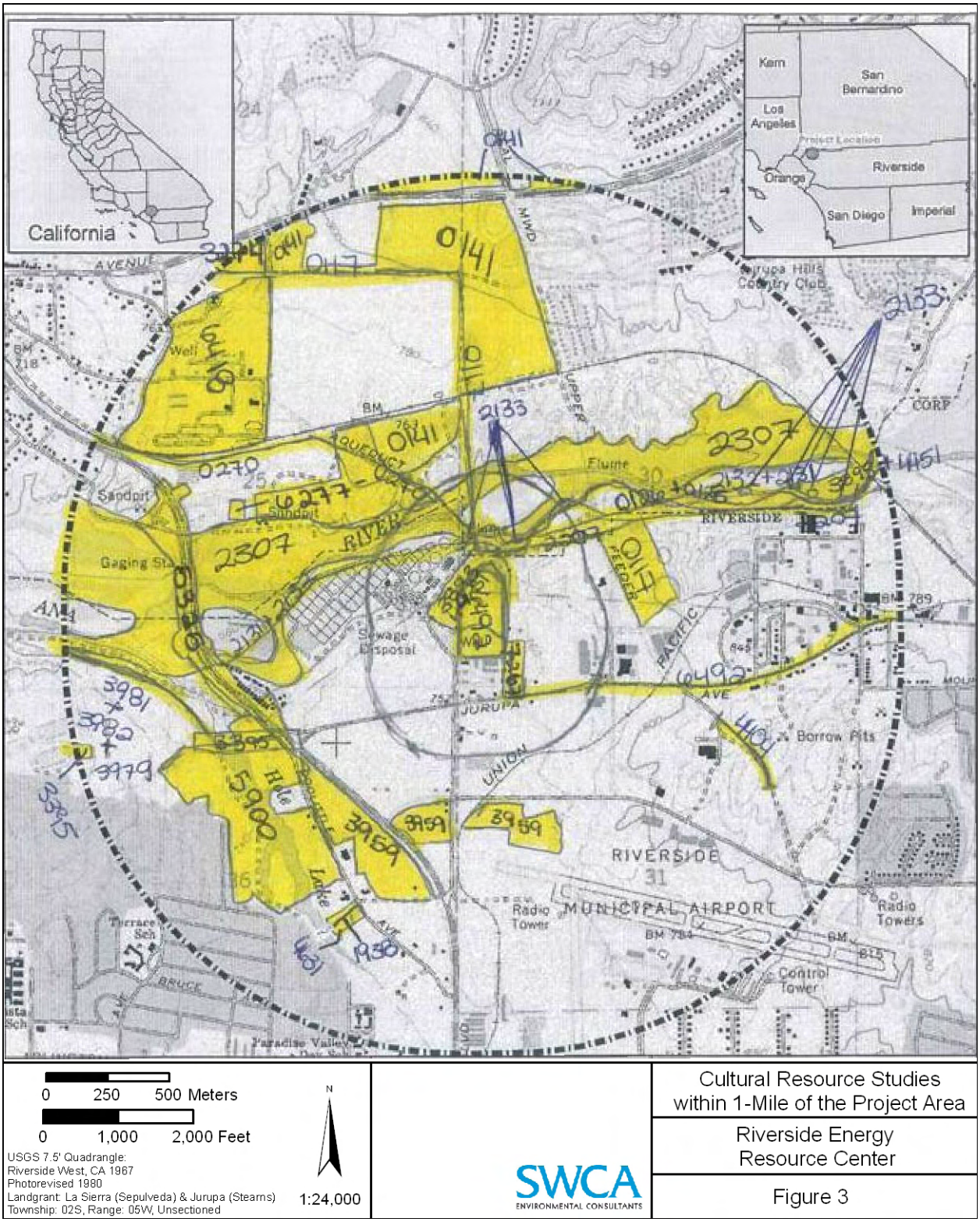


Figure 6.4-3 Cultural Resource Studies within 1 Mile of the Project Area

The four studies that cover portions of the RERC Units 3&4 project area are briefly summarized below, and the location of these surveys presented in Figure 6.4-3.

RI-3893 (Dillon 1995)

Brian Dillon conducted an archaeological survey of the proposed Riverside Cogeneration Project along the Santa Ana River. It consisted of an examination of a 125-acre landfill site, a 25-acre borrow area, and an approximately four-mile pipeline route between the two areas. The examination did not reveal any previously unknown cultural resources. Five previously recorded sites (CA-RIV-325, CA-RIV-620, CA-RIV-679, CA-RIV-3355 and CA-RIV-3375) occurred close enough to the proposed pipeline that monitoring was recommended for these sites. Two other previously recorded sites (CA-RIV-127 and CA-RIV-3361H) had the potential to be intersected by the proposed cogeneration pipeline, and the recommendation made that these sites also be monitored for cultural resources. Dillon recommended that monitoring of the initial pipeline trenching be undertaken to assure avoidance of these sites.

RI-4451 (Alexandrowicz 1999)

John S. Alexandrowicz of Archaeological Consulting Services (ACS) completed the monitoring recommended by Dillon (1995) in 1999. Alexandrowicz identified the six sites (CA-RIV-127, CA-RIV-325, CA-RIV-620, CA-RIV-3355, CA-RIV-3361H, CA-RIV-3375) Dillon thought worthy of examination during construction monitoring, as well as a seventh site—the first gas well to be drilled in the landfill. Monitoring occurred near only four these sites—CA-RIV-127, CA-RIV-620, CA-RIV-3361H and at Well #1—revealing no significant cultural resources (Alexandrowicz 1999:4). Monitoring was not undertaken during construction around the remaining three sites. The gas line associated with this effort is located just north of the project area.

RI-6492 (Maxon and Steely 2004)

SWCA archaeologist Patrick Maxon and SWCA architectural historian Jim Steely conducted archival research and field surveys in support of the RERC Units 1&2 project that currently exist within the project area. The original RERC project consisted of two aero-derivative combustion turbine engines (RERC Units 1&2), an on-site switchyard, on-site natural gas and water supply interconnection, on-site administration building and warehouse, and approximately 1.75 miles of 69 kV transmission line (Maxon and Steely 2004:4). One prehistoric archaeological site and ten historic properties were identified as a result of this study. The majority of these resources are located along the transmission alignment which is not part of the current study. One historic building, the Riverside Water Quality Control Plant (P-33-13252), is located on a parcel that is adjacent to the current Project. The results of the cultural resource surveys conducted by Maxon and Steely were negative for prehistoric or historic period archaeological or historic built environment resources in the RERC Units 3&4 project area. The Area of Potential Effects (APE) for 2004 project was different due to the inclusion of the transmission line that lead to a linear APE that extended beyond the current project area.

No Report Number (Sikes et al 2007)[1]

During the construction of RERC Units 1&2, cultural resource personnel monitored ground-disturbing construction activities with the potential to impact intact sediment at the plant site and transmission line. The monitors also spot-checked construction activities along the transmission line to ensure that the activities did not impact the historic structures within 100 feet of the transmission line. No cultural resources were discovered during monitoring of the ground-disturbing activities, and no historic structures were impacted by construction activities along the transmission line.

Previously Recorded Cultural Resources within 1 Mile

Thirty-five cultural resources have been previously recorded within a 1-mile radius of the project area (Table 6.4-2; Figure 6.4-4). No cultural resources have been recorded within the project area or within a 200-foot buffer.

Table 6.4-2 Previously Recorded Cultural Resources within 1 Mile of the Project Area

Trinomial / Primary Number	Other Identifier	Resource Description	Recorded by / Date	Within Project Area?
CA-RIV-127		Granitic outcrop with ten milling features containing slicks, mortars, and a milling basin. The site is located next to the Santa Ana River and bisected by a Union Pacific Railroad bridge (CA-RIV-3361-H).	Coorhart / 1951 Haenszel, A. / 1971 Kirkish, A. / 1972 Hall, M. / 1975 Mc Carthy, D. / 1987 Sorensen, J. et al. / 1987	No
	State Historical Landmark # 787	De Anza Crossing of the Santa Ana River 1775 and 1776, located near the Union Pacific Railroad Bridge (CA-RIV-3361H)		No
CA-RIV-494		Habitation debris that includes ground stone, chipped stone, and hammer stones. The site is destroyed, and is now a graded, hard-packed parking lot.	Calt, A. / 1971 Hall, C. / 1975 Chambers Group, Inc. / 2006	No
CA-RIV-560		Sparse scatter of flakes with a possible rock feature that was not relocated during an update in 1975.	Kirkish, A. / 1972 Hall, C. / 1975	No

Trinomial / Primary Number	Other Identifier	Resource Description	Recorded by / Date	Within Project Area?
CA-RIV-561		Sparse scatter of flakes and groundstone	Sorensen, J. et al. / 1972 Hall, C. / 1975 Hammond, S / 1973 Hall, C. / 1975	No
CA-RIV-619		Sparse scatter of flakes and groundstone	Hammond, S / 1973 Hall, C. / 1975	No
CA-RIV-620		Bedrock milling feature site with 15 slicks and two basin metates.	Hammond, S. / 1973 Hall, C. / 1975 McCarthy, D. / 1987 Parr, R. / 1988	No
CA-RIV-679		Several red pictographs on a large granite boulder. The boulder is located on a terrace along the south edge of the river bottom.	Haenszel, A. / 1967	No
CA-RIV-700	Pedley Crossing	Four bedrock milling features near the north end of Van Buren Bridge	Haenszel, A. / 1971	No
CA-RIV-884		Red pictographs on the south side of a flat-topped granite boulder	Haenszel, A. / 1971	No
CA-RIV-3355		Two bedrock milling features with two slicks	Schmidt, J. et al. / 1987	No
CA-RIV-3359H		Scatter of historical debris that includes glass shards, ceramic sherds, and metal cans	Sorensen, J. et al. / 1987	No
CA-RIV-3361		Union Pacific Railroad Bridge over Santa Ana River, construction completed in 1904	Sorensen, J. et al. / 1987 SWCA / 2004	No
CA-RIV-3363		Bedrock milling feature site containing one conical mortar	Sorensen, J. et al. / 1987	No
CA-RIV-3375		Bedrock milling feature site containing three milling slicks	Parr, R. / 1988	No
CA-RIV-5805H/ P-33-7539		Historic “Hole Dam” complex constructed of earth and cobbles	Alexandrowicz, S. et al. / 1995	No
CA-RIV-5806H/ P-33-7540		Historic canal that is cut/dug into granite bedrock	Alexandrowicz, S. et al. / 1995	No

Trinomial / Primary Number	Other Identifier	Resource Description	Recorded by / Date	Within Project Area?
P-33-9651		Complex of structures (dam) built circa 1915 and associated with the Willits J. Hole Ranch. NRHP Status Code 5S3	Collet, R. / 2000	No
CA-RIV-6452/ P-33-9652		Bedrock milling feature site consisting of one basin, one slick, and one rub	Collet, R. / 2000	No
CA-RIV-6785/ P-33-11397		Lithic scatter consisting of seven flakes and one mano fragment	Love, B. et al. / 2002	No
CA-RIV-6786H/ P-33-11398		Historic remains consisting of several wood pillars, concrete pylons, and concrete footings	Love, B. et al. / 2002	No
P-33-11592		Isolate consisting of one bifacial mano and one chalcedony flake	Love, B. et al / 2002	No
P-33-11633		Historic single family residence with ancillary buildings. NRHP Status Code 6Z	Love, B. et al / 2002	No
P-33-12735		Isolate consisting of an amethyst bottle fragment	Romani, G., and Wakefield, S. / 1988	No
P-33-12736		Isolate consisting of a sun-colored amethyst jar base and approx. 25 fragments of patinated clear and amber glass	Romani, G., and Wakefield, S. / 1988	No
P-33-13252		Historic wastewater treatment plant that includes office and maintenance buildings- originally constructed in 1942	SWCA / 2004	No, but on adjacent parcel
P-33-13253		Historic one-story ranch style home- circa 1960	SWCA / 2004	No
P-33-13254		Historic 1.5-story Quonset hut- circa 1950	SWCA / 2004	No
P-33-13531		Bedrock milling site with three mortars located on two boulders	Maxon, P., and Paige P. / 2003	No
P-33-15968		Historic mid-20th century industrial building. NRHP Status Code 6Z	Tibbet, C. / 2005	No
P-33-15969		Historic mid-20th century industrial building. NRHP Status Code 6Z	Tibbet, C. / 2005	No

Trinomial / Primary Number	Other Identifier	Resource Description	Recorded by / Date	Within Project Area?
P-33-16019		Historic steel truss bridge with a “through” configuration designed to carry the Metropolitan Water District Upper Feeder across the Santa Ana River- built approx. 1950	Mock, K., and Hollins, J. / 2006	No
P-33-16020		Historic gauging station constructed in the 1930’s	Mock, K., and Hollins, J. / 2006	No
P-33-16021		Historic retaining wall along the south bank of the Santa Ana river	Mock, K., and Hollins, J. / 2006	No
CA-RIV-8761/ P-33-16737		Bedrock milling site containing two milling slicks	Knell, E., and Tuma, M. / 2007	No

The record search reveals that the immediate area around the proposed RERC Units 3&4 project area is sensitive for the presence of cultural resources, particularly prehistoric archaeological resources. Many of these resources are associated with the Santa Ana River floodplain (see Figure 6.4-4), which was extensively used by prehistoric residents of the area. Sixteen prehistoric archaeological sites and one isolated prehistoric artifact find have been identified within one mile of the proposed Project. Of the sixteen prehistoric archaeological sites, nine contain milling features, four are lithic scatters (two of which contain ground stone), two contain pictographs, and one contains habitation debris.

The four closest prehistoric archaeological sites, CA-RIV-620, CA-RIV-679, CA-RIV-3355, and CA-RIV-3375, are within 0.25 mile of the project area. CA-RIV-620 is a bedrock milling feature site with 15 slicks and two basin metates. CA-RIV-679 consists of several red pictographs on a granite boulder. CA-RIV-3355 consists of two granite boulders that contain milling slicks. CA-RIV-3375 has three bedrock milling slicks on two granite outcrops.

The records search also reveals that 17 historic period archaeological sites and buildings or structures occur within one mile of the project area. Historic period archaeological sites include two historic trash deposits, one historic retaining wall, two isolated finds that included glass bottles and bottle fragments, one historic canal, and one historic dam. Historic built environment resources identified within one mile of the proposed Project include the adjacent RRWQCP, one Union Pacific Railroad bridge, a truss bridge, one Quonset hut, two single family residences, two industrial buildings, one gauging station, and one dam structure complex.

No listed properties in the NRHP, ADOE, or HPD are located within the boundaries of the project area. California Historic Landmark No. 787, the de Anza Crossing of the Santa Ana River, 1775 and 1776 is located almost 1 mile east of the proposed Project near the existing Union Pacific Railroad bridge (P-33-3361).

A review of the USGS 1901 Elsinore, California 30-minute and 1901 and 1942 Riverside, California 15-minute Quadrangles indicate that Jurupa and Van Buren avenues were established sometime prior to 1901. Sometime between 1905 and 1942, several dirt roads were constructed along the south side of the Santa Ana River, just north of the project area. No buildings are depicted in the vicinity of the project area on any of these maps. The RRWQCP was constructed in 1942 after the 1942 Riverside, California map was finalized.

6.4.3.6 Sacred Lands File Search and Native American Consultation

The Project initiated Native American consultation for the Project on December 11, 2007 by contacting NAHC to request a review of the Sacred Lands File and to obtain a list of Native American groups or individuals listed by the NAHC for Riverside County. The NAHC responded on December 18, 2007 and indicated that the search failed to indicate the presence of Native American sacred lands or traditional cultural properties within the

immediate project area (Appendix 6.4-B). Letters were mailed to each of the 12 NAHC-listed contacts on December 19, 2007.

Three Native American groups, the Morongo Band of Mission Indians, the Soboba Band of Luiseño Indians, and the Pechanga Band of Mission Indians, responded to the letter. None of the groups provided information regarding any specific cultural resources within the project area. Each tribe's response is summarized below and can also be found in Appendix 6.4-B.

The Morongo Band of Mission Indians responded via e-mail on December 26, 2007. The Morongo Band of Mission Indians stated that the Project is outside of the tribe's reservation boundaries, but does fall within the tribe's traditional use area. They further indicated that they have no information to provide regarding the proposed Project, but offered the following comments/desired conditions with regard to the proposed Project: (1) the Tribe recommends a cultural resource survey and archaeological site monitoring and at least one Native American monitor if Native American cultural resources (other than isolates) are found on the project site; (2) the Tribe requests that cultural resources are considered during project design; (3) the Tribe requests that the county coroner be contacted in the event that human remains are found during ground disturbances; (4) if cultural resources are found during ground disturbance, the Tribe requests that construction work halts in the vicinity of the find until a qualified archaeologist has had an opportunity to evaluate the find; and (5) if the cultural resource find is significant, the Tribe requests consultation with the project archaeologist.

The Soboba Band of Luiseño Indians responded via a letter dated January 2, 2008, which was received by SWCA on January 15, 2008. The letter acknowledged that the Project was outside of their reservation lands, but stated that it falls within the bounds of the Tribal Traditional Use Areas. They requested the following: (1) that Cultural Resource Monitors be present during any ground disturbing proceedings; and (2) government-to-government consultation.

The Pechanga Band of Mission Indians responded via e-mail on January 3, 2008 and later provided a hard copy letter via mail. The letter from the Pechanga Band of Mission Indians acknowledged that the Project is outside of their reservation lands, but stated that it is immediately outside the northernmost portion of their ancestral territory. The Pechanga Band of Mission Indians stated that they are not interested in commenting on the proposed Project; however, they would like to request (1) copies of all Project related archaeological reports and site records; and (2) government-to-government consultation with the Project Proponent and the CEC regarding the treatment and disposition of all artifacts.

6.4.3.7 Local Contacts

The following local historic associations, societies and specialists were contacted to obtain additional information available regarding cultural resources located within one mile of the project area:

- City of Riverside, Erin Gettis, Historic Preservation Officer, Planning Department (contacted in 2004)
- City of Riverside, Kimberly Johnson, Historic Preservation Office Staff (contacted on October 1, 2007 and January 4, 2008)
- County of Riverside, Cindy Thomack, Historic Preservation Officer (contacted in 2004)
- Riverside Public Library, William Swafford, City Librarian (contacted in 2004)
- Old Riverside Foundation (contacted in 2004)
- Riverside Historical Society (contacted in 2004)

Erin Gettis, Historic Preservation Officer at the City of Riverside Planning Department, was also contacted. Ms. Gettis suggested researching the City's Historic Resources Inventory Data Base on the City of Riverside Web site. The database may be searched by address, style, builder, name, type, etc., but it is not possible to search by street or area (see Maxon and Steely 2004 for a table of properties that were checked against the database. Of the 10 historic properties recorded as a result of 2004 literature review and pedestrian survey associated with RERC Units 1&2, only four properties (5746, 5868 and 5876 Jurupa Avenue and 6019 Florence Street) appear on the list. Neither the Riverside Regional Water Quality Control Plant, Martha McLean-Anza Narrows Park, Union Pacific Railroad Bridge, MWD Upper Feeder bridge, nor remnants of water ditches are listed as historic resources identified by the City. This information strengthens our contention that all properties older than 45 years and retaining sufficient historic integrity within 1 mile of the project boundaries were identified and recorded as a result of the survey. Kimberly Johnson stated that the database had not been updated since the original search in 2004.

Cindy Thomack at the County of Riverside searched her files in 2004 for evidence of cultural resources near the project area. According to Ms. Thomack a historic properties survey of parts of the County was undertaken in the early 1980s. The survey was accomplished mostly by volunteers under the supervision of a County historian. The record is incomplete, as properties were missed by the survey, and properties not old enough for listing at the time, may have now become eligible. No 1980s survey properties were within the project's APE.

William Swafford stated that he had no knowledge of significant historic properties near the project area. Calls to the Old Riverside Foundation and the Riverside Historical Society went unanswered. The Applicant is not aware of any significant cultural resources located within 1 mile of the project area that were not already identified as a result of the literature review previously undertaken at the EIC.

6.4.4 Methods

6.4.4.1 Field Survey

Project archaeologist Kip Harper and architectural historian Jim Steely conducted archaeological and architectural surveys of the project area on January 9, 2007 (Figure 6.4-5). The project area has been subjected to major ground disturbances related to the Tequesquite landfill project and the construction of RERC Units 1&2. Ground visibility was poor, less than 10 percent, for identifying archaeological resources in the project area as the ground surface was obscured by concrete paving, imported gravel, and landscaping. Ground visibility was poor in approximately 50 percent of the surrounding buffer area due to the presence of a paved parking lot along the eastern portion of the buffer as well as paved areas in the southern and southwestern portion of the buffer area. Ground visibility in the remaining 50 percent of the buffer area was approximately 80–95 percent and was only obscured by sparse native and nonnative vegetation. Disturbances in the buffer area included ground disturbance related to the Tequesquite landfill project, construction of existing buildings, streets, and paved parking lots.

The survey methods varied according to the conditions of the level of visibility and disturbances within the project area, the 200-foot buffer, and the one parcel area surrounding the project area (i.e., the Architectural APE). These areas were surveyed for prehistoric artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools), historic debris (e.g., metal, glass, ceramics), soil discoloration that might indicate the presence of a cultural midden, soil depressions and other features indicative of the former presence of structures or buildings (e.g., postholes, foundations), and for standing structures thought to potentially have historical significance under the pertinent laws.

A reconnaissance level survey was undertaken within the project area itself. As described earlier, the project area is heavily disturbed as a result of the construction activities associated with the RERC Units 1&2, is already well below ground surface, and was intensively surveyed as part of RERC Units 1&2. Ground visibility in the project area also was obscured by imported gravel and pavement associated with the RERC facility.

The portions of the project area buffer with ground visibility were intensively surveyed with transects spaced no greater than 15 meters. The intensively surveyed areas were in the northern, western and eastern portions of the 200-foot buffer (Figure 6.4-5). Ground visibility in parts of the 200-foot buffer was obscured by a paved car lot (east of project area), buildings and pavement (south of the project area, and roads (see Figure 6.4-5). These areas were surveyed at the reconnaissance level as well.

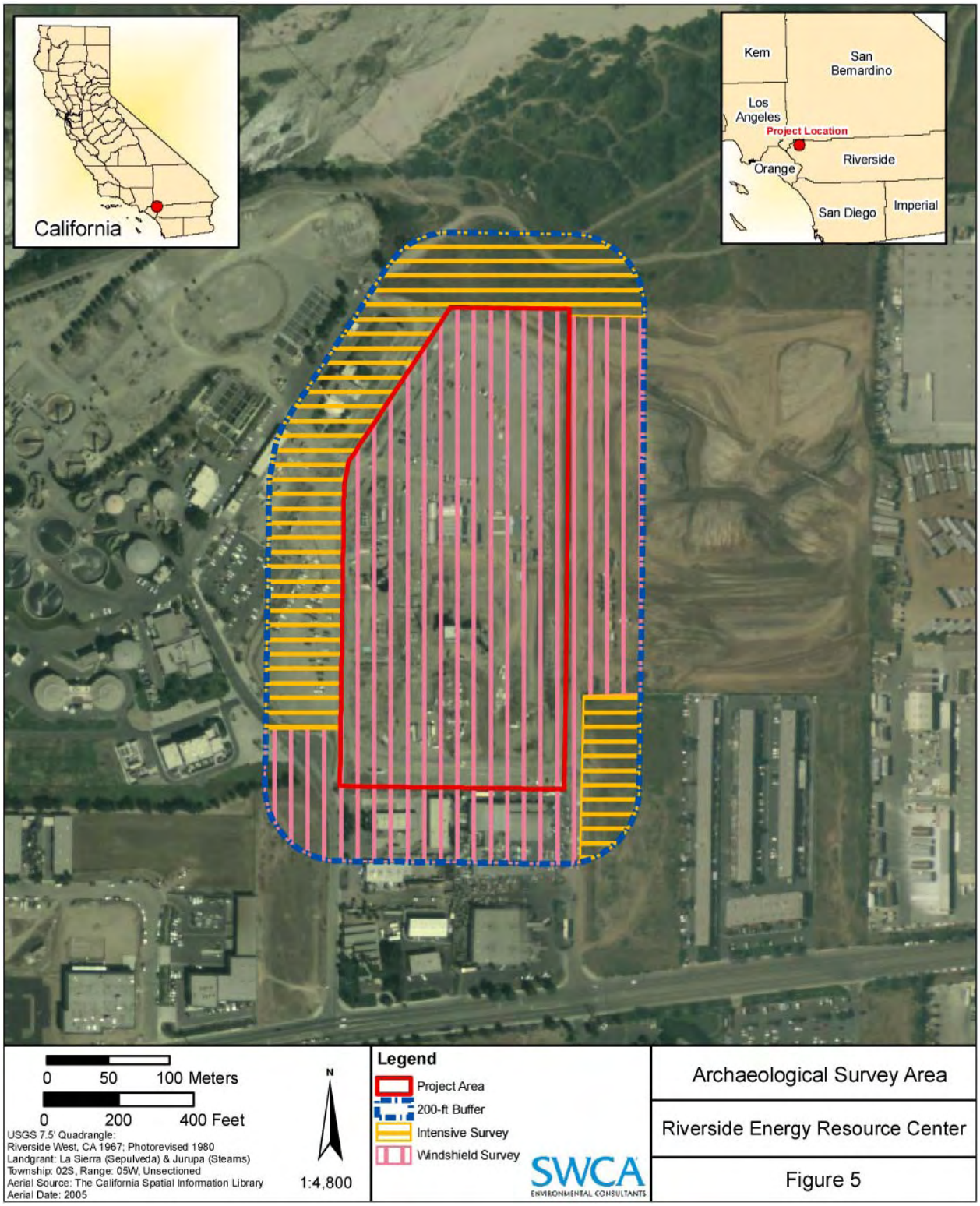


Figure 6.4-5 Archaeological Survey Area

Jim Steely and Kip Harper also conducted a reconnaissance survey of an area extending to a distance no less than one parcel away from the project area on January 9, 2007. Typically, a cultural resources reconnaissance includes examining the property for resources older than 45 years of age, and, if warranted, to formally record them using California Department of Parks and Recreation (DPR) 523 site recording forms. A more intensive survey was undertaken in parts of the adjacent Riverside Water Quality Control Plant (RRWQCP) property due to the presence of a known building older than 45 years of age. One historic building located at the adjacent Riverside Regional Water Quality Control Plant was recorded in 2004; the site records were updated as part of the current project.

6.4.5 Impacts

The literature review conducted at the Eastern Information Center, University of California, Riverside revealed that no known cultural resources have previously been recorded within the project area.

The archaeological survey was negative in the Archaeological APE for prehistoric or historic archaeological resources. The architectural survey did identify, however, one historic-age property in the Architectural APE: the 1942 Riverside Water Quality Control Plant (P-33-13252) which meets the criteria for the CRHR and the NRHP under 1/A for association with significant events (federal New Deal planning and infrastructure development in cooperation with state and local governments) and 3/C for significance of architectural design and engineering (wastewater infrastructure designed as a modern "Ranch Style" house with landscaped grounds. The buildings and associated structures of the facility were examined in 2004 and again in 2008 to confirm their integrity and verify their significance.

The Riverside Water Quality Control Plant is a significant surviving complex from the New Deal era (1933-1943) at the local level (Appendix 6.4-C). During the Great Depression in the 1930s and continuing through the beginning of World War II private and public construction declined to a fraction of its former activity in the 1920s national economic boom. To rectify the situation, President Franklin Roosevelt, beginning with his inauguration in 1933, developed his "New Deal" of economic and environmental programs to provide employment for as many as a third of the American workforce. The New Deal's Work Projects Administration (WPA) found particular popularity with local governments needing to update their water and wastewater systems in an era also marked by great advances in sanitation and conservation.

In the early 1940s Riverside experienced economic recovery from the Depression. With the promise of residential growth the City of Riverside opened its new wastewater treatment plant (RRWQCP), likely built with WPA assistance, just as World War II enveloped the United States and again halted most private construction. The RRWQCP allowed Riverside to address the mid-1940s strain on infrastructure brought by several wartime facilities in the area, then accommodated the city's role in California's postwar boom in housing and commercial development (Leighninger 2007). The RRWQCP's original main "Ranch House" office and mechanical building with associated garage,

landscaping, and treatment fields are remarkably intact. They would suffer no visual intrusion from RERC Units 3&4 since an industrial crowding trend around this resource began long ago with the periodic expansion of the wastewater plant itself. Thus, Project related impacts to the historic elements of the treatment plant would be less than significant. The architectural historian observed no other resources on the adjacent parcels that appeared to be 45 years of age or older.

6.4.5.1 Environmental Checklist

Table 6.4-3 provides the CEQA checklist questions that are used to assess the significance of potential impacts to cultural resources.

Table 6.4-3 CEQA Environmental Checklist – Cultural Resources

Cultural Resources **Would the Project:**	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less then Significant**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				X
c) Disturb any human remain, including those interred outside of formal cemeteries?				X

6.4.6 Mitigation

Due to the highly disturbed nature of the project area and lack of known archaeological resources in the project area, archaeological monitoring is not warranted for this Project.

Riverside Regional Water Quality Control Plant (P-33-13252)
The Riverside Regional Water Quality Control Plant, though eligible for the NRHP and CRHR as a significant surviving example of 1933-1943 New Deal public works (see above), will suffer no loss of integrity as a result of the Project. Thus, Project related impacts to the treatment plant would be less than significant, and no additional mitigation measures need be addressed as part of the proposed Project.

Human Remains
The discovery of human remains is always a possibility during ground disturbances; State of California Health and Safety Code Section 7050.5 covers these findings. This code section states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a Most Likely Descendent (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific

removal and nondestructive analysis of human remains and items associated with Native American burials.

6.4.7 References

Alexandrowicz, John Stephen

1999 *Cultural Resources Monitoring for the Tequesquite Landfill Well and Gasline Project, City of Riverside, County of Riverside, California* (Report No. RI-4451). Report on file, Eastern Information Center, University of California, Riverside.

Bean, Lowell John

1972 *Mukat's People: The Cahuilla Indians of Southern California*. University of California Press, Berkeley.

1978 Cahuilla. In *California,* edited by Robert F. Heizer, pp. 575-587. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

1990 *Ethnography of the Toro Canyon Cahuilla*. Prepared for George Berkey & Associates, Inc. Cultural Systems Research, Inc., Menlo Park, California.

Bean, Lowell John and Harry W. Lawton

1993 Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 27-54. Ballena Press, Menlo Park, California.

Bean, Lowell John and William B. Mason

1962 *The Romero Expeditions, 1823-1826*. Palm Springs Desert Museum, Palm Springs, California.

Bean, Lowell John and Katherine Siva Saubel

1972 *Temalpakh: Cahuilla Indian Knowledge and Usage of Plants*. Malki Museum Press, Morongo Indian Reservation, California.

Bean, Lowell John and Florence Shipek

1978 Luiseño. In *California,* edited by Robert F. Heizer, pp. 550-563. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John and Charles R. Smith

1978a Gabrielino. In *California,* edited by Robert F. Heizer, pp. 538-549. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

1978b Serrano. In *California,* edited by Robert F. Heizer, pp. 570-574. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John, Sylvia B. Vane, and Jackson Young
1991 The Cahuilla Landscape: The Santa Rosa and San Jacinto Mountains. *Ballena Press Anthropological Papers No. 37*. Ballena Press, Menlo Park, California.

Bettinger, Robert L.
1974 The Dead Dog Site (4-Riv-202). In *Perris Reservoir Archeology: Late Prehistoric Demographic Change in Southeast California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L. Mix, pp. 79-93. California Department of Parks and Recreation, Archaeological Reports 14.

Brown, Alan K. (Editor/Translator)
2001 *A Description of Distant Roads: Original Journals of the First Expedition into California, 1769-1770, by Juan Crespi*. San Diego State University Press, California.

California Energy Commission
2007 Rules of Practice and Procedure & Power Plant Site Certification Regulations: Siting Regulations, April 2007. California Energy Commission, 1516 Ninth Street,
Sacramento, CA 95814-5512

California Highways
2004 "Trails and Roads: De Anza Trail." Electronic documents, www.cahighways.org and http://www.pacificnet.net/~faigin/CA WYS/deanza.html, accessed 2 February 2004.

Campbell, Elizabeth W.C. and William H. Campbell
1935 The Pinto Basin Site: An Ancient Aboriginal Camping Ground in the California Desert. *Southwest Museum Papers* 9:1–51.

City of Riverside
2001 Treatment Facility History. Chronology of construction and expansion at the city's wastewater treatment plant, provided to the SWCA by Riverside employees Ernie Meloy and Karen Conner.

2004 History of Riverside. Electronic document, www.riversideca.gov/empire/history.htm, accessed 30 January 2004.

2007 Title 20 of the Municipal Code. Available at www.riversideca.gov/planning/historic.htm

Cottrell, Marie and Kathleen Del Chario
1981 *Archaeological Investigations of the Tomato Springs Sites*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Dale, Nancy
1985 *Flowering Plants: The Santa Monica Mountains, Coastal and Chaparral Regions of Southern California*. Capra Press, Santa Barbara, California.

de Barros, Philip
1996 *San Joaquin Hills Transportation Corridor: Results of Testing and Data recovery at CA-ORA-1357*. Report on file, South Central Coastal Information Center, California State University, Fullerton

Demcak, Carol R.
1981 Fused Shale As a Time Marker in Southern California: Review and Hypothesis. Unpublished Master's Thesis, Department of Anthropology, California State University, Long Beach.

Dillon, Brian D.
1995 *Archaeological Assessment of the Riverside Cogeneration Project on the Santa Ana River, Riverside County, California* (Report No. RI-3893). Report on file, Eastern Information Center, University of California, Riverside.

2002 California Paleo-Indians: Lack of Evidence, or Evidence of a Lack? In *Essays in California Archaeology: A Memorial to Franklin Fenenga*, edited by William J. Wallace and Francis A. Riddell, pp. 110–128. Contributions of the University of California Archaeological Research Facility, No. 60, Berkeley.

Dixon, E. James
1968 Cogged Stones and Other Ceremonial Cache Artifacts in Stratigraphic Context at ORA-58, a Site in the Lower Santa Ana River Drainage, Orange County. *Pacific Coast Archaeological Society Quarterly* 4(3):57-68.

Driver, Harold E.
1969 *Indians of North America*, 2nd Edition. University of Chicago Press, Chicago, Illinois.

Drover, Christopher E.
1971 Three Fired-Clay Figurines from 4-Ora-64, Orange County, California. *Pacific Coast Archaeological Society Quarterly* 7(4):73-86.

1975 Early Ceramics from Southern California. *The Journal of California Anthropology* 2(1):101-107.

Drover, Christopher E., Henry C. Koerper, and Paul E. Langenwalter II
1983 Early Holocene Adaptation on the Southern California Coast: A Summary Report of Investigations at the Irvine Site (CA-ORA-64), Newport Bay, Orange County, California. *Pacific Coast Archaeological Society Quarterly* 19(2 & 3):1-84.

Eberhart, Hal
1961 The Cogged Stones of Southern California. *American Antiquity* 26:361-370.

Erlandson, Jon M.
1991 Early Maritime Adaptations on the Northern Channel Islands. In *Hunter-Gatherers of Early Holocene Coastal California* edited by J. M. Erlandson and R. Colten. Perspectives in California Archaeology, Vol. 1. Institute of Archaeology, University of California, Los Angeles.

Erlandson, Jon M., Theodore Cooley, and Richard Carrico
1987 A Fluted Projectile Point Fragment from the Southern California Coast: Chronology and Context at CA-SBA-1951. *Journal of California and Great Basin Anthropology* 9:120-128.

Glassow, Michael A.
1997 Middle Holocene Cultural Development in the Central Santa Barbara Channel Region. In *Archaeology of the California Coast during the Middle Holocene*, edited by J. M. Erlandson and M. A. Glassow, pp.73-90. Perspectives in California Archaeology, Vol. 4. Institute of Archaeology, University of California, Los Angeles.

Glassow, Michael A, L. Wilcoxen, and J.M. Erlandson
1988 Cultural and Environmental Change during the Early Period of Santa Barbara Channel Prehistory. In *The Archaeology of Prehistoric Coastlines*, edited by G. Bailey and J. Parkington pp. 64–77. Cambridge University Press, Cambridge.

Governor's Office of Planning and Research
1998 CEQA, California Environmental Quality Act Statutes and Guidelines. Governor's Office of Planning and Research, Sacramento, California. http://ceres.ca.gov/ceqa/rev/approval.html.

Grenda, Donn R.
1995 *Prehistoric Game Monitoring on the Banks of Mill Creek: Data Recovery at CA-RIV-2804, Prado Basin, Riverside County, California.* Statistical Research Technical Series No. 52. Statistical Research, Inc., Tucson, Arizona.

1997 *Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore*. Statistical Research Technical Series No. 59. Statistical Research, Inc., Tucson, Arizona.

Grunsky, F. R.
1989 *Pathfinders of the Sacramento Region*. Elk Grove Library.

Hall, Matthew C.
1988 For the Record: Notes and Comments on "Obsidian Exchange in Prehistoric Orange County." *Pacific Coast Archaeological Society Quarterly* 24(4):34-48.

Hansen, Janet L. and Jennifer A. Mermilliod
2002 *Historic Property Survey Report for the Jurupa Avenue Railroad Underpass/ Mountain View Avenue Grade Crossing Closure Project*. Planning Department, City of Riverside, California.

Heizer, Robert F.
1978 Introduction. In *California*, edited by Robert F. Heizer, pp. 1-6. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Herring, Alika
1968 Surface Collections from ORA-83, A Cogged Stone Site at Bolsa Chica, Orange County, California. *Pacific Coast Archaeological Society Quarterly* 4(3):3-37.

Holland, R. F.
1986 *Preliminary descriptions of the terrestrial communities of California*. Nongame Heritage Program, California Department of Fish and Game.

Holland, V. L. and D. J. Keil
1995 *California Vegetation*. Kendall/Hunt Publishing Company, Dubuque, Iowa.

Johnson, J.R., T.W. Stafford, Jr., H.O. Ajie and D.P. Morris
2002 Arlington Springs Revisited. In *Proceedings of the Fifth California Islands Symposium*, edited by Browne, D., K. Mitchell and H. Chaney, pp. 541–545. USDI Minerals Management Service and The Santa Barbara Museum of Natural History, Santa Barbara, CA.

Jones, Terry L., Richard T. Fitzgerald, Douglas J. Kennett, Charles Miksicek, John L. Fagan, John Sharp, and Jon M. Erlandson
2002 The Cross Creek Site and Its Implications for New World Colonization. *American Antiquity* 67:213-230.

King, Chester
1993 Fuel Use and Resource Management: Implications for the Study of Land Management in Prehistoric California and Recommendations for a Research Program. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 279-298. Ballena Press, Menlo Park, California.

2003 *Japchibit Ethnohistory*. National Forest Service.

Koerper, Henry C.
1995 *The Christ College Project: Archaeological Investigations at CA-ORA-378, Turtle Rock, Irvine, California*, Volume II. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Koerper, Henry C. and Christopher E. Drover
1983 Chronology Building for Coastal Orange County: The Case from CA-ORA-119-A. *Pacific Coast Archaeological Society Quarterly* 19(2):1-34.

Koerper, Henry C., Roger D. Mason, and Mark L. Peterson
2002 Complexity, Demography, and Change in Late Holocene Orange County. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp. 63-81. Perspectives in California Archaeology Vol. 6. Costen Institute of Archaeology, University of California, Los Angeles.

Kowta, Makoto
1969 The Sayles Complex, A Late Milling Stone Assemblage from the Cajon Pass and the Ecological Implications of its Scraper Planes. *University of California Publications in Anthropology* 6:35-69. Berkeley, California.

Kroeber, Alfred J.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Dover Publications, Inc., New York.

Langenwalter, Paul E., II and James Brock
1985 *Phase II Archaeological Studies of the Prado Basin and the Lower Santa Ana River*. Report on file, U.S. Army Corps of Engineers, Los Angeles District.

Leighninger, Robert D. Jr.
2007 *Long-Range Public Investment: The Forgotten Legacy of the New Deal***.** University of South Carolina, Columbia, S.C.

Macko, Michael E.,
1998a *The Muddy Canyon Archaeological Project: Results of Phase II Test Excavations and Phase III Data Recovery Excavations at Archaeological Sites within the Crystal Cove Planned Community, Phase IV, Tentative Tract 15447, San Joaquin Hills, Orange County, California*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

1998b Neolithic Newport. In *Executive Summary: Results of Implementing Mitigation Measures Specified in the Operation Plan and Research Design for the Proposed Newporter North Residential Development at ORA-64*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger E., Brant A. Brechbiel, Mark L. Peterson, Clay A. Singer, Paul E. Langenwalter II, and Robert O. Gibson
1991 *Newport Coast Archaeological Project: Results of Data Recovery at the Late Small Rockshelters, CA-ORA-674, CA-ORA-677, CA-ORA-678, CA-ORA-1206, CA-ORA-1210, CA-ORA-676, CA-ORA-682, CA-ORA-679, and CA-ORA-1204*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger D., Brant A. Brechbiel, Clay A. Singer, Patricia A. Singer, Wayne H. Bonner, Robert O. Gibson, Mark L. Peterson, and Lisa Panet Klug
1992 *Newport Coast Archaeological Project: Results of Data Recovery at the French Flat Complex Sites, CA-ORA-232, CA-ORA-233, CA-ORA-671, CA-ORA-672, and CA-ORA-1205*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger D., Brant A. Brechbiel, Clay A. Singer, Mark L. Peterson, Linda Panet Klug, Wayne H. Bonner, Robert O. Gibson, and Patricia A. Singer
1993 *Newport Coast Archaeological Project: Results of Data Recovery at the Pelican Hills Sites, CA-ORA-662, CA-ORA-677, CA-ORA-678, CA-ORA-1206, CA-ORA-1210, CA-ORA-676 and CA-ORA-1203*, Volume 1. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger D. and Mark L. Peterson
1994 *Newport Coast Archaeological Project: Newport Coast Settlement Systems–Analysis and Discussion*, Volume 1, part 1 of 2. Prepared by The Keith Companies. On file, South Central Coastal Information Center, California State University, Fullerton.

Mason, Roger D., Henry C. Koerper, and Paul E. Lagenwalter II
1997 Middle Holocene adaptations on the Newport Coast of Orange County. In *Archaeology of the California Coast during the Middle Holocene*, edited by Jon M. Erlandson and Michael A. Glassow, pp. 35-60. UCLA Institute of Archaeology, Los Angeles.

Maxon, Patrick and James Steely
2004 *Cultural Resources Literature Review and Pedestrian Reconnaissance for the proposed Riverside Energy Resource Center, Riverside County, California* (Report No. RI-6492). Report on file, Eastern Information Center, University of California, Riverside.

Meighan, Clement W.
1954 A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10(2):215-227.

Mithun, Marianne
2001 *The Languages of Native North America*. Reprinted. Originally published 1999. Cambridge University Press, Cambridge, Massachusetts.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moriarty, James R., III
1966 Cultural phase divisions suggested by typological change coordinated with stratigraphically controlled radiocarbon dating in San Diego. *The Anthropological Journal of Canada* 4(4):20-30.

Morton, D.M. and Cox, B.F.
1994 Geologic map of the Riverside West 7.5' Quadrangle, Riverside County, California: United States Geological Survey Open-File Report 88-754.

2001 Geologic map of the Riverside West 7.5' Quadrangle, Riverside County, California, version 1.0: United States Geological Survey Open-File Report 01-451.

Morton, D.M. and Matti, J.C.
1989 A Vanished Late Pliocene to Early Pleistocene Alluvial-Fan Complex in the Northern Perris Block, Southern California. In *Conglomerates in Basin Analysis: A Symposium Dedicated to A.O. Woodford,* edited by I.P. Colburn, P.L. Abbott, and J. Minch, p. 73-80. Pacific Section S.E.P.M., Vol. 62,

Munz, P. A. and D. D. Keck
1968 *A California Flora with Supplement*. University of California Press, Berkeley.

National Park Service
1991 *Historic American Engineering Record*. HAER No. CA 123, HAER CAL 33-RIVSI.V.

O'Neil, Stephen
2001 *Ethnobotanical Research in the Bolsa Chica Region*. Prepared for Dr. Nancy Whitney-Desautels. Scientific Research Systems, Inc., Temecula, California.

Office of Historic Preservation
1990 *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format.* Department of Parks and Recreation, Office of Historic Preservation, Sacramento, California.

Peterson, Mark L.
2000 *Bonita Mesa Archaeological Project*. The Intermediate: A Non-Traditional Approach to a Revised Interpretation of Human Settlement Systems of the Newport Bay and San Joaquin Hills Region of Orange County, California. Volume I. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Reinman, Fred M.
1964 Maritime Adaptations on San Nicolas Island, California. *University of California Archaeological Survey Annual Report 1963-1964*:47-80.

Rick, Torben C., Jon M. Erlandson, and René Vellanoweth
2001 Paleocoastal Marine Fishing on the Pacific Coast of the Americas: Perspectives from Daisy Cave, California. *American Antiquity* 66:595-613.

Rogers, David B.
1929 *Prehistoric Man of the Santa Barbara Coast*. Santa Barbara Museum of Natural History, Santa Barbara, California. Edited by Richard F. Pourade. Union Tribune Publishing Company, San Diego.

Rogers, Malcom J.
1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. *San Diego Museum of Man Papers* 3.

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167-198.

Sawyer, J. O., and T. Keeler-Wolf
1995 *A Manual of California Vegetation*. California Native Plant Society, Sacramento.

Sawyer, William A.
2006 Report of Testing and Data Recovery at Sites within the Muddy Canyon Archaeological District, San Joaquin Hills, Orange County, California (provisional title). Report in progress, LSA Associates, Inc.

Sawyer, William A. and James Brock
1999 *Archaeology of Foothill Ranch, El Toro, California*. Report on file, South Central Coastal Information Center, California State University, Fullerton.

Sawyer, William A., and Henry C. Koerper
2006 The San Joaquin Hills Venus: A Ceramic Figurine from CA-ORA-1405-B. In *Contributions from Orange County Presented in Remembrance of John Peabody Harrington*, edited by Henry C. Koerper, pp. 13-34. *Coyote Press Archives of California Prehistory*, Number 53. Coyote Press, Salinas, California.

Shipley, William F.
1978 Native Languages of California. In *California*, edited by Robert F. Heizer, pp. 80-90. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Sikes, Nancy, Michael W. Tuma, and Kevin Hunt
2007 Cultural Resources Monitoring for the Riverside Energy Resource Center Project, City of Riverside, Riverside County, California. Report available from SWCA Environmental Consultants, 625 Fair Oaks Avenue, Suite 190, South Pasadena, California, 91030.

Sleeper, Jim
1982 *Jim Sleeper's Orange County Almanac of Historical Oddities. Being a County Report, plainly Related in such a Manner as to Revive many Matters hitherto considered of such little Consequence as to be Overlooked in Previous Compendiums, Together with such Facts, Names, Dates and similar Impedimentia, many of them wholly Accurate, which may Prove Useful if not Rewarding to the Prudent Reader*. OCUSA Press, Trabuco Canyon, California.

Strong, W. Duncan
1929 Aboriginal Society in Southern California. *University of California Publications in American Archaeology and Ethnology*, Vol. 26, No.1

Strudwick, Ivan H.
2004 The Use of Fired Clay Daub from CA-ORA-269 in the Identification of Prehistoric Dwelling Construction Methods, San Joaquin Hills, Orange County, California. Paper presented at the meeting of the Southern California Academy of Sciences, California State University, Long Beach, May 15, 2004.

Sutton, Mark Q.
1993 On the Subsistence Ecology of the "Late Inland Millingstone Horizon" in Southern California. *Journal of California and Great Basin Anthropology* 15(1):134-140.

Taşkiran, Ayşe
1997 Lithic Analysis. In *Hunting the Hunters: Archaeological Testing at CA-RIV-653 and CA-RIV-1098, Riverside County, California*, edited by Donn R. Grenda and Deborah W. Gray, pp. 41-53. Statistical Research Technical Series No. 65. Statistical Research, Inc., Tucson, Arizona.

Timbrook, Jan, John R. Johnson, and David D. Earle
1993 Vegetation Burning by the Chumash. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 117-150. Ballena Press, Menlo Park, California.

Towner, Ronald H., Keith B. Knoblock, and Alex V. Benitez
1997 Flaked and Ground Stone Analyses. In *Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore,* edited by Donn R. Grenda, pp. 167-248. Statistical Research Technical Series No. 59. Statistical Research, Inc., Tucson, Arizona.

True, Delbert L.
1958 An Early Complex in San Diego County, California. *American Antiquity* 23:255–263.

1993 Bedrock Milling Elements as Indicators of Subsistence and Settlement Patterns in Northern San Diego County, California. *Pacific Coast Archaeological Society Quarterly* 29(2):1–26.

Van Bueren, Thad M., L. Mark Raab, and Elizabeth Skinner
1986 *Archaeological Investigations at CA-RIV-2803 and –2804, Prado Flood Control Basin, California*. INFOTEC Research, Inc., Sonora, California. Submitted to the Army Corps of Engineers, Los Angeles District.

Van Bueren, Thad M., Susan K. Goldberg, Michael J. Moratto, Portia Lee, and Jerrel H. Sorrenson
1989 *Inventory and Evaluation of Cultural Resources: Bolsa Chica Mesa and Huntington Beach Mesa, Orange County, California*. Prepared by Infotech Research, Inc. Copies on file at the South Central Coastal Information Center, California State University, Fullerton.

Wallace, William
1955 Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11: 214-230.

1978 Post-Pleistocene Archaeology, 9000 to 2000 B.C. In *California*, edited by Robert F. Heizer, pp. 25-36. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Warren, Claude N.
1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32:233-236.

1968 Cultural Tradition and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States*, edited by Cynthia Irwin-Williams, pp. 1-14. Eastern New Mexico University Contributions in Anthropology No. 1. Portales.

Warren, Claude N. and D.L. True
1961 The San Dieguito Complex and its Place in California Prehistory. *Archaeological Survey Annual Report for 1960-1961*: 246-337. University of California, Los Angeles.

1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, with contributions by D.A. Fredrickson, C. Raven, and C. N. Warren, pp. 339-430. Academic Press, Orlando.

Wilke, Philip J.
1974 The Peppertree Site (4-Riv-463). In *Perris Reservoir Archeology: Late Prehistoric Demographic Changes in Southeastern California*, edited by James F. O'Connell, Philip J. Wilke, Thomas F. King, and Carol L.Mix, pp.49-63. California Department of Parks and Recreation Archeology Reports 14.

1978 Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California. *Contributions of the University of California Archaeological Research Facility* No. 38.

6.5 Geologic Resources and Hazards

6.5.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from RERC Units 3&4 will be exported outside of the City.

The RERC Units 3&4 project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to geologic resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified.

6.5.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. The RERC Units 3&4 Project will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. RERC Units 3&4 and will occupy approximately 2.2 of 16 acres. An additional 2 acres are reserved for construction laydown. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

The project will be designed and constructed to California Building Code (CBC) requirements for seismic zone 4. This should minimize any potential impacts from seismic ground shaking. Additionally, the Project shall be designed and constructed in accordance with the 2007 California Building Standards Code.

6.5.2 Laws, Ordinances, Regulations and Standards

LORS applicable to geologic resources and hazards are summarized in Table 6.5-1.

Table 6.5-1 Geologic Resources and Hazards

Jurisdiction	Authority	Administrative Agency	Compliance
State/Local	California Building Code (CBC), 2007	City of Riverside	Design criteria for structures regarding seismic design and load
State/Local	California Government Code, Section 530091	City of Riverside	Exempts project facilities for the generation and production of electrical energy by a local public agency from County and City building ordinances
Local	City of Riverside 2025 General Plan	City of Riverside	To the extent not exempted by Section 530091, the City shall require compliance with the Public Safety Element of the General Plan, Policies PS-1.1 and PS-1.2.

6.5.3 Setting

6.5.3.1 Regional Geology

The project area is located near the northern end of a large geomorphic province of southern California characterized by the presence of numerous small northwestern-trending mountain ranges and intervening plains and valleys, referred to in the geologic literature as the Peninsular Ranges geomorphic province. The nearest of these northwest-trending ranges of the Peninsular Ranges are the San Jacinto Mountains to the east, with the Santa Ana Mountains to the southwest. The Peninsular Ranges province abuts to the north against a series of east-west trending mountain ranges, which comprise the Transverse Ranges geomorphic province and extends southeastward into the Baja California peninsula. The east-west trending mountain ranges consist of the San Gabriel and San Bernardino Mountains to the north of the project area.

The intervening valley between the Santa Ana and San Jacinto Mountains is the Perris Plain, a mass of igneous rocks consisting of island-like hills of plutonic rocks surrounded by valleys filled with various ages of alluvium derived from erosion of the surrounding mountain ranges. The plutonic rocks of the Perris Plain consist predominately of tonalite, granodiorite and quartz diorite, with many similar igneous rock varieties and lesser amounts of metamorphic and volcanic rocks. Long term erosion of the Perris plain has resulted in the more resistant rock types elevated above the remaining elevation, and the infilling of these areas with various types and ages of alluvium. The Pedley Hills, approximately 1.9 kilometers (1.2 miles) north of the site, and the Jurupa Mountains,

approximately 5.6 kilometers (3.5 miles) north of the site, are an example of the more resistant bedrock composed of granodiorite and older metamorphic rocks.

The Perris plain is considered internally stable; however, it is bounded on the north, west and east by active faults. These are the Cucamonga fault on the north, the San Jacinto fault on the east, and the Whittier-Elsinore fault on the western margin of the plain.

The nearest known active earthquake fault in relation to the subject site is the San Jacinto fault located approximately 17.2 kilometers (10.7 miles) to the northeast. Approximately 7 kilometers (4.3 miles) north-northwest of the site is a linear cluster of small seismic events occurring along what is suspected to be a northeast trending fault. This fault has no known surface trace and is only suspected due to the seismicity and an elevation difference in groundwater levels noted on either side of this feature. Other faults in the region include the Whittier-Elsinore fault, the Cucamonga fault and the San Andreas Fault.

The geology of the site and surrounding region is mapped by Morton and Cox (2001). Refer to Figure 6.5-1 located at the end of this section.

6.5.3.2 Local Geology

Subsurface exploration and previous published literature indicate that igneous bedrock deposits underlie the subject site. A thin layer of fill materials occurs across portions of the site. These materials are described in further detail in the following sections.

6.5.3.3 Surficial Deposits

Fill: Fill materials exist across portions of the project site and are encountered to depths of approximately 1 to 5 feet below the existing ground surface (LOR Geotechnical Group, Inc., 2004). These fills primarily consist of dry, loose, light brown silty sand (LOR Geotechnical Group, Inc., 2008). These materials are the result of past grading activities at the site as well as site discing for weed abatement.

Bedrock: Bedrock occurs under the limited fill material or is exposed. This igneous bedrock exists to a maximum explored depth of approximately 36.5 feet below the existing ground surface based on the geologic investigation performed to support RERC Units 1&2 construction (LOR Geotechnical Group, Inc., 2004). The bedrock materials were noted to consist primarily of coarse-grained quartz diorite. These materials are slightly to moderately weathered at the surface and quickly became much less weathered with depth. Several areas of rooted and stockpile corestones, or “floaters”, were present prior to RERC Units 1&2 being constructed. It is possible that proposed grading and excavation activities to support RERC Units 3&4 construction would reveal additional rooted boulders or “floaters.” These materials are noted to be slightly weathered and very hard. These floaters are typically damp to moist and gray to speckled gray-white in color. Equivalent Standard Penetration Test data, in-place density test data and CPT data indicate that these units become hard to very hard beginning at a depth of approximately 0.75 to 1.5 feet. Refusal was experienced within three of 29 exploratory borings ranging from depths of approximately 11.5 to 33 feet beneath the existing ground surface. These borings occurred prior to RERC Units 1&2 construction.

6.5.3.4 Groundwater Hydrology

Perched groundwater was encountered within 15 of 29 exploratory borings at the site conducted prior to RERC Units 1&2 construction. Depths ranged from approximately 11 to 25.8 feet beneath the ground surface (LOR Geotechnical Group, Inc., 2004). This corresponds to elevations ranging from approximately 695.5 feet above mean sea level (msl) to 715 feet above msl. The groundwater levels recorded were at the time of the borings and were not monitored. Data indicates that the groundwater follows the regional topography and is generally to the north-northwest towards the Santa Ana River. No groundwater seepage was observed during site reconnaissance.

The City of Riverside Public Utilities, Water Department was contacted to establish the hydrologic conditions at the site. Riverside Public Utilities Water Department indicated they have no wells in the area of the project site. Questions on groundwater were referred to Western Municipal Water District, (WMWD), who also indicated they have no wells in the area of the site. WMWD also stated there is no true groundwater table at the site due to the shallow bedrock. Any groundwater encountered would be as infilling of cracks and fissures.

6.5.3.5 Mass Movement

The majority of the site is comprised of a relatively flat surface. Occurrence of mass movement failures such as landslides, rockfalls or debris flows within such areas are generally uncommon and no evidence of mass movement was observed inside the project area.

6.5.3.6 Faulting

No active or potentially active faults are known to exist at the subject site. In addition, the project area does not lie within a current State of California Earthquake Fault Zone (Hart, 1997).

The closest known active fault is the San Bernardino segment of the San Jacinto fault zone, located approximately 17.2 kilometers (10.7 miles) to the northeast. In addition, other relatively close active faults include the Whittier-Elsinore fault zone located approximately 18.8 kilometers (11.7 miles) to the southeast, the Cucamonga fault, located approximately 21.9 kilometers (13.6 miles) to the north, and the San Bernardino segment of the San Andreas Fault zone, and located approximately 28.2 kilometers (17.5 miles) to the northeast.

The San Jacinto fault zone is a sub-parallel branch of the San Andreas Fault zone, extending from the northwestern San Bernardino area south into the El Centro region. This fault has been active in recent times with several large-magnitude events. It is believed that the San Jacinto fault is capable of producing an earthquake magnitude on the order of 6.5 or greater.

The Whittier-Elsinore fault zone is one of the largest in southern California. At its northern end, it splays into two segments and, at its southern end, is cut by the Yuba Wells fault. The

primary sense of slip along the Elsinore fault is right lateral strike-slip. It is believed that the Elsinore fault zone is capable of producing an earthquake magnitude on the order of 6.5 to 7.5.

The Cucamonga fault is considered part of the Sierra Madre fault system, which marks the southern boundary of the San Gabriel Mountains. This is a north-dipping thrust fault, which is believed to be responsible for the uplift of the San Gabriel Mountains. It is believed that the Cucamonga fault is capable of producing an earthquake magnitude on the order of 7.0 or greater.

The San Andreas Fault is considered the major tectonic feature of California, separating the Pacific Plate and the North American Plate. While estimates vary, the San Andreas fault is generally thought to have an average slip rate on the order of 24 mm/yr and be capable of generating large-magnitude events on the order of 7.5 or greater.

Past standards of practice included a discussion of all potential earthquake sources within a 100-kilometer (62 mile) radius. While there are other large earthquake faults within a 100-kilometer (62 mile) radius of the site, none of these is considered as relevant to the site as the faults described above, due to their closer distance and larger anticipated magnitudes.

6.5.3.7 Historical Seismicity

To obtain a general perspective of the historical seismicity of the project area and surrounding region a search was conducted for historic seismic events at and around the area within various radii. This search was conducted utilizing the historical seismic search program by the Southern California Earthquake Data Center (SCEDC). This program conducts a search of seismic events logged by the Southern California Seismic Network (SCSN) within a specified radius and selected magnitudes, and then either plots the events with Google Maps or lists the events in spreadsheet format. Data from the SCSN is available through the Southern California Earthquake Center. At the time of our search, the database contained data from January 1, 1932 through December 14, 2007.

A search regarding the general seismicity of the region was conducted by selecting an epicenter map listing all events of magnitude 4.0 and greater recorded from 1932 through 2007 and within a 100 kilometer (62 mile) radius of the project site. The site lies within a relatively active region associated with the Elsinore and San Jacinto fault zones trending northwest to southeast. The results indicate there have been 419 recorded events within the 100 kilometer radius. The vast majority of those events were between magnitude 4 and 5. Of these events, the closest was between a magnitude 4 and 5 and was located approximately 9 miles northeast of the project site.

A search was also conducted in 2003 using a historical seismicity search program developed by EPI Software, inc., for the RERC Units 1&2 Project. Refer to Figure 6.5-2 located at the end of this section. This search regarding the micro seismicity of the area lying within a 15 kilometer (6.2 mile) radius of the site was examined by selecting an epicenter map listing events on the order of 0.0 and greater since 1978. In addition, only the “A” events or most accurate events were selected. Caltech indicates the accuracy of the “A” events to be approximately 1 km. The result of this search is a map that presents the seismic history around the project

area with much detail, not permitted on the larger map. The map is located at the end of this section. The reason for limiting the events to post-1978 on the detail map is to enhance the accuracy of the map. Events recorded prior to the mid-1970s are generally considered less accurate due to advancements in technology. The San Jacinto fault appears to be the source of numerous events. In addition to these events, there is a distinct band of very small seismic events trending northeast to southwest approximately 7 kilometers (4.3 miles) to the north-northwest of the project area. While this very wide band nearly 5 to 7 km (3 to 4 miles) is not known to be associated with any surface fault features, it may represent the far northwestern end of a buried fault believed to be associated with a groundwater barrier that lies to the north-northwest in the Fontana region.

6.5.4 Impacts

The historical seismicity of the site entails numerous small to medium magnitude earthquake events occurring around the project area. These events are predominately associated with the presence of the San Jacinto fault. Any future developments at the subject site should anticipate that moderate to large seismic events could occur in the vicinity of the project area.

Other secondary seismic hazards generally associated with severe ground shaking during an earthquake include liquefaction, seiches and tsunamis, earthquake induced flooding, landslides and rockfalls, and seismic-induced settlement.

Liquefaction: Liquefaction generally occurs during strong ground shaking within fine-grained loose sediments where the groundwater is usually less than 50-feet. As the project area is underlain at very shallow depths by hard to very hard, igneous bedrock the possibility of liquefaction at the project site is considered minimal.

Seiches/Tsunamis: The potential for the project area to be affected by a seiche or Tsunamis (earthquake generated wave) is considered nil due to absence of any large bodies of water near the project site.

Flooding (Water Storage Facility Failure): There is no large water storage facility (reservoir or impoundment) located on or near the site which could possibly rupture during an earthquake and affect the project site by flooding.

Seismically Induced Landsliding: Due to the low relief of the project area and surrounding region and presence of igneous bedrock, the potential for landslides to occur at the project site is considered nil.

Rockfalls: No large, exposed, loose or un-rooted boulders are present above the project area that would affect the integrity of the project site.

Seismically Induced Settlement: Settlement generally occurs within areas of loose, granular soils with relatively low density. Since the project area is underlain at very shallow depths by hard to very hard igneous bedrock, the potential for settlement is considered low,

however the earthwork operations during the development of the project area will most probably mitigate any such loose soil conditions.

Table 6.5-2 summarizes results of the CEQA Environmental Checklist for geology.

Table 6.5-2 CEQA Environmental Checklist for Geology

	Potentially Significant Impact	Less than Significant w/ Mitigation	Less than Significant	No Impact
Geology – Would the Project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving the following:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking.			X[1]	
iii) Seismic-related ground failure, including liquefaction.				X
iv) Landslides.				X
b) Result in substantial soil erosion?				X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse due to the loss of topsoil?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X

	Potentially Significant Impact	Less than Significant w/ Mitigation		No Impact
Mineral Resources - Would the Project:				
a) Result in the loss of availability of a locally important mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X

1- Due to the site's location, there is a high potential for strong to very strong ground shaking from an earthquake on a nearby fault. Measures given in this report and in the California Building Code should be strictly adhered to.

6.5.5 Permits Required

No permits that specifically address geologic resources and hazards were identified.

6.5.6 References

California Building Standards Commission, 2007, 2007 California Building Code Volume 2 of 2, 2007.

International Code Council, Inc., 2006, 2006 International Building Code Conference.

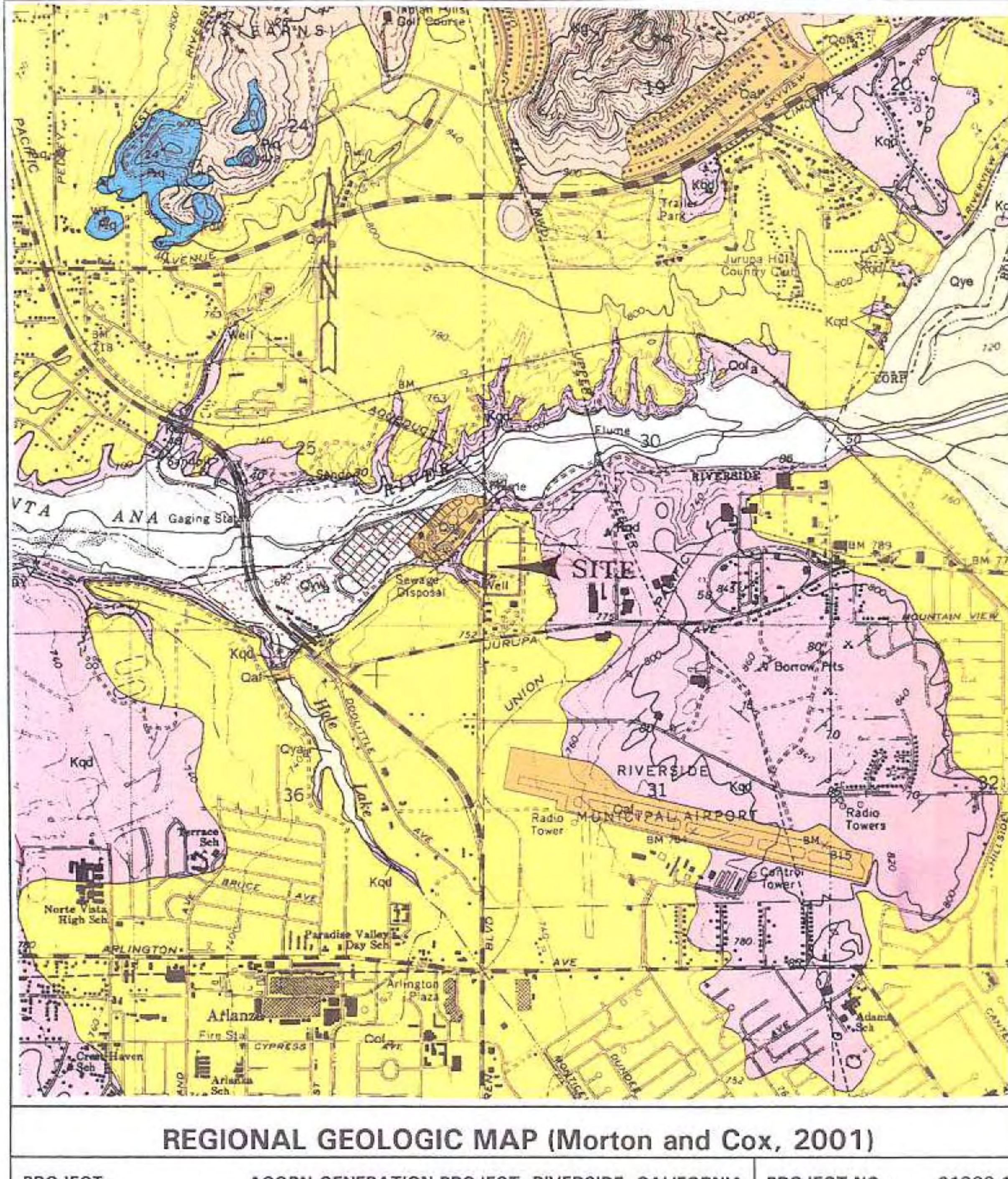
American Society of Civil Engineers, 2006, Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-05.

Hart, E.W. and W.A. Bryant, 1997, Fault-rupture hazard zones in California, California Department of Conservation Division of Mines and Geology Special Publication 42.

Morton, D.M. and Cox, B.F., 2001, Geologic Map of the Riverside West 7.5' Quadrangle, Riverside County, California, v. 1.0, Open File Report 01-451.

LOR Geotechnical Group, Inc. 2004. Geotechnical Investigation, Acorn Generation Project, Northern Terminus of Acorn Street, Riverside, California. Project No. 61833.1. Prepared for Powers Engineers, January 21, 2004.

LOR Geotechnical Group, Inc. 2008. Preliminary Geotechnical Review Report on the Existing Site Conditions, Riverside Energy Resource Center Expansion of RERC Units 3&4 Riverside, California. Project No. 61833.13. Prepared for Power Engineers on January 18, 2008.



REGIONAL GEOLOGIC MAP (Morton and Cox, 2001)

PROJECT:	ACORN GENERATION PROJECT, RIVERSIDE, CALIFORNIA	PROJECT NO.:	61833.1
CLIENT:	POWER ENGINEERS	ENCLOSURE:	A-3
LOR Geotechnical Group, Inc.		DATE:	JANUARY 2004
		SCALE:	1" = 2,000'

Figure 6.5-1 Regional Geologic Map

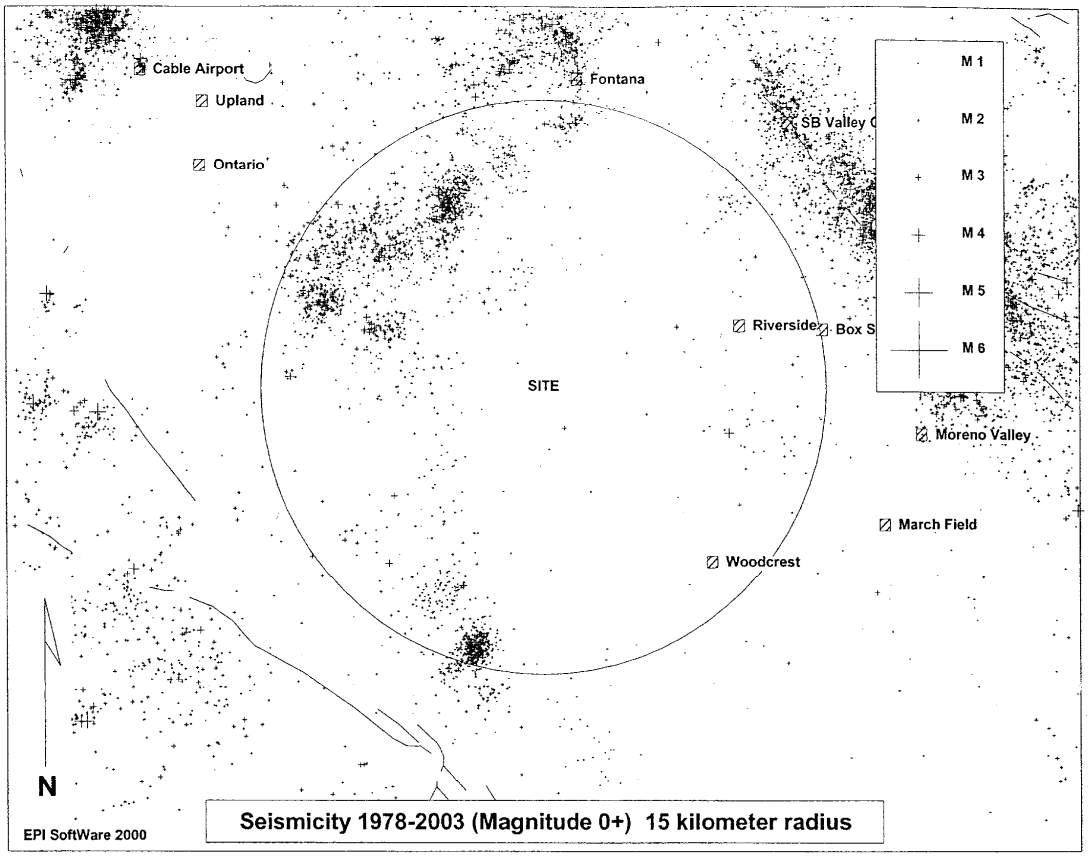
Qaf — **Artificial fill (late Holocene)**—Deposits of fill resulting from human construction or mining activities. Largest areas are in north-central part of quadrangle related to grading associated with residential development and airport runway construction

Qof — **Old alluvial fan deposits (late to middle Pleistocene)**—Indurated, to slightly indurated, sandy, alluvial fan deposits. Covers extensive areas north and south of Santa Ana River. Most of unit is slightly to moderately dissected and reddish-brown. Locally includes thin, discontinuous surface layer of Holocene alluvial fan material

Kqd — **Quartz diorite (Cretaceous)**—Medium- to coarse-grained biotite-hornblende quartz diorite. Most is slightly to well foliated and contains discoidal to pancake-shaped melanocratic inclusions in foliation plane. Grades into diorite and biotite-hornblende tonalite. Exposed extensively in La Sierra Heights area and around Riverside airport

DESCRIPTION OF GEOLOGIC UNITS (Morton and Cox, 2001)

PROJECT:	ACORN GENERATION PROJECT, RIVERSIDE, CALIFORNIA	PROJECT NO.:	61833.1
CLIENT:	POWER ENGINEERS	ENCLOSURE:	A-4
LOR Geotechnical Group, Inc.		DATE:	JANUARY 2004
		SCALE:	NO SCALE



SITE LOCATION: 33.9624 LAT. -117.45282 LONG.

MINIMUM LOCATION QUALITY: A

TOTAL # OF EVENTS ON PLOT: 11136

TOTAL # OF EVENTS WITHIN SEARCH RADIUS: 3077

MAGNITUDE DISTRIBUTION OF SEARCH RADIUS EVENTS:

0.0- .9 : 306
1.0- 1.9 : 2445
2.0- 2.9 : 311
3.0- 3.9 : 15
4.0- 4.9 : 0
5.0- 5.9 : 0
6.0- 6.9 : 0
7.0- 7.9 : 0
8.0- 8.9 : 0

0 7 15
KILOMETERS

CLOSEST EVENT: 1.5 ON WEDNESDAY, JULY 24, 2002 LOCATED APPROX. 1.8 KILOMETERS NORTHWEST OF THE SITE

LARGEST 5 EVENTS:

3.6 ON SATURDAY, JANUARY 30, 1999 LOCATED APPROX. 13 KILOMETERS NORTH OF THE SITE
3.5 ON TUESDAY, JANUARY 24, 1995 LOCATED APPROX. 10 KILOMETERS EAST OF THE SITE
3.4 ON SUNDAY, MARCH 25, 2001 LOCATED APPROX. 14 KILOMETERS NORTHWEST OF THE SITE
3.4 ON WEDNESDAY, JULY 27, 1994 LOCATED APPROX. 11 KILOMETERS NORTHWEST OF THE SITE
3.2 ON TUESDAY, JANUARY 20, 1998 LOCATED APPROX. 11 KILOMETERS SOUTHWEST OF THE SITE

Enclosure A-6

Figure 6.5-2 Seismicity – 1978-2003

6.6 Paleontological Resources

6.6.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the RERC will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to paleontological resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified.

This section also presents the findings of a comprehensive literature review, museum records search, and reconnaissance field survey conducted for the Project. This study was performed in order to evaluate the paleontological sensitivity of the project area and vicinity, assess potential project-related impacts on paleontological resources, and provide recommendations for the management of paleontological resources. This study was conducted in accordance with the professional guidelines established by the Society of Vertebrate Paleontology (SVP) (1995) and requirements set forth by the California Energy Commission (2000).

6.6.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. RERC Units 3&4 will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. RERC Units 3&4 will be located immediately north of RERC Units 1&2 and will occupy approximately 2.2 of 16 acres. An additional 2 acres are reserved for construction laydown.

The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls with landscaping, installed per City of Riverside standards. The plant has paved roads and parking areas which will be extended to include RERC Units 3&4 and the new Dispatch & Scheduling Building. RPU will pave the main power block area and remaining areas will be covered with crushed rock.

6.6.1.2 Definition and Significance of Paleontological Resources

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced. Fossils are an important scientific and educational resource because they are used to:

- Study the phylogenetic relationships between extinct organisms, as well as their relationships to modern groups.
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including biases in the fossil record.
- Reconstruct ancient environments, climate change, and paleoecological relationships.
- Provide a measure of relative geologic dating, which forms the basis for biochronology and biostratigraphy, and which is an independent and supporting line of evidence for isotopic dating.
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time.
- Study patterns and processes of evolution, extinction, and speciation.
- Identify past and potential future human-caused effects to global environments and climates.

6.6.2 Laws, Ordinances, Regulations, and Standards

Fossils are classified as nonrenewable scientific resources and are protected by various laws, ordinances, regulations, and standards (LORS) across the country. The SVP (1995) has established professional standards for the assessment and mitigation of adverse impacts to paleontological resources. This paleontological assessment was conducted in accordance with the LORS that are applicable to paleontological resources within the RERC Units 3&4 project area. These LORS are summarized in Table 6.6-1 and the following paragraphs.

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 *et seq.*; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federally administered lands. Federal protection for significant paleontological resources would apply to the Project if any construction or other related project impacts occurred on federally owned or managed lands. No federal protection of paleontological resources pertains to this Project.

With regard to paleontological resources, the CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA, Public Resources Code Sections 15000 et seq.). Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "*Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*"

Other state requirements for paleontological resources management are included in the Public Resources Code (Chapter 1.7), Section 5097.5 and 30244. These statutes prohibit the removal of any paleontological site or feature on public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state) lands. These protections would apply to the proposed Project only if the state or a state agency were to obtain ownership of project lands during the term of the project license.

Table 6.6-1 Summary of Paleontological Laws, Ordinances, Regulations, and Standards

Agency/Owner	Pertinent Paleontological LORS
Federal	None
State	CEQA
County	Riverside County General Plan
City	Riverside City 2025 General Plan

6.6.2.1 Professional Standards

The SVP has established standard guidelines (SVP, 1995) that outline professional protocols and practices for the conducting of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Typically, state regulatory agencies with paleontological LORS accept and utilize the professional standards set forth by the SVP.

As defined by the SVP (1995:26), significant nonrenewable paleontological resources are defined as:

"fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a

project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments."

As defined by the SVP (1995:26), significant fossiliferous deposits are defined as:

"A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years, BP [before present]."

Based on the significance definitions of the SVP (1995), all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from that for archaeological resources as follows:

"It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case" [SVP, 1995]

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

6.6.3 Resource Assessment Guidelines

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under federal (National Environmental Policy Act, or NEPA), state (California Environmental Quality Act, or CEQA), and local (City of Riverside and County of Riverside) laws and regulations. This study satisfies Project requirements in accordance with CEQA (13 PRC, 2100 et seq.) and Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the SVP (1995) and requirements set forth by the California Energy Commission (CEC) in Appendix B, Information Requirements for an Application of the CEC's Power Plant Site Certification Regulations (CEC, 2000).

6.6.3.1 Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources," the SVP (1995:23) defines three categories of paleontological sensitivity (potential) for sedimentary rock units: high, low, and undetermined:

- **High Potential.** Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontologic resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.

- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.

- **Undetermined Potential.** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

In addition to the three categories above**,** metamorphic and granitic rock units do not yield fossils and therefore have no potential to yield significant nonrenewable fossiliferous resources.

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within the study area.

6.6.4 Methods

Due to the nature of the fossil record, paleontologists cannot know either the quality or the quantity of fossils present in a given geologic unit prior to natural erosion or human-caused exposure. Therefore, in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce scientifically significant fossils elsewhere within the same geologic unit (both within and outside of the study area) or a unit representative of the same depositional environment.

6.6.4.1 Museum Records Search

The vertebrate paleontology section of the Natural History Museum of Los Angeles County (LACM) (McLeod, 2007) and the San Bernardino County Museum (SBCM) (Scott, 2008) performed detailed reviews of their museum collections records for the purposes of determining whether there are any known fossil localities in or near the RERC Units 3&4 project area, identifying the geologic units present, and determining the paleontological sensitivity ratings of those geologic units in order to assess potential impacts to nonrenewable paleontological resources. Published and unpublished literature and geologic maps were reviewed, and, if needed, mitigation measures specific to this Project would have been developed in accordance with the SVP's professional standards and guidelines (1995).

6.6.4.2 Field Survey

A reconnaissance survey of the RERC Units 3&4 project area was performed on January 9, 2008. The purpose of the fieldwork was to inspect the study area for surface fossils and exposures of potentially fossil-bearing geologic units and to determine areas in which fossil-bearing geologic units could be exposed during project-related ground disturbances.

6.6.5 Geology and Paleontology

6.6.5.1 Geologic Setting

California is naturally divided into the following twelve geomorphic provinces, each distinguished from one another by having unique topographic features and geologic formations: (1) the Sierra Nevada, (2) the Klamath Mountains, (3) the Cascade Range, (4) the Modoc Plateau, (5) the Basin and Range, (6) the Mojave Desert, (7) the Colorado

Desert, (8) the Peninsular Ranges, (9) the Transverse Ranges, (10) the Coast Ranges, (11) the Great Valley, and (12) the Offshore area. The RERC Units 3&4 project is located in the Peninsular Ranges geomorphic province in the northern-most portion of the Perris block.

The Peninsular Ranges province extends southeast from the latitude of Los Angeles-San Bernardino all the way to the tip of Baja California (Elders, 1971). This area is composed of a group of geologic blocks and faults that have both lateral and vertical slip components. The Perris block runs northwest-southeast through the Peninsular Ranges and is mirrored by the Santa Ana block to the west and the San Jacinto block to the east. The block is a relatively stable area bounded on the north by the Cucamonga fault zone and on the south by a series of sedimentary basins that lie between Temecula and Anza (Morton and Matti, 1989).

Approximately 90 to 120 million years ago, during the Cretaceous Period, a major episode of mountain building known as the Nevadan Orogeny caused the formation of massive granitic intrusions in what is today the Sierra Nevada Mountain Range. At about the same time, the granitic rocks of the Peninsular Ranges were also forming. Although similar in age and composition, the Peninsular granitics are generally less silicic and more calcic than typical Sierran granitics. The magma that fed the Peninsular and Sierran batholiths originated from the melting of crustal material during the subduction of the Pacific plate beneath the western edge of North America, similar to the current situation along the western coast of South America (Norris and Webb, 1990).

During the Miocene, about 25 to 29 million years ago, the Pacific plate became completely overridden by the North American plate. Tangential motion replaced convergent motion when the Pacific plate's mid-ocean ridge reached the subduction zone, and the ridge became a transform fault and shear boundary between the two plates (the San Andreas Fault). The Pacific plate is now moving northwest in relation to the North American plate, and it is believed that about 350 miles (560 km) of total displacement has occurred along the fault zone. The San Andreas plate boundary through California has been extensively studied but much is still unknown about the causes, timing, and triggering of major earthquakes along this boundary.

About 5 million years ago, the Sierra Nevada Mountain Range, the Coast Ranges, the Transverse Ranges, and the Peninsular Ranges began to be uplifted. Studies on the nature and distribution of clasts shed from the Transverse and Peninsular Ranges and deposited on the Perris block area suggest that the Peninsular Ranges were formed much further south of their present location and have been moved by the San Andreas Fault (Morton and Matti, 1989).

Across the Perris block are a wide variety of plutonic rocks that are part of the Peninsular Ranges Batholith, including tonalite, quartz diorite, granodiorite, granite, and sparse small bodies of gabbro and diorite (Morton and Cox, 2001; Morton and Kennedy, 1991). Alluvial deposition on top of and surrounding these granitic outcrops consists variously of sand, gravel and cobbles, and strongly eroded gravel and pebbly sand. The RERC

Units 3&4 project area is situated in this landscape of alluvial valley deposits amid elevated Cretaceous plutonic rocks. The project area, however, is underlain solely by artificial fill and quartz diorite, neither of which is paleontologically sensitive.

6.6.5.2 Site Specific Geology and Paleontology

According to published geologic mapping (Morton and Cox, 2001), the RERC Units 3&4 project area is underlain by Recent artificial fill, Quaternary alluvial fan deposits, and Cretaceous-aged plutonic igneous rock (Figure 6.6-1). However, geotechnical investigations indicate that the Quaternary alluvial fan deposits are no longer present within the project area as a result of previous grading activities (LOR Geotechnical Group, Inc., 2004). The absence of this unit was confirmed by the onsite paleontologist during the construction of RERC Units 1&2 (DeBusk and Corsetti, 2006). Refer to Table 6.6-2. These geologic units, and their paleontological resource potential, are discussed in more detail in the following paragraphs.

Recent Artificial Fill

The project area is partially underlain by artificial fill consisting of light brown silty sand (LOR Geotechnical Group, Inc., 2004) that is present at depths of up to 5 feet below the current grade (LOR Geotechnical Group, Inc., 2008). Artificial fill is the result of human construction and is not considered to be paleontologically sensitive.

Quaternary Older Alluvial Fan Deposits

As mapped by Morton and Cox (2001) (Figure 6.6-1), Quaternary older alluvial fan deposits were once present within the project area. These deposits locally consist of indurated, slightly to moderately dissected, reddish brown sand. Geotechnical studies performed by LOR Geotechnical Group, Inc. (2004) indicate that the bulk of the project area was previously graded down to expose igneous bedrock across most of the site and as a result, the Quaternary alluvial fan deposits are no longer present within the project area. This geologic unit was not observed during previous grading activities within the project area (DeBusk and Corsetti, 2006) or during the field survey, which is in concurrence with the results of the geotechnical investigation.

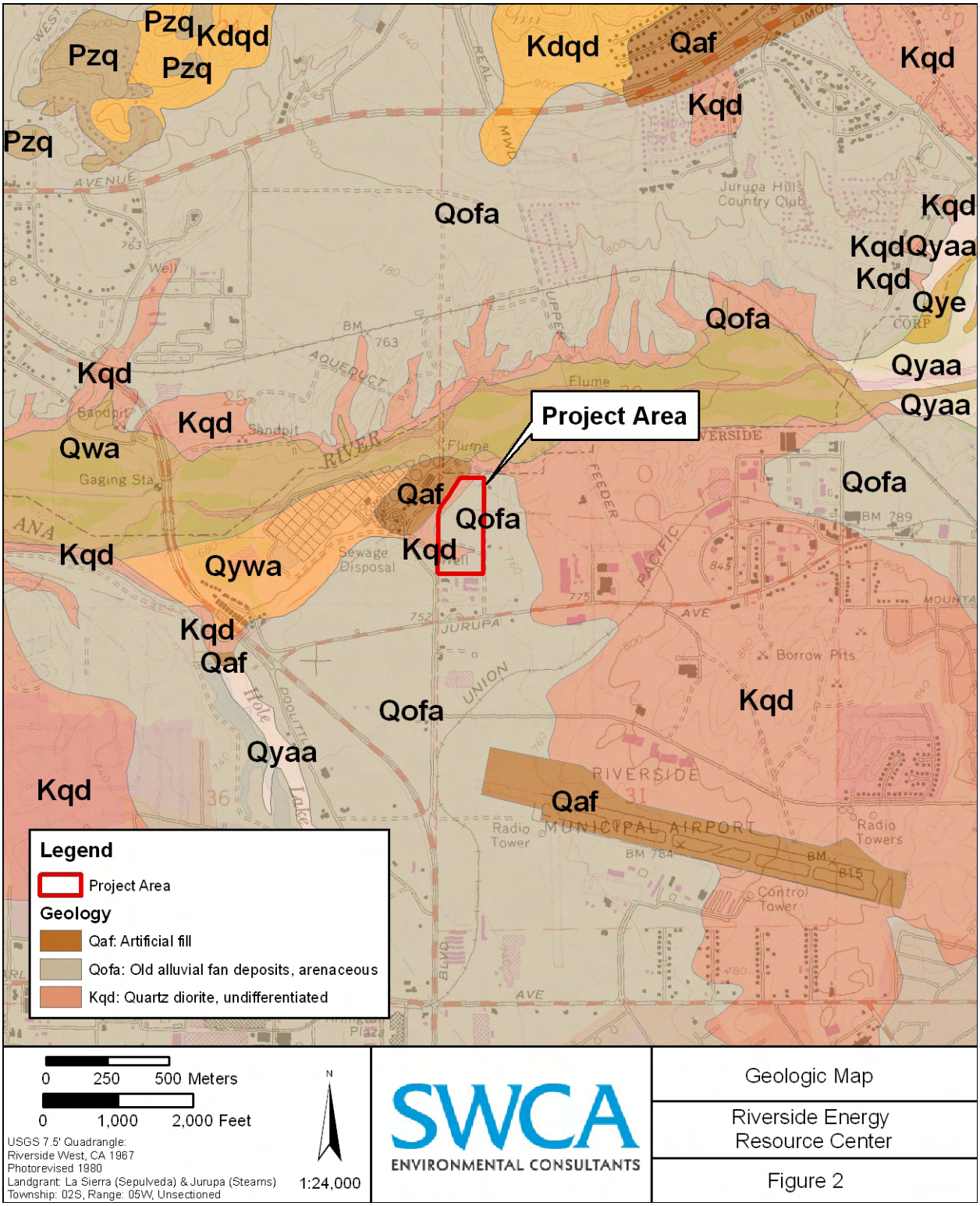
Cretaceous Quartz Diorite

Plutonic igneous rock of Cretaceous age underlies the entire project area. Exploratory borings conducted throughout the project site indicate the presence of igneous bedrock either at the surface or immediately beneath artificial fill (LOR Geotechnical Group, Inc. 2004). This geologic unit is composed of medium to coarse grained, slightly to well foliated, biotite hornblende quartz diorite. Plutonic igneous rocks do not contain paleontological resources and this geologic unit is not considered to be paleontologically sensitive.

Table 6.6-2 Geologic Units Underlying the Riverside Energy Resource Center Units 3&4 Project Area and their Paleontological Sensitivity Ratings

Geologic Unit	Age	Taxon	Paleontological Sensitivity Rating
Artificial Fill	Holocene	None	None
Quartz Diorite	Cretaceous	None	None

Figure 6.6-1 Geologic Map of Project Area



6.6.6 Analysis and Results

6.6.6.1 Museum Record Search

A comprehensive review of museum collections records at the Natural History Museum of Los Angeles County (LACM) and the San Bernardino County Museum (SBCM) confirmed that no fossil localities have been previously recorded within the RERC Units 3&4 project area or within 1 mile of the project boundary (McLeod, 2007; Scott, 2007). There is one known fossil vertebrate locality from somewhat nearby in sediments similar to the alluvial fan deposits found within the project area. A fossil deer, *Odocoileus*, was recovered from Quaternary alluvial deposits at LACM locality number 1207 in the northern part of the City of Corona, southwest of the proposed project area (McLeod, 2007).

Based on the literature review, field survey, geotechnical investigations and the results of the museum records search, a paleontological sensitivity map was developed for the project area (Figure 6.6-2).

6.6.6.2 Field Survey

A pedestrian reconnaissance survey of the project area was performed on January 9, 2008 in compliance with CEC and County of Riverside guidelines. During the field survey, the paleontologist noted the existing administration buildings, RERC Units 1&2, paved roads and parking areas, and equipment storage areas. The area immediately north of RERC Units 1&2, allotted for the development of RERC Units 3&4, was observed as flat and entirely covered by gravel (see Figures 6.6-3 and 6.6-4). No paleontological resources were observed during the survey.

6.6.6.3 RERC Units 1&2 Construction Experience

A paleontologist was onsite during excavation and grading operations related to the construction of the RERC Units 1&2 plant site and associated 69kV transmission line. The paleontologist reported that no paleontological resources were discovered and no paleontologically sensitive sediments were observed at the plant site (DeBusk and Corsetti, 2006).

Figure 6.6-2 Paleontological Sensitivity Map

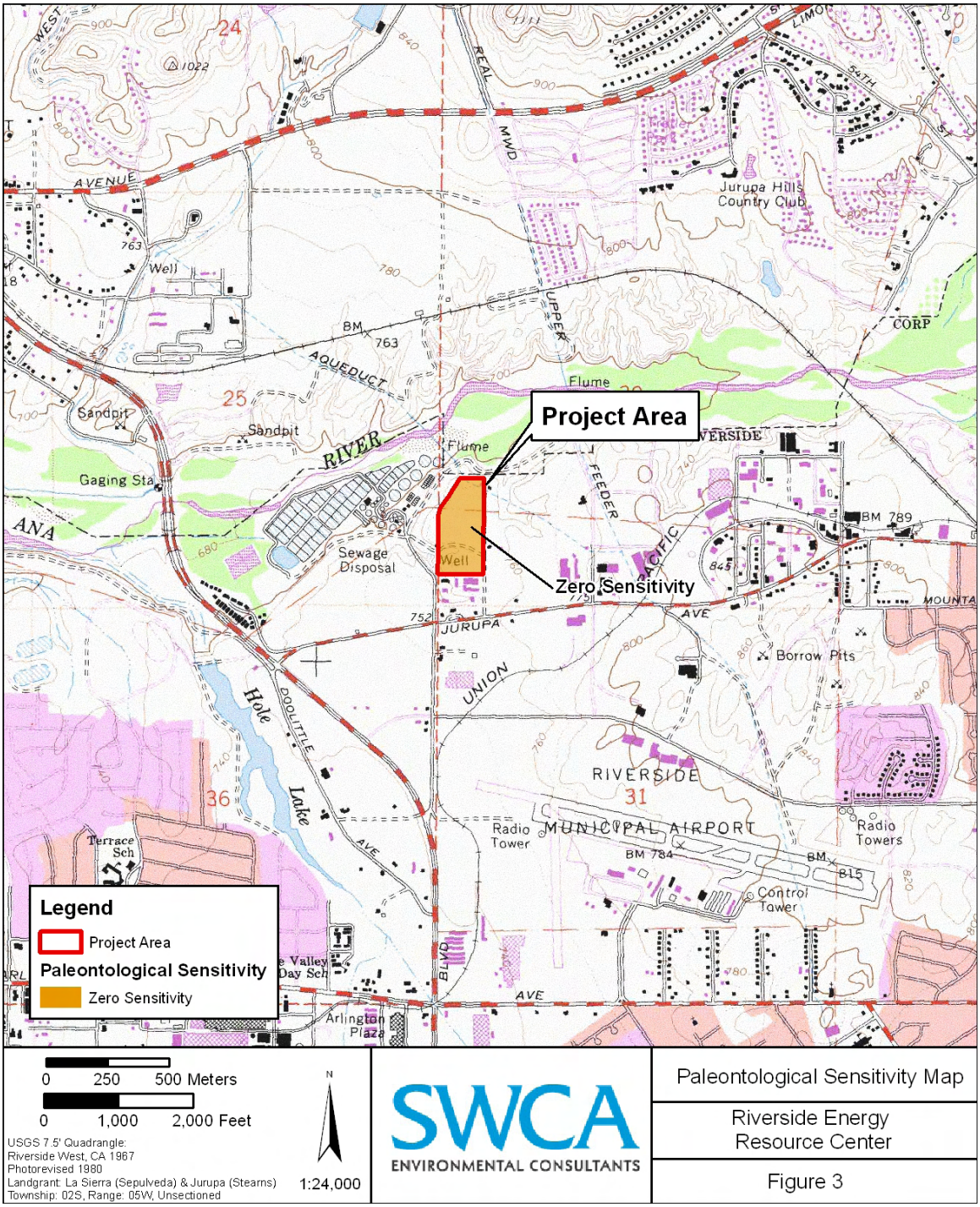


Figure 6.6-3 View of the southeastern portion of the RERC Units 3&4 project area, facing southwest. The existing structures in view are RERC Units 1&2.

Figure 6.6-4 View of the northern portion of the RERC complex, facing southwest. The gravel lot in view is the proposed location of RERC Units 3&4.

6.6.7 Impacts

The RERC Units 3&4 project site is underlain by Cretaceous-aged quartz diorite and artificial fill, neither of which is considered paleontologically sensitive. No impacts to paleontological resources are anticipated to occur as a result of the proposed development of the project area.

Table 6.6-3 is the CEQA Environmental Checklist for paleontological resources.

Table 6.6-3 CEQA Environmental Checklist – Paleontological Resources

Paleontological Resources – Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant	No Impact
a) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature				X

6.6.8 Mitigation Measures

Ground disturbing activities related to development within the RERC Units 3&4 project area are not likely to result in adverse impacts to significant paleontological resources. Thus, no paleontological mitigation is recommended.

6.6.9 References

California Energy Commission. 2000. Energy Facility Licensing Process: Developers Guide of Practices and Procedures. Staff Report, 67 p.

DeBusk, J. and Corsetti, C. 2006. Final Paleontological Monitoring Report for the Riverside Energy Resource Center, Riverside, Riverside County, California. Prepared by SWCA Environmental Consultants; Project Number 7468. Submitted to Powers Engineers, May 30, 2006.

Elders, W.A. 1971. Geologic Excursions in Southern California, Geological Society of America, Cordilleran Section Meeting, Riverside, California: University of California, Riverside, Campus Museum Contributions, no. 1.

LOR Geotechnical Group, Inc. 2004. Geotechnical Investigation, Acorn Generation Project, Northern Terminus of Acorn Street, Riverside, California. Project No. 61833.1. Prepared for Powers Engineers, January 21, 2004.

LOR Geotechnical Group, Inc. 2008. Preliminary Geotechnical Review Report on the Existing Site Conditions, Riverside Energy Resource Center Expansion of Units 3 and 4 Riverside, California. Project No. 61833.13. Prepared for Power Engineers on January 18, 2008.

McLeod, S. A. 2007. Unpublished paleontological specimen and locality data. Natural History Museum of Los Angeles County, Los Angeles, California, 2 p.

Morton, D. M. and Cox, B. F. 2001. Geologic Map of the Riverside West 7.5-Minute Quadrangle, Riverside County, California: U.S. Geological Survey Open-File Report 01-451.

Morton, D. M. and Kennedy, M. P. 1991. Geologic Map of the Bachelor Mountain 7.5-Minute Quadrangle, Riverside County, California: U.S. Geological Survey Open-File Report 03-103.

Morton, D. M., and Matti, J. C. 1989. A vanished late Pliocene to early Pleistocene alluvial-fan complex in the northern Perris block, Southern California.: In *Conglomerates in Basin Analysis: A Symposium Dedicated to A.O. Woodford*, edited by I. P. Colburn, P. L. Abbott, and J. Minch, Pacific Section S.E.P.M., Vol. 62, p. 73–80.

Norris, R. M. and Webb, R. W. 1990. *Geology of California*, second edition, John Wiley & Sons, New York, p. 277–300.

Scott, E., 2008. Unpublished paleontological specimen and locality data. San Bernardino County Museum, Redlands, California, 3 p.

Society of Vertebrate Paleontology (SVP). 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines. Society of Vertebrate Paleontology News Bulletin. v. 163, p. 22–27.

6.7 Noise

6.7.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate two additional simple cycle units at its Riverside Energy Resource Center (RERC) in the city of Riverside, California. The two new units, RERC Units 3&4, with a nominal generation capacity of 95 megawatts (MW), will be largely identical to the first two units and co-located with and to the north of RERC Units 1&2. The Project will interconnect to the City of Riverside's 69kV high voltage transmission system at the existing RERC Switchyard.

Potential noise impacts for the construction and operation of the existing RERC Units 1&2 facility were addressed in a previous Small Power Plant Exemption (CEC Docket Number: 04-SPPE-1) which assessed potential impacts using baseline ambient noise measurements obtained in 2004. The purpose of the current study is solely to address the potential impacts associated with the current Project (RERC Units 3&4). In order to provide a conservative analysis, operational noise levels were calculated based on the combined noise levels of all four units (proposed Project Units 3&4 plus existing Units 1&2) and the potential impacts assessed relative to the original 2004 baseline ambient noise measurements.

6.7.1.1 Overview of Project Components

The proposed project site is the existing RERC, owned by the City of Riverside, and located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. Existing RERC facilities include: two aero-derivative combustion turbine generators (RERC Units 1&2) with Emission Control Modules (ECMs), an on-site substation, natural gas and water supply interconnection, and on-site administration building and warehouse. The Project will consist of two additional aero-derivative combustion turbine generators (RERC Units 3&4) with ECMs, the addition of two more bays to the existing RERC switchyard, the addition of two more demineralized water storage tanks to the existing make-up water system, a new Dispatch and Scheduling Building for RPU, and a Water Laboratory. The plant will be used primarily for peaking generation needs and all power produced will stay entirely within RPU's system. The entire plant perimeter is fenced with a combination of chain-link fencing and architectural block walls.

The proposed site is generally flat, with a slight slope downhill from south to north. As indicated previously, the site is located within an industrial area. The nearest noise-sensitive receptors considered in this study include residential properties 2,870 feet north; 4,000 feet south; 4,100 feet east; and 4,130 feet southwest of the Project site. A kennel is located 500 feet south of the Project site; this property is also being used as a residence, and so must be considered as a noise-sensitive receptor even though it is a non-conforming use. The nearest park and school are located 3,320 feet and 3,600 feet north of the site, respectively. Other noise-sensitive locations include the nearest church, at a distance of 1,200 feet to the southeast, and a recreational trail located 790 feet northeast

of the site. This study also considers potential noise impacts at the nearest off-site offices, located 690 feet to the east, and at the nearest industrial properties located 330 feet east and 620 feet south of the Project site.

The Project will implement the following noise control measures in order to reduce noise related to construction and operation to acceptable levels:

- The construction contractor will comply with all federal and local regulations on truck and construction equipment noise. The contractor will ensure the use of functioning exhaust mufflers and engine silencers on all engine-driven equipment and avoid unnecessary equipment idling for long periods
- The use of noise-producing signals, including horns, whistles alarms and bells will be for safety warning purposes only.
- No construction-related public address loudspeaker, two-way radio or music system will be audible at any adjacent noise-sensitive land use.
- The construction contractor will implement a noise awareness program for construction workers and a noise complaint process for the surrounding community. The onsite construction supervisor will be authorized to receive noise complaints and will be responsible for their resolution
- Residences within ¾ mile of the site will be notified prior to the start of project construction
- If blasting is employed during construction, the blast target will be completely enveloped with rubber blast mats. The surrounding community will be notified of the date and time the blasting will occur.
- During project construction, at construction site locations where the noise level is above 85 dB(A), signs will be posted identifying them as high noise level areas, and hearing protection will be required. A hearing conservation program will be implemented as required by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) regulations.
- During project operations, at plant locations where the noise level is above 85 dB(A), signs will be posted identifying them as high noise level areas, and hearing protection will be required. A hearing conservation program will be implemented as required by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) regulations.

6.7.2 Acoustical Definitions

Sound pressure can be measured in units called microPascals (μPa). Expressing sound levels in terms of μPa would be very cumbersome since it would require a wide range of very large numbers. For this reason, sound pressure levels are described in logarithmic units of ratios of actual sound pressures to a reference pressure squared. These units are called bels. In order to provide a finer resolution, a bel is subdivided into 10 decibels, abbreviated dB.

Since decibels are logarithmic units, sound pressure levels cannot be added or subtracted by ordinary arithmetic means. For example, if one machine produces a sound pressure level of 70 dB, two machines running simultaneously would not produce 140 dB. In fact,

they would combine to produce 73 dB. This same principle can be applied to other quantities as well. In other words, doubling the number of machines will increase the noise level by 3 dB. Conversely, halving the number of machines will reduce the noise level by 3 dB.

Sound pressure level alone is not a reliable indicator of loudness. The frequency or pitch of a sound also has a substantial effect on how humans will respond. While the intensity of the sound is a purely physical quantity, the loudness or human response depends on the characteristics of the human ear.

Human hearing is limited not only to the range of audible frequencies, but also in the way it perceives the sound pressure level in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and perceives both higher and lower frequency sounds of the same magnitude with less intensity. In order to approximate the frequency response of the human ear, a series of sound pressure level adjustments is usually applied to the sound measured by a sound level meter. The adjustments, or weighting network, are frequency dependent.

The A-scale approximates the frequency response of the average young ear when listening to most ordinary everyday sounds. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. The A-weighted sound level of long-term noise-producing activities within and around a community varies considerably with time. Measurements of this varying noise level are accomplished by recording values of the A-weighted level during representative periods within a specified portion of the day. The values considered in this study are:

Leq: The energy equivalent (or average) sound level. This is the descriptor used by Riverside County to determine compliance with its regulations.

L10: This is the sound level exceeded 10% of the time during a measurement.

L50: The median sound level. This is the sound level exceeded 50% of the time during a measurement, and is the descriptor used by the City of Riverside to determine compliance with its regulations.

L90: This is the sound level exceeded 90% of the time during a measurement.

It is recognized that a given level of noise may be more or less tolerable depending on the duration of exposure experienced by an individual. There are numerous measures of noise exposure that consider not only the A-level variation of noise but also the duration of the disturbance. The State Department of Aeronautics and the California Commission on Housing and Community Development have adopted the community noise equivalent level (CNEL). This measure weights the average noise levels for the evening hours (7:00 p.m. to 10:00 p.m.), increasing them by 5 dB, and weights the late evening and morning hour noise levels (10:00 p.m. to 7:00 a.m.) by 10 dB. The daytime noise levels are

combined with these weighted levels and are averaged to obtain a CNEL value. Both the City and County of Riverside use the CNEL descriptor.

6.7.3 Ambient Noise Survey

In order to document the baseline ambient noise environment, measurements were obtained between March 15 and 19, 2004 at 16 locations throughout the study area. Figure 6.7-1 illustrates the measurement locations (located at the end of this section).

Long-term (25-hour) monitoring was conducted at three locations in the study area. At each location, noise levels were measured at microphone heights of 5' and 15' to correspond with ground floor and second floor receptors. The results of the long term measurements are provided in Appendix 6.7-A and are summarized in Table 6.7-1 at the end of this section. The monitoring location designated Long-Term 1 (LT-1) was in the rear yard of the residence at 6495 Thunder Bay Trail, representing the nearest residential community north of the Project site. Position LT-2 was in the rear yard of the residence at 8835 Alabama Street. This residence is located west of the Project site. Lastly, monitoring location LT-3 was located in the rear yard of the residence at 6401 Vickers Drive, which is southeast of the site. All long-term monitoring was conducted using Larson Davis Model 820 Type 1 community noise analyzers.

Short-term (20-minute duration) noise monitoring was conducted at 13 locations throughout the study area during random hours of the day. These attended measurements were obtained with a Type 2 Larson Davis Model 712 sound level meter. The results of the short-term measurements are provided in Appendix 6.7-A and are summarized in Table 6.7-2 at the end of this section.

All monitoring equipment used in the study was programmed for slow time response and the A-weighted decibel scale. To ensure accuracy, the equipment was calibrated before each measurement. The accuracy of the calibrator is maintained through a program established by the manufacturer, and is traceable to the National Bureau of Standards. All instrumentation meets the requirements of the American National Standards Institute (ANSI) S1.4-1971.

Weather conditions during the survey period were generally clear, with temperatures that ranged from 48º to 91º Fahrenheit. Relative humidity varied from 25% to 60%, and the average wind speed ranged from 0 to 9 mph. These conditions were conducive to accurate measurements. The weather observation notes, and data collected during each measurement, are included on the Noise Survey forms provided in Appendix 6.7-A.

Existing ambient noise in the study area is generated primarily by traffic on the local streets, operations on the Metrolink/Union Pacific rail line north of the Project site, flight activities from Riverside Municipal Airport, industrial activities, the Riverside Regional Water Quality Control Plant.

6.7.4 Recommended A-Weighted Sound Level Design Goals

The noise levels generated by the proposed Project will propagate to areas within both the City and County of Riverside. Therefore, the noise regulations and ordinances of these two jurisdictions must be considered when evaluating the potential impact of the Project.

Title 5 of the City of Riverside Municipal Code identifies the following noise standards for various land use categories shown in Table 6.7-3:

Table 6.7-3 Noise Standards, City of Riverside, California

Land Use	**Noise Level, L50**
Residential	45 dB(A), 10 pm to 7 am 55 dB(A), 7 am to 10 pm
Office/Commercial	65 dB(A), anytime
Industrial	70 dB(A), anytime

Construction noise is only subject to the above standards if it occurs on a weekday between 7 pm and 7 am, on a Saturday between 5 pm and 8 am, or at any time on a Sunday or a Federal holiday. The City's General Plan identifies noise/land use compatibility guidelines (not standards) of 60 dB CNEL for residential, school and church uses; 65 dB CNEL for parks; 67.5 dB CNEL for office, commercial and professional buildings; and 70 dB CNEL for industrial and manufacturing uses.

The Riverside County Department of Health specifies that project-generated noise, when experienced at a nearby dwelling or school, must not exceed an Leq of 65 dB(A) between 7 am and 10 pm or 45 dB(A) between 10 pm and 7 am. At residential properties the CNEL may not exceed 65 dB.

The California Energy Commission (CEC) regulations regarding new noise sources evaluate their impact on residential and recreational receptors with respect to an increase over pre-existing noise levels. The CEC defines the area potentially impacted by the Project as that area where there would be an increase of 5 dB or more above existing noise levels during either construction or operation. Based on the noise monitoring conducted in March 2004, the following CEC impact criteria thresholds in Table 6.7-4 can be established for the project:

Table 6.7-4 CEC Impact Criteria Thresholds

Location	CNEL		Leq	
	Measured Existing	CEC Threshold	Measured Existing	CEC Threshold
LT-1, nearest residence to the north	75 dB	80 dB	45 dB(A)	50 dB(A)
LT-2, nearest residence to the west	62 dB	67 dB	48 dB(A)	53 dB(A)
LT-3, nearest residence to the southeast	54 dB	59 dB	35 dB(A)	40 dB(A)
ST-5, recreational trail to the north	N/A	N/A	46 dB(A)	51 dB(A)
ST-13, kennel (nearest residence to the southeast)	N/A	N/A	63 dB(A)	68 dB(A)

The most stringent criteria will be used in this study to assess impact. These are:

1. For residential and school properties in Riverside County (i.e., north of the Project site), an Leq of 45 dB(A) or less, as required by the County's Department of Health.

2. At the recreational trail north of the Project site, an Leq of 51 dB(A) or less, which represents an increase of 5 dB(A) over existing levels, as required by the CEC.

3. At properties in the City of Riverside, the noise ordinance standards of 45 dB(A) or less for residential properties; 65 dB(A) or less for office, commercial and church properties; and 70 dB(A) or less for industrial properties.

6.7.5 Noise Prediction Modeling of Operational Noise

The preliminary plant design for RERC Units 3&4 by POWER Engineers includes a listing of each new piece of major equipment to be used at the site, as well as its location. Sound power levels for most of the equipment items were provided by vendors. The major noise sources associated with the Project are almost identical to those at the existing RERC Units 1&2 facility and are expected to include two General Electric LM6000 PC SPRINT packages with Emission Control Modules (ECMs), ammonia vaporization skids, chiller package, auxiliary cooling tower, fuel gas compressor skid, and tempering air fans. The CTG packages will include associated noise improvements such as silencers and enhanced enclosure walls. In addition, the chiller package will be enclosed and the fuel gas compressor skids will be partially enclosed with acoustical panels.

As discussed in Section 6.7.1, operational noise levels were calculated based on the combined noise levels of all four units (proposed RERC Units 3&4 plus existing RERC Units 1&2) in order to provide a worst-case analysis. Therefore, the major noise sources

associated with both the Project and the existing facility were included in the noise model. Multiples of the same equipment items were accounted for and added together to estimate the composite sound power level for all of the major equipment.

This composite level was applied to the acoustic center of the Project site and used in the prediction of far field noise levels. For receptors in the near field of the Project site (e.g., the recreational trail, the wastewater treatment plant offices and the industrial properties to the east and south), the noise level of each equipment item was predicted separately based on its actual location rather than the acoustic center of the site. The spectral sound power data used in the analysis, as well as the calculations, are provided in Appendix 6.7-A.

The formula used to calculate the sound pressure level (SPL) based on an equipment item's sound power level (PWL) and distance is as follows:

$$SPL = PWL - 20 \log(r) + 2.5 \text{ dB(A)},$$

where r is the distance between the equipment item and the receptor (in feet).

Additional propagation losses due to air absorption were considered using recognized procedures. Average meteorological conditions, specifically wind speed and direction, were also considered in the analysis to determine if they would have a significant impact on sound propagation. Depending on the direction the wind is traveling relative to the sound, it can greatly increase or decrease sound levels at a receptor's location. Based on long-term weather monitoring, the wind at the Project site is from the west about 50% of the year. Average speeds range from 2 to 6 mph. Recognized procedures indicate that wind, at these speeds, will have no impact on sound propagation. However, to provide a conservative analysis, sound attenuation due to ground absorption has not been considered in this study.

RPU is proceeding to install a dedicated black start capability for RERC Units 1&2. The black start diesel will not be connected to RERC Units 3&4. This change is being permitted through SCAQMD and the CEC will be involved in accordance with the RERC Units 1&2 SPPE Small Power Plant Exemption Decision facility modification notification requirements and the existing SCAQMD operating permit. Noise levels from the black start generator were not included in the noise model for the following reasons:

- The generator will be housed in a manufacturer-supplied sound attenuated enclosure. Based on manufacturer's noise data for an equivalent unit (exact procurement details for the black start generator have not yet been finalized) it is anticipated that the overall sound power level of the generator will be less than that of other noise sources at the facility including the CTG packages, ammonia evaporation skids, chiller package, auxiliary cooling tower, and fuel gas compressor skids.
- Under typical operating conditions the generator will be run for approximately 20 minutes per month for testing. Testing would take place during weekday daytime

hours when the operation would have the least impact on the surrounding noise-sensitive land uses.

- As discussed previously, aside from testing, the black start generator will be used only under emergency conditions to start the RERC Units 1&2 if there is no available power from the local grid to perform this function. Such black start events are infrequent. Based on RPU operating history, the October 2007 blackout of the City (which was related to wildfire events) was the first such occurrence in more than fifteen years. In the 100 year history of RPU, the City has only been blacked out on five occasions. If a black start condition were to occur, it is expected that the generator would operate for a few hours, starting initially to provide power to the Dispatch & Scheduling building so that system restoration efforts could be managed as well as keeping systems at RERC Units 1&2 energized to keep the units ready for operation and eventual start. Once one of the CTG units was operating at stable load, the black start diesel would be secured.

6.7.6 Environmental Consequences

6.7.6.1 Power Plant Operational Noise

The calculations provided in Appendix 6.7-A indicate that the normal operational noise level from the proposed power plant complies with the City and County of Riverside's noise standards, and with the CEC's noise impact criteria thresholds. Therefore, additional mitigation (beyond that already included in the project's design) is not required. Table 6.7-5, located at the end of this section, shows the predicted noise levels at the receptors considered in this study. A check mark in the table indicates that the noise level complies with the applicable standards.

Figure 6.7-2 illustrates the area where there is a potential increase of 5 dB or more over existing noise levels during normal plant operations (located at the end of this section). As Table 6.7-5 and Figure 6.7-2 indicate, there are no residences or recreational areas located within the noise impact area. Thus, no noise impact will be created by the Project.

In summary, the proposed Project, as designed, is expected to comply with local regulations, and is not expected to either increase ambient noise levels by 5 dB at a noise-sensitive receptor, or produce a significant impact.

6.7.6.2 Project Construction Noise

Construction of the power plant will occur over several months, and is scheduled to take place only on weekdays between 7 am and 7 pm, and Saturdays between 8 am and 5 pm. No construction will occur on Sundays or Federal holidays. Thus, Project construction will comply with the local regulations.

Based on the calculations provided in Appendix 6.7-B, it is estimated that the Leq at the nearest noise-sensitive receptors will be as indicated in Table 6.7-6:

Table 6.7-6 Estimated Leq at Nearest Noise-Sensitive Receptors

Location	Estimated Construction Noise Level	Measured Existing Ambient	Estimated Cumulative Noise Level	Increase
Residences north of site (LT-1)	53 dB(A)	57 dB(A)	58 dB(A)	1 dB
Residences west of site (LT-2)	48 dB(A)	50 dB(A)	52 dB(A)	2 dB
Residences east of site (LT-3)	43 dB(A)	48 dB(A)	49 dB(A)	1 dB
Recreational trail north of site	50 dB(A)[1]	46 dB(A)	51 dB(A)	5 dB
Kennel residence (ST-13)	51 dB(A)	63 dB(A)	63 dB(A)	0 dB

As indicated in Table 6.7-6 above, Project construction is expected to increase noise levels at the nearest sensitive receptors by 5 dB or less. Therefore, construction noise will not create a significant impact.

It is possible that some limited blasting may be required during the construction to remove some large boulders at the site. If this occurs, the construction noise levels will exceed the CEC threshold. This impact cannot be fully mitigated. However, noise control measures as described in Section 6.7.1.1 will significantly reduce the noise levels caused by the blasting.

6.7.6.3 Operation of Access Road

The Project site will be accessed via an existing paved section of Payton Avenue. Within the site, existing roads will be extended to provide access to the RERC Units 3&4 equipment areas. These roads will be used for worker access, and to move equipment and materials to the RERC site. Traffic associated with the Project will be minimal, and noise associated with the use of the roads will be insignificant at any noise-sensitive receptor. Therefore, operation of the access road will not create an impact.

6.7.7 Laws, Ordinances, Regulations, and Standards (LORS)

The proposed Project will comply with all applicable LORS pertaining to noise, as discussed in the following sections. Section 6.7.1.1 describes noise control measures for compliance with applicable LORS and/or to reduce potentially significant impacts to less-than-significant levels.

6.7.7.1 Federal

There are a number of federal laws and guidelines that address a broad range of noise and vibration issues, some of which are not directly related to the proposed Project. Several of the more significant documents are listed below:

- National Environmental Policy Act (42 United States Code [USC] 4321, et seq.) (Public Law 91-190) (40 Code of Regulations [CFR] Section 1506.5).
- Noise Control Act of 1972 (42 USC 4910).

[1] Includes barrier effect of slope on the north side of the site.

- The U. S. Environmental Protection Agency (EPA) recommendations from *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, NTIS 550\9-74-004, USEPA, Washington, D.C., March 1974.
- Federal Energy Regulatory Commission Guidelines on noise emissions from compressor stations, power plants, substations, and transmission lines (18 CFR 157.206[d] 5).
- Federal Highway Administration Noise Abatement Procedures (23 CFR Part 772).
- Housing and Urban Development Environmental Standards (24 CFR Part 51).
- OSHA Occupational Noise Exposure; Hearing Conservation Amendment (CFR 48 (46), 9738-9785 (1983)).

The EPA has not promulgated standards or regulations for environmental noise generated by power plants. However, as listed above, the EPA has published a guideline (EPA Levels Document, Report No. 556/9-74-664) containing recommendations that limit outdoor noise levels at residential properties to an Ldn of 55 dB. (Ldn, or day-night sound level, is a weighted average noise exposure similar to CNEL.) The recommendation for indoors is an Ldn of 45 dB. The agency is careful to stress that the recommendations do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

6.7.7.2 State of California

Cal-OSHA (8 California Code of Regulations, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Section 5095) requires that all in-plant noise levels be limited to 85 dB(A) at 3 feet from equipment sources to protect worker safety. If areas of the plant exceed 85 dB(A), then a hearing conservation program must be implemented by RPU.

There will be areas within the plant where the noise level exceeds 85 dB(A), but none of them will be normal employee work stations. Full-time operators and maintenance personnel will have only limited exposure to these high noise levels under normal circumstances. Signs will be posted requiring the use of hearing protection in areas where the noise level exceeds 85 dB(A).

The State of California (in CCR 65302f) requires local jurisdictions to prepare General Plans that include Land Use and Noise Elements. These Noise Elements must use the CNEL or Ldn noise descriptor to assess noise/land use compatibility.

The CEC (1997) requires that noise be considered when residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute, are located within the area impacted by the proposed Project. This is the area where the proposed Project may increase the existing noise levels by 5 dB or more during either construction or operation.

6.7.7.3 Local Noise Regulations

The Project is subject to the noise control policies of the City and County of Riverside. The noise levels generated by the Project must comply with the limits established for noise-sensitive uses within the respective jurisdiction.

Table 6.7-7 shows the results of the CEQA Environmental Checklist for noise.

Table 6.7-7 CEQA Environmental Checklist- Noise

Environmental Impacts	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
11. NOISE. *Would the project result in:*				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			**X**	
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			**X**	
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?			**X**	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Project?			**X**	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?				**X**
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**
g) Exceed an applicable LRDP or Program EIR standard of significance?				**X**

6.7.8 Agency Contacts

Agency	Contact/Title	Telephone
City of Riverside Planning Department 3900 Main Street, Third Floor Riverside, CA 92522	Ken Guiterrez	(909) 826-5371
County of Riverside Planning Department 4080 Lemon Street Riverside, CA 92502	Robert Johnson Planning Director	(909) 955-1800

6.7.9 Schedule of Other Required Permits/Approvals

No permits or additional approvals are required.

6.7.10 References

Beranek and Ver. 1992. *Noise and Vibration Control Engineering, Principles and Applications.* Wiley Interscience, New York.

Calderone and Garbin. 2001. Demolition Range Noise Abatement Technique Demonstration and Evaluation for the McAlester Army Ammunition Plant. Sandia National Laboratories Report SAND2001-2267.

California Energy Commission (CEC). 2000. Rules of Practice and Procedure, Power Plant Site Certification Regulations. February.

City of Riverside, General Plan, Section VII – Growth Management, Part D Noise Element.

City of Riverside, Municipal Code, Chapter 16.08, Building Code.

City of Riverside, Municipal Code, Title 7, Noise Control.

County of Riverside, Health Services Agency, Department of Public Health. 2002, Requirements for Determining and Mitigating Non Transportation Noise Source Impacts to Residential Properties. November.

County of Riverside, Health Services Agency, Department of Environmental Health. 1998. Requirements for Determining, and Mitigating, Traffic Noise Impacts to Residential Structures. November.

County of Riverside. *Noise Element of the General Plan,* Section E.

Electrical Energy Institute (EEI). 1983. Electric Power Plant Environmental Noise Guide, 2nd Edition, Revised.

Harris, Cyril M. 1991. Handbook of Acoustical Measurements and Noise Control. 3rd Edition. McGraw-Hill, Inc. New York.

Table 6.7-1 Long-Term Noise Level Summary, March 15-19, 2004

Site ID	Location	25 Hr. Leq, dB(A)	Ldn	CNEL	25 Hr. Average L90, dB(A)	25 Hr. Average L50, dB(A)	25 Hr. Average L10, dB(A)
LT-1	Rear yard of residence at 6495 Thunder Bay Trail (north of site)	60 / 68	67 / 75	67 / 75	42 / 46	45 / 49	55 / 61
LT-2	Rear yard of residence at 8838 Alabama Street (west of site)	54 / 57	59 / 62	59 / 62	45 / 48	49 / 51	56 / 57
LT-3	Rear yard of residence at 6401 Vickers Drive (east of site)	48 / 51	50 / 53	50 / 54	42 / 45	44 / 48	49 / 53

Legend: 1st floor / 2nd floor

Table 6.7-2 Short-Term Noise Measurements, March 16-17, 2004

Site ID	Measurement Location	Measurement Period				Measurement Results, dB(A)					
		Date	Start Time	Duration (min)	Predominant Noise Sources	Leq	Lmax	Lmin	L90	L50	L10
ST-1	Clay Park	3/16/04	10:22	21	Traffic, aircraft, trains, birds, dogs	56	73	76	48	51	59
ST-2	Indian Hill School	3/17/04	10:15	22	Traffic, children	48	68	37	39	42	50
ST-3	Residence at 7982 Claudette Dr.	3/16/04	9:01	21	Industrial, traffic, train, aircraft, birds	61	79	46	48	51	59
ST-4	Residence at 6465 Avenue Juan Diaz	3/17/04	18:06	20	Traffic, aircraft, dogs, trains, birds	57	81	42	43	46	53
ST-5	Recreational trail	3/17/04	14:12	20	Industrial, aircraft, trains, birds	46	61	38	40	42	47
ST-6	Administrative offices at water treatment plant	3/16/04	12:17	20	Industrial, trains	55	65	50	52	54	58
ST-7	Maaco, 5925 Payton	3/16/04	13:04	20	Industrial, train, aircraft	61	76	52	54	58	65
ST-8	Industry, 7171 Jurupa, Unit 30	3/16/04	13:38	21	Industrial, aircraft, dogs	58	71	47	51	56	60
ST-9	Church, 7110 Jurupa, Unit 5	3/16/04	14:19	20	Industrial, aircraft, radio	59	81	50	52	55	59
ST-10	Residence, 6344 Jurupa	3/17/04	17:02	20	Traffic	70	84	51	60	68	73
ST-11	Residence, 6896 Palos	3/17/04	11:14	20	Traffic, aircraft	45	57	38	40	43	48
ST-12	Residence, 6711 Doolittle	3/17/04	15:01	16	Traffic, aircraft	59	79	44	47	50	55
ST-13	Hidden Valley Kennel	3/17/04	13:15	20	Traffic, dogs	63	78	50	53	58	66

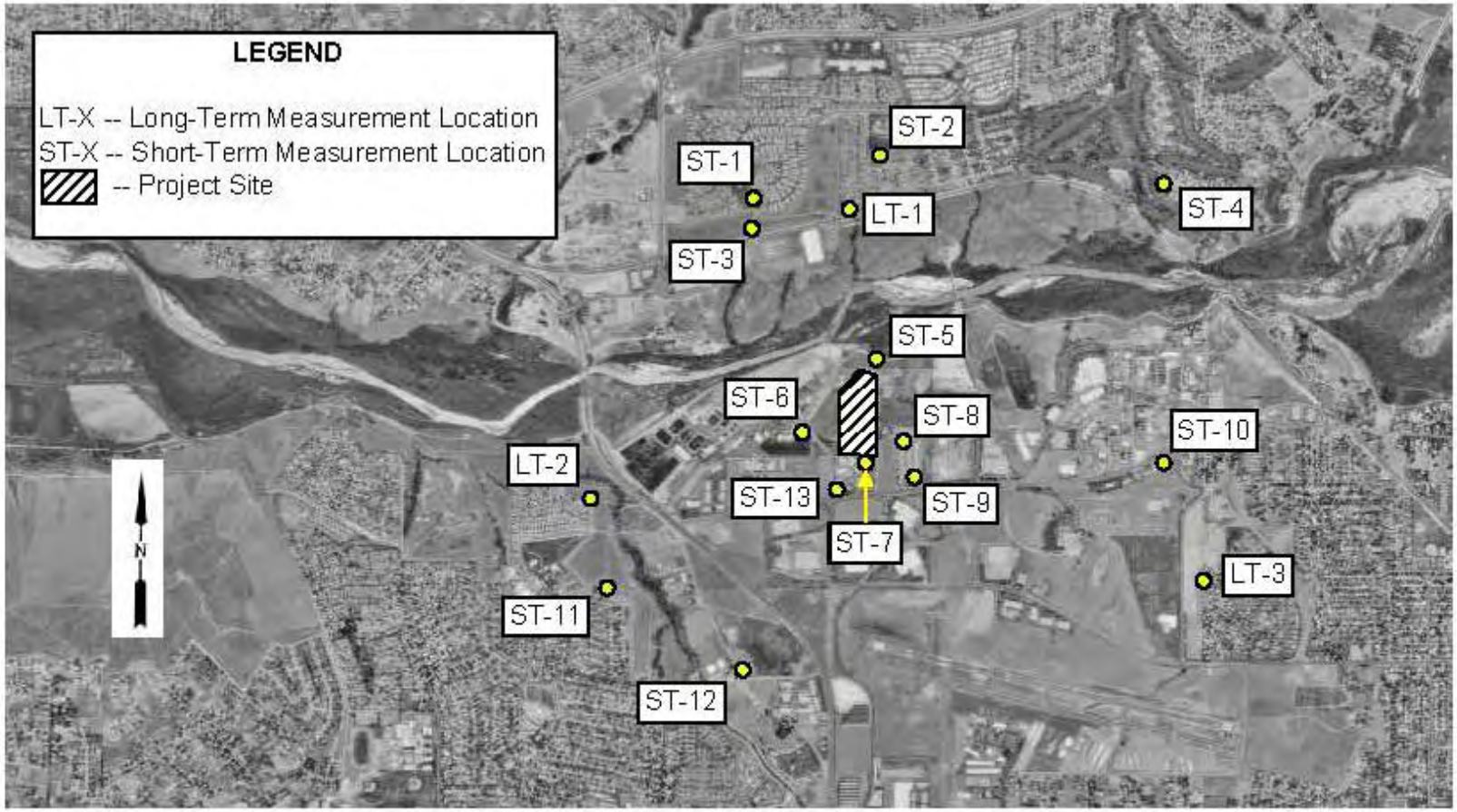
Table 6.7-5 Compliance with Noise Standards (✓ = Satisfied)

Location	City of Riverside	County of Riverside	CEC
LT-1	N/A	45 / 45 dB(A) ✓	✓ by 2 dB
LT-2	41 / 45 dB(A) ✓	N/A	✓ by 4 dB
LT-3	35 / 45 dB(A) ✓	N/A	✓ by 2 dB
ST-1	N/A	N/A	✓ by 4 dB
ST-2	N/A	35 / 45 dB(A) ✓	✓ by 5 dB
ST-3	N/A	45 / 45 dB(A) ✓	✓ by 2 dB
ST-4	39 / 45 dB(A) ✓	N/A	✓ by 4 dB
ST-5	N/A	N/A	✓ by 2 dB
ST-6	60 / 65 dB(A) ✓	N/A	N/A
ST-7	48 / 70 dB(A) ✓	N/A	N/A
ST-8	55 / 70 dB(A) ✓	N/A	N/A
ST-9	42 / 65 dB(A) ✓	N/A	✓ by 5 dB
ST-10	39 / 45 dB(A) ✓	N/A	✓ by 5 dB
ST-11	41 / 45 dB(A) ✓	N/A	✓ by 4 dB
ST-12	40 / 45 dB(A) ✓	N/A	✓ by 5 dB
ST-13	45 / 45 dB(A) ✓	N/A	✓ by 5 dB

Legend: Estimated Project noise level / standard

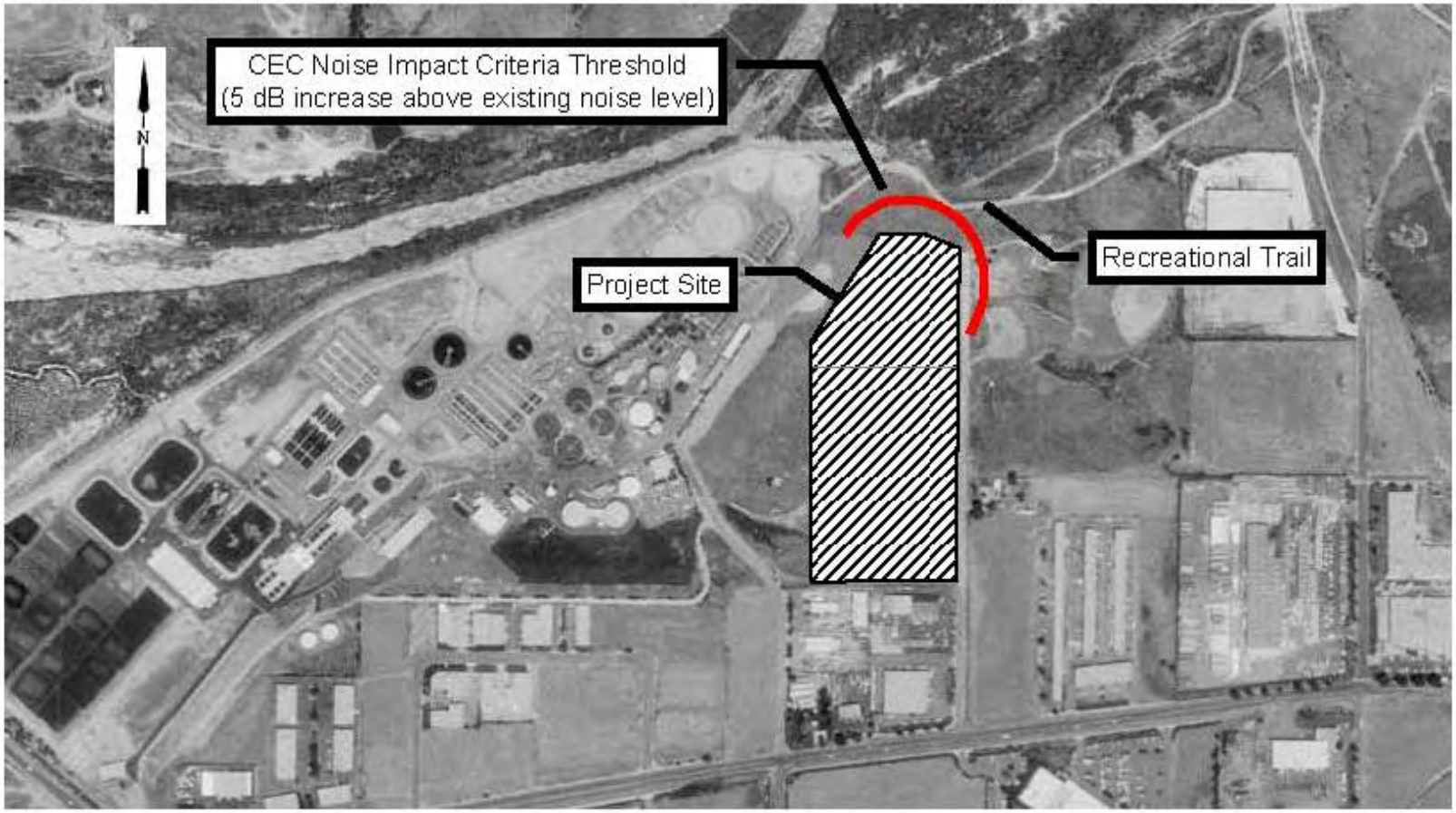
N/A: Not applicable

Figure 6.7-1 Noise Measurement Locations



WIELAND ASSOCIATES, INC.	Noise Measurement Locations	6.7-1

Figure 6.7-2 Site Vicinity Map with Noise Contour



WIELAND ASSOCIATES, INC.	Site Vicinity Map with Noise Contour	6.7-2

6.8 Public Health and Safety

6.8.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from RERC Units 3&4 will be exported outside of the City.

The RERC Units 3&4 project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to public health related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified.

There are three components of health and safety that overlap with air quality management. The first component, which is summarized in Section 6.8.3, includes an identification of health risks that may be attributed to accidental releases of ammonia (NH3) from the existing on-site storage tank. The second component, which is summarized in Section 6.8.4, includes health risks that may be attributed to construction emissions, specifically emissions from diesel-fueled construction equipment. The third component, which is summarized in Section 6.8.5, includes health risks that may be attributed to the operation of the proposed gas turbines and cooling tower, once they are constructed. Section 6.8.7 includes a summary of conclusions and findings relative to the significance of health and safety impacts resulting from the Project. Section 6.8.6 includes a list of references.

6.8.1.1 Project Description

The project site is owned by RPU and is located adjacent to the RERC Units 1&2 that were constructed in 2006. The facility is on the north side of Jurupa Avenue along Payton Avenue. The proposed Project will consist of two additional aero-derivative combustion turbine generators with Emission Control Modules (ECM), mechanical chillers for turbine inlet air cooling, a shared cooling tower, electrical equipment, and on-site ancillary buildings. RERC Units 3&4 will occupy approximately 2.2 acres. An additional 2 acres are reserved for construction laydown.

The area surrounding the RERC Units 3&4 project site is a mix of commercial, light industrial and rural land uses. A survey was conducted to determine the location of any nearby sensitive receptors. Several residential tracks are located in the project area, the nearest being approximately 3,000 feet to the north of the Project across the Santa Ana River. A single residence is also located approximately 1000 feet south of the Project. No

schools or other categories of sensitive receptors were found within 3,000 feet of the Project. Appendices 6.8-B and 6.8-C include maps showing those sensitive receptors that are located nearest to the facility and that are included as discrete receptor locations in the health risk assessment for the Project.

Various measures will be implemented to reduce environmental impacts from construction activities. Contractors will be required to utilize certified nonroad engines in construction equipment to the extent practical. Utilization of nonroad engines will reduce NO_X emissions, which will aid in reducing the formation of NO_2 and ozone. Ultra-low sulfur fuel will be used to fuel construction equipment. This will help to minimize diesel particulate emissions and related health impacts. The use of certified engines, combined with the use of ultra-low sulfur fuel will also reduce emissions of diesel particulate matter,

Technology will also be implemented to reduce emissions during RERC Units 3&4 operations. The combustion turbines will burn natural gas to reduce emissions of both criteria and toxic pollutants. State-of-art combustion technology will also promote fuel efficiency and reduce emission rates of various pollutants. Selective catalytic reduction technology will be installed to further reduce NO_X emissions that contribute to NO_2 and ozone formation. Oxidization catalysts will be installed to reduce CO emissions from the combustion turbines. The oxidization catalysts will also reduce emissions of toxic organic compounds and also of ozone-forming reactive organic compounds. Makeup water used in the cooling tower will be treated to remove minerals that could otherwise become airborne. Mist eliminators will also be installed on the cooling tower to prevent the transport of toxic compounds and particulate emissions.

The proposed mitigation measures are integral to the construction and operation of the proposed Project. They serve to ensure that the proposed Project will not result in public health impacts that exceed established thresholds of significance.

6.8.2 Laws, Ordinances, Regulations and Standards

An overview of the regulatory process for public health issues is presented in this section.

The relevant laws, ordinances, regulations, and standards (LORS) that affect public health and are applicable to this Project are identified in Table 6.8-1. This table also identifies the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies. The conformity of the Project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations where each of these issues is addressed.

Table 6.8-1 Summary of Principal Regulations for Public Health

Regulation	Purpose	Regulating Agency	Project Conformance
Clean Air Act (CAA)	Regulates public exposure to various air pollutants.	USEPA CARB SCAQMD	Based on the results of the risk assessment, toxic air pollutants do not exceed significance thresholds. Cancer risk and chronic analysis Emissions of criteria pollutants will be minimized by applying BACT to the facility.
California Health and Safety Code 25249.5 (Proposition 65)	Regulates public exposure to chemicals known to cause cancer or reproductive toxicity.	OEHHA	Based on the results of the risk assessment, toxic air pollutants do not exceed significance thresholds.
40 CFR Part 68 (Risk Management Plan) and Health and Safety Code 25531 to 25541	Regulates public exposure to acutely hazardous materials.	USEPA OES Riverside Fire Department	A hazard analysis was conducted to assess potential risks from a spill or rupture of the aqueous ammonia storage tank.
California Health and Safety Code 44360 to 44366 (AB2588)	Regulates public exposure to toxic air contaminants.	CARB SCAQMD	Based on the results of the risk assessment, toxic air pollutants do not exceed significance thresholds.

6.8.3 Aqueous Ammonia Hazard Assessment

The Clean Air Act and the California Accidental Release Program (CalARP) regulations require an assessment of the hazards associated with an accidental release of a regulated substance such as ammonia. However, because of the size of the ammonia storage tank (12,000 gallons) and the concentration of the material (19 percent aqueous solution), the facility is not required to prepare a federal Risk Management Plan (RMP). Furthermore, the City of Riverside Fire Department Certified Unified Program Agency (CUPA), which administers the State CalARP program, does not require an RMP for the Riverside Energy Resource Center facility.

Although applicable regulations do not require the preparation of a hazard assessment, an analysis of the worst-case accidental aqueous ammonia release scenario as defined under CalARP Program Level 1 was prepared for the ammonia storage tank prior to its installation in 2005. The results of the initial analysis are included in Appendix 6.8-A. Since no additional ammonia storage capacity will be added, and the original worst-case analysis was for a storage tank rupture, a new hazard assessment was determined not to be necessary. In addition, a response plan with mitigation measures for potential ammonia releases has been implemented. This plan will modified as necessary to address RERC Units 3&4.

6.8.4 Health Risk Impacts from Construction Emissions

Table 6.8.2 includes a summary of the results of the health risk assessment for the construction operations to determine maximum health risk levels at nearby locations where sensitive receptors may exist. The health risk assessment for construction operations reflects daily maximum diesel particulate emissions over the entire duration of the construction project. In accordance with CARB guidelines, the assessment included both cancer risk and chronic analysis. The cancer and chronic health risks calculations are based on the results of the air quality impact analysis for diesel particulate emissions. Specifically, the receptor location impact values for particulate emissions identified through AERMOD were entered into a spreadsheet, which also contained the cancer and chronic potency value for diesel particulate emissions. The results were adjusted to reflect a potential 2-year exposure period.

The assessment results indicate that health risks attributed to construction at the peak sensitive receptor location are 1.03×10^{-7}, which is significantly below the significance threshold of 10×10^{-6}. The resulting chronic health index at the same receptor location is 0.002, which is below the significance level of 1.0. Detailed health risk assessment information for construction emissions is presented in Appendix 6.8-B.

Health risks will be mitigated during construction activities through several measurers, including the use of ultra-low sulfur fuel and the use of certified non-road engines to reduce diesel particulate emissions.

Table 6.8-2 Summary of Health Risk Analysis - Construction Activity

Hazard Description	Results	Significance Threshold
Point of Maximum Impact		
Maximum Individual Cancer Risk	1.03×10^{-07}	10×10^{-06}
Chronic Hazard Index	0.002	1.0

6.8.5 Health Risk Impacts from Facility Operations

Table 6.8-3 includes a summary of the health risk assessment results for facility operations. The assessment reflects modeled emissions of toxic compounds from the two gas turbines and the cooling tower during a normal operating year. Emissions from the cooling tower reflect the use of reclaimed water and reflect the presence of chemicals that are typically found in cooling water treatment products. Emissions from the gas turbines reflect the use of CO catalyst systems that will also control organic toxic compounds.

A protocol clarifying the health risk assessment methodology for facility operations was submitted to the CEC in September 2007. The protocol outlined the methods and assumptions that were used in the preparation of the health risk assessment. The protocol was subsequently approved by CEC staff on October 31, 2007.

The health risk assessment also included an analysis of commissioning operations. The health risk assessment for this operating scenario only included a short-term (acute) analysis. Emissions from the two turbines assumed no control and cooling towers were assumed to be at typical emission levels. Although the commissioning health risk assessment included two operating turbines, in reality only one turbine will be commissioned at a time.

The calculated maximum individual cancer risk of 1.06×10^{-07} for the Project reflects a 70-year exposure period at the point of maximum impact. The calculated chronic health risk index of 0.002 reflects a 1-year exposure and the calculated acute health risk index of 0.085 reflects a 1-hour exposure. Mitigated health risks at the point of maximum impact are well below the established levels of significance for cancer, chronic and acute health risks. Additional health risk assessment results can be found in Appendix 6.8-C.

Although not part of the Project, a black start engine is being installed at the facility as part of an independent amendment to the existing SCAQMD facility permit. A health risk assessment was conducted for the black start engine based upon an assumed operating schedule of 0.5 hour per day and up to 54 hours per year. The operating schedule was selected to promote conformity with other similar equipment located in the City. The health risk assessment indicates a calculated cancer risk of 1.53×10^{-6}, and a chronic risk index of 0.005. The results confirm that impacts of the Project remain below levels of significance, even if combined with impacts of the black start engine.

Health impacts will be mitigated through several measures. First, the gas turbines will burn natural gas and will be equipped with a CO oxidization unit. The oxidization unit will control up to 85% of organic toxic emissions resulting from turbine combustion. Second, reclaimed water will be demineralized, thereby reducing a portion of metals that may otherwise be emitted into the atmosphere from the cooling tower. Detailed health risk assessment information is included in Appendix 6.8-C.

Table 6.8-3 Summary of Health Risk Assessment - Facility Operations

Hazard Description	Results	Significance Threshold
Normal Operations Point of Maximum Impact		
Cancer Risk	1.06×10^{-07}	1.0×10^{-05}
Chronic Hazard Index	0.002	1.0
Acute Hazard Index	0.085	1.0
Cancer Burden	0.00001	0.5
*Commissioning Operations Point of Maximum Impact**		
Cancer Risk	Not Applicable	Not Applicable
Chronic Hazard Index	Not Applicable	Not Applicable
Acute Hazard Index	0.442	1.0
Cancer Burden	Not Applicable	Not Applicable

* Commissioning analysis reflected 2 turbines in operation. In practice, only 1 turbine will operate at a time during the commissioning period.

6.8.6 Agency Contacts

Agency	Name/Title	Address	Phone Number
Riverside County Community Health Agency, Dept. of Environmental Health	Keith Jones (Hazmat)	4065 County Circle Dr. Riverside, CA 92503	(951) 358-5055
City of Riverside Fire Department	Joan Ledbetter Deputy Fire Marshal	3775 Fairmont Blvd. Riverside, CA 92501	(951) 826-5338

6.8.7 Summary and Conclusions

Three air quality components of the proposed Project have potential health and safety impacts. These components include the risk of an accidental release of NH3, health risks attributed to toxic emissions from construction operations, and from toxic emissions associated with facility operations. The analysis of the risks attributed the Project indicate that risks can be mitigated to levels that are below established thresholds of significance.

6.9 Traffic and Transportation

6.9.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will serve the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the Project will be exported outside of the City.

This section discusses potential impacts to existing traffic conditions related to the proposed Project. The project site is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This analysis is intended to evaluate the potential for project impacts during construction and operation. Presented is a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting traffic conditions. Required permits and permitting agencies are identified.

No significant traffic impacts will occur resulting from plant construction and operation.

6.9.1.1 Project Description

The proposed site is owned by the City of Riverside and is located adjacent to the City of Riverside's Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 3&4 will consist of two aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. Interconnections for natural gas, reclaimed water, potable water, and electric transmission are already located on site. The RERC Units 3&4 power plant will occupy approximately 2.2 acres of the 16 acre RERC site. An additional 2 acres are reserved for construction laydown. The entire plant perimeter will be fenced with a combination of chain-link fencing and architectural block walls.

6.9.1.2 Project Location

The Project will be located at the RERC facility east of Acorn Street within the City of Riverside, California. Intersections within the project vicinity that could be affected by the Project include:

- Jurupa Avenue at Van Buren Boulevard
- Jurupa Avenue at Acorn Street
- Jurupa Avenue at Grand Avenue

The Project was designed to meet the City of Riverside Traffic Study Guidelines.

6.9.1.3 Project Site Population

Currently, eighteen (18) RPU employees and consultants are located at the RERC facility. Approximately one quarter of these people are associated with the operation of RERC. The remaining site population is associated with management, engineering, and administrative aspects of the RPU electrical system that were previously located at other RPU facilities. The site population is typically only present during normal daytime work hours with operators being called out as needed when nighttime or weekend operation of the plant is required.

With the proposed project expansion (which includes the Dispatch and Scheduling Building personnel) the site population will grow to a total of approximately thirty (30) employees. Less than five of the additional employees will be associated with plant operations. The remaining personnel will are associated with RPU's decision to relocate their existing scheduling and dispatch personnel from other facilities to the new Scheduling and Dispatch building at the RERC site, as part of RERC Units 3&4.

The addition of 12 employees would not be expected to generate a significant number of additional trips to warrant a detailed traffic analysis largely because the bulk of these employees are already making trips to their current work locations within the City of Riverside. The result is to modify the work location that the trips go to.

Increased trips to support the project expansion, once completed, are not expected to be significant since less than five additional people are involved. Since this Project will not result is a significant increase in traffic once the expansion is operational, this traffic study focuses on the Project's construction impacts, when construction activities will occur and up 100 construction workers will be working on site for several months.

6.9.1.4 Project Traffic Study Methodologies

The methodologies and assumptions used to conduct the circulation impact analysis for the proposed Project include the following (note: the KOA 2008 Traffic Study is included in its entirety in Appendix 6.9-A).

A. Study Timeframes

This report presents an analysis of the intersection operating conditions during the morning and evening peak hours for the following anticipated timeframes:

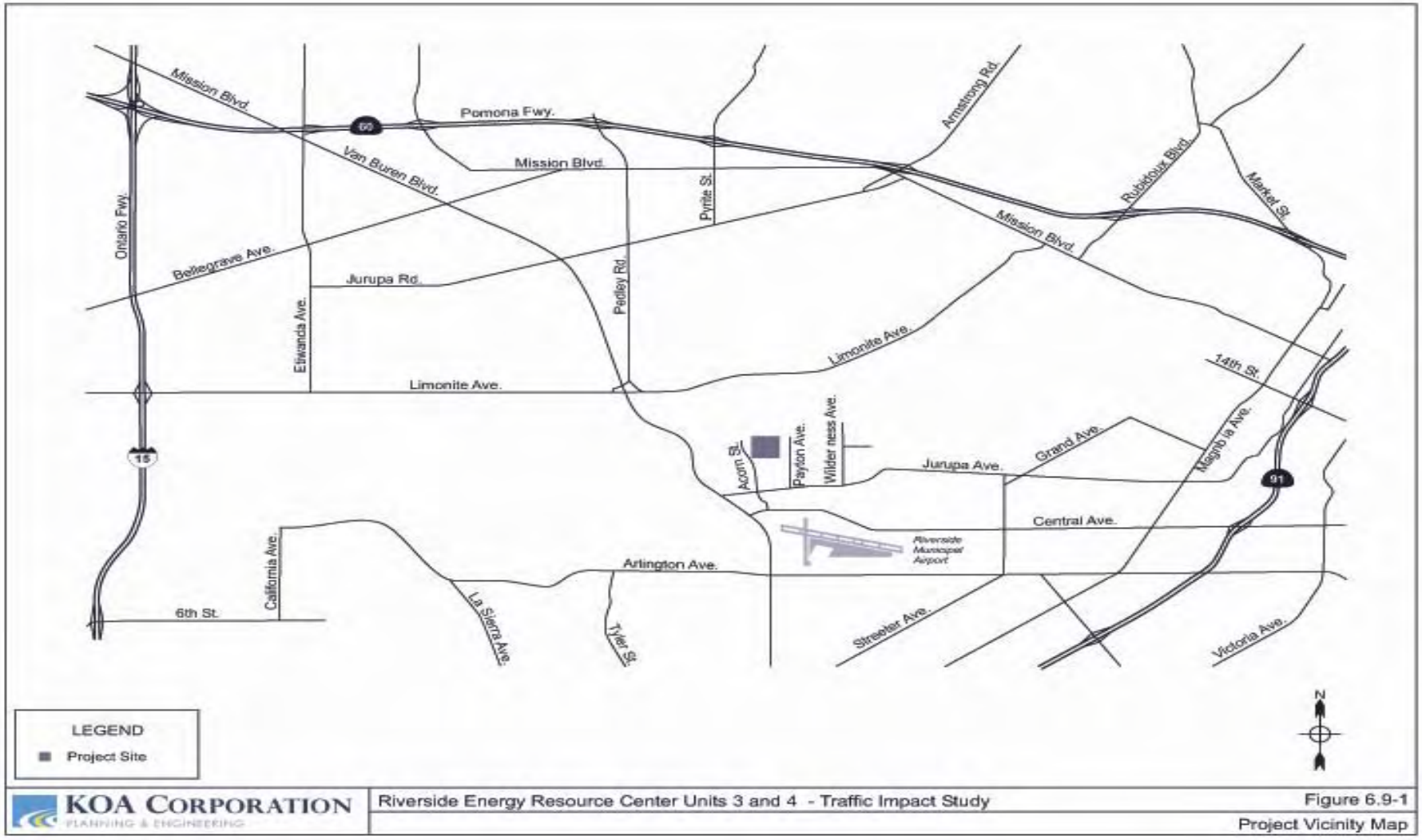
- Existing: Year 2008
- Future: Year 2009

The Year 2009 was selected for analysis to coincide with the proposed construction and Project completion.

B. Study Area

The study area was determined through a review of the project vicinity as shown in Figure 6.9-1. The study area was expanded to include the following intersections (refer to Figure 6.9-2 Study Area/Expanded Study Area):

- Jurupa Avenue at Van Buren Boulevard
- Jurupa Avenue at Acorn Street
- Jurupa Avenue at Grand Avenue

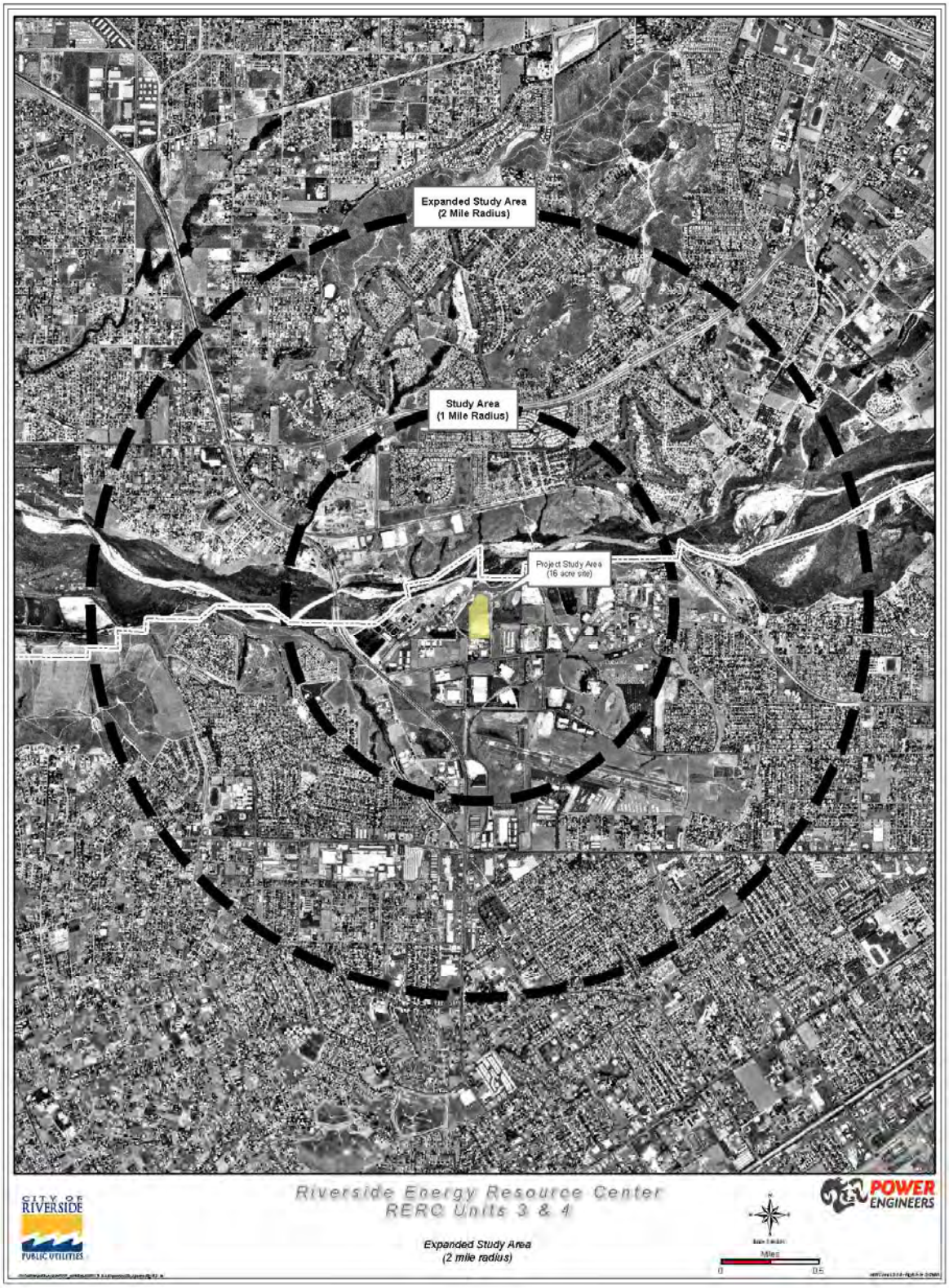


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-1
Project Vicinity Map

Figure 6.9-2 Expanded Study Area



C. Analysis Methodologies

The traffic analysis methodologies and concepts used in this study can be found in the Highway Capacity Manual (HCM). Level of Service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Level of Service (LOS) ranges from Level of Service A (free flow, little congestion) to Level of Service F (forced flow, extreme congestion) (Table 6.9-1).

Table 6.9-1 Level of Service Descriptions

Level of Service	Traffic Description
A	Excellent, Light Traffic
B	Good, Light to Moderate Traffic
C	Moderate Traffic, with Insignificant Delay
D	Heavy Traffic, with Significant Delay
E	Severe Congestion and Delay
F	Failed, Indicated Levels Cannot Be Handled

Level of Service for signalized intersections is based upon the average time (seconds) that vehicles approaching an intersection are delayed (Table 6.9-2). There is a specific delay and Level of Service associated with each approach and an overall average delay for all movements. The overall Level of Service for the intersection is based upon the overall average delay.

Table 6.9-2 Levels of Service for Intersections

Level of Service	Signalized Intersection Control Delay (in sec/veh)	Unsignalized Intersection Control Delay (in sec/veh)
A	0 – 10	0 – 10
B	10.1 – 20	10 – 15
C	20.1 – 35	15 – 25
D	35.1 – 55	25 – 35
E	55.1 – 80	35 – 50
F	80 or more	50 or more

Un-signalized intersection Level of Service is also based upon the control delay, but delay is only assessed for those traffic movements that are stopped or must yield to through traffic.

Level of Service D is frequently identified as the minimum allowable “Standard” service level during peak hours at intersections. Most arriving traffic will clear the intersection on the first allowable green cycle under this Level of Service. Mitigation measures should be considered when traffic conditions are forecasted to decline to poorer levels of service.

Some movements, including cross traffic on the minor street or left turns onto the major street, can be subject to long delays, however through traffic and right turns from the major street will not experience any delays at stopped intersections. When delay for cross traffic is severe (Level of Service F) the intersection should be evaluated further for possible improvement with traffic signals. In some cases, this analysis determines that the delay is being experienced by a very low number of vehicles and traffic signals are not warranted. In other cases, the number of stopped vehicles is substantial and traffic signals may be justified as a mitigation measure, additional analysis is required to determine the need and justification for the installation of a traffic signal.

The City of Riverside follows the Riverside County Level of Service Standards. The County's policy has identified a Level of Service D as the minimum allowable service level during peak hours at signalized intersections along all County-maintained roads and conventional state highways. Mitigation measures should be considered when traffic conditions are forecasted to decline to poorer levels of service.

D. Intersection Capacity Analysis

The analysis of peak hour intersection conditions was conducted using the TRAFFIX software. The following peak hours were selected for analysis to coincide with normal weekday peak traffic periods:

- Weekday AM (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM (peak hour between 4:00 PM and 6:00 PM)

All signalized intersections were analyzed based on the "operational analysis" procedure for signalized intersections, as defined in the 2000 Highway Capacity Manual (HCM). Local practice uses 1,900 passenger cars per hour of green per lane (pcphgpl) as the maximum saturation flow of a single lane at an intersection for existing and future scenarios. This saturation flow rate is adjusted to account for lane width, on-street parking, conflicting pedestrian flow, traffic composition, (i.e., percent of trucks) and shared lane movements (e.g., through and right-turn movements from the same lane). Level of Service for signalized intersections is based on the average time (seconds) that vehicles entering an intersection are delayed.

In addition, a peak hour factor was added to all of the volumes, to analyze the peak hour. Traffic volumes may fluctuate from minute to minute within the peak periods, so a peak hour factor increases the hourly volume, to simulate the higher 15 minute peak period for the entire peak period. The existing peak hour factor (or a default of 0.95, if the existing was higher) was calculated from existing traffic count information and applied to all intersections for the existing and future scenarios. To follow County of Riverside guidelines, a loss time of 4 seconds per phase (16 seconds for all studied intersections) and a minimum 7 seconds of green time per movement were also assumed.

E. Traffic Count Data

Existing average daily traffic data was obtained from a study submitted to the City and completed by Counts Unlimited in April and May 2007. All traffic count data used in this study is compiled in Appendix 6.9-B.

F. Future Year 2009 Traffic Volumes

Peak hour intersection volumes under future conditions were forecast based on existing peak hour intersection volumes adjusted to reflect anticipated growth in the City. Project trips were added to this background base to determine the relative impact of the Project.

6.9.2 Laws, Ordinances, Regulations and Standards

Federal, state and local laws, ordinances, regulations and standards (LORS) applicable to traffic and transportation are summarized in Table 6.9-3.

Table 6.9-3 Laws, Ordinances, Regulations and Standards

Jurisdiction	Authority	Administering Agency	Compliance
FEDERAL	Hazardous Materials Transportation Act of 1974; 49 Code of Federal Regulations (CFR) 397.9	U.S. Department of Transportation	Establishes criteria and regulation for safely transporting hazardous materials across interstate lines
	49 CFR Chapter II, Subchapter C and Chapter III, Subchapter B	U.S. Department of Transportation and the California Department of Transportation (Caltrans)	Contains standards for the transportation of goods, materials and substances. Requires the proper handling and storage of hazardous materials during transportation.
STATE	California Vehicle Code Section 35780; California Streets and Highways Code, Sections 660-711; 21 CCR 1411.1-1411.6	Caltrans	Requires a permit for loads exceeding any Caltrans weight, length, or width standard for public roadways
	California Streets and Highways Code, Sections 117 and 660-711	Caltrans	Requires Caltrans permit for any roadway encroachment during truck transportation and delivery.
	California Vehicle Code Section 31300 et seq.	Caltrans	Requires transporters to meet certain storage, handling and routing standards for the transportation of hazardous materials on public roadways.
CITY	City of Riverside 2025 General Plan, Circulation and Community Mobility Element	City of Riverside	Specifies long term planning goals and procedures addressing the quality of City transportation infrastructure

6.9.2.1 Policy Analysis

Riverside 2025 General Plan Policy Analysis, Circulation and Community Mobility Element.

Policy CCM-1.4:	Support improvement of the Van Buren Boulevard/I-215 interchange and along the length of Van Buren Boulevard between I-215 and SR-91.
Policy CCM-2.2:	Balance the need for free traffic flow with economic realities and environmental and aesthetic considerations, such that streets are designed to handle normal traffic flows with tolerances to allow for potential short-term delays at peak-flow hours.
Policy CCM-2.3:	Maintain LOS D or better on Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges, allow LOS F at peak hours as the acceptable standard on a case-by-case basis.
Policy CCM-2.4:	Minimize the occurrence of streets operating at LOS F by building out the planned street network and by integrating land use and transportation in accordance with the General Plan principles.
Objective CCM-6:	Reduce peak hour trips, roadway congestion and air pollution.
Policy CCM-6.1:	Encourage the reduction of vehicle miles, reduce the total number of daily peak hour vehicular trips, increase the vehicle occupancy rate and provide better utilization of the circulation system through the development and implementation of TDM programs contained in the SCAQMD and County of Riverside TDM Guidelines.
Objective CCM-11:	Promote improved air transportation for Riverside in a matter that benefits the City.
Policy CCM-11.1:	Protect flight paths from encroachment by inappropriate development using the Riverside County Airport Land Use Compatibility Plan to determine the consistency of proposed development.
Policy CCM-11.5:	Coordinate public and local transit with planning for air transportation.
Policy CCM-11.6:	Encourage the development of high-speed ground transportation systems to supplement the air travel system for meeting regional travel needs.

Policy CCM-11.7: Ensure environmental impacts such as noise, air quality, pollution, traffic congestion, and public safety hazards associated with continued operation of local airports are mitigated to the extent practicable.

Policy CCM-12.2: Ensures that new development projects provide adequate truck loading and unloading facilities.

Policy CCM-13.1: Ensure that new development provides adequate parking.

Policy CCM-13.2: Accommodate joint use of parking facilities as part of an area plan or site plan, based on the peak parking demands of permitted uses in the planning area.

The proposed Project is compatible as complies with the objectives and policies of the City of Riverside 2025 and General Plan Circulation and Community Mobility Element.

6.9.3 Existing Conditions

The existing conditions in the study area are limited to specific roadways in the Project's vicinity. Refer to figure 6.9-1 Project Vicinity Map and Figure 6.9-3 Existing Geometrics.

A. Existing Circulation Network

Streets in the project vicinity, which could be affected by the proposed Project include Acorn Street, Jurupa Avenue, Van Buren Boulevard, and Grand Avenue.

Acorn Street

Acorn Street is a two-lane roadway running on a north/south alignment located approximately 500 feet to the west of the project site. It extends from Central Avenue and ends about one quarter mile north of Jurupa Avenue. It provides one travel lane per direction and is divided by a broken yellow center line. The speed limit is posted at 40 mph. Land uses along this roadway in the project vicinity are mostly industrial uses with some vacant lots. Acorn Street is controlled by a four-way stop sign at Jurupa Avenue.

Jurupa Avenue

Jurupa Avenue is a four-lane roadway running on an east/west alignment located adjacent to and south of the project site. It extends east from Van Buren Boulevard, past the project site where it turns into Olivewood Avenue. It provides two travel lanes per direction and is divided by a two way left turn lane. The speed limit is posted at 50 mph near the intersection of Van Buren Boulevard, and then drops to 45 mph at Acorn Street. Land uses along this roadway in the project vicinity are mostly industrial uses with many vacant lots. Jurupa Avenue is controlled by a traffic signal at Van Buren Boulevard and Grand Avenue and an all-way stop sign at Acorn Street.

Van Buren Boulevard

Van Buren Boulevard is a four-lane roadway running on a north/south alignment located approximately one-half mile west of the project site. It provides two travel lanes per direction, and is divided by a raised median. The speed limit is posted at 55 mph in the project vicinity. Van Buren Boulevard begins approximately 16 miles southwest of the site, at the I-215 Freeway and extends east then curves north, past the project site, where it turns into Mission Boulevard at the SR-60 Freeway. It is controlled by a traffic signal at Jurupa Avenue. The land uses in the vicinity are mostly industrial uses with some vacant lots.

Grand Avenue

Grand Avenue is a four-lane roadway running on a north/south alignment located approximately two miles east of the project site. It provides two travel lanes per direction, and is divided by a double yellow line. The speed limit is posted at 40 mph in the project vicinity. Grand Avenue, which derives from Streeter Ave where it begins on Jurupa Ave east of the project site and continues on one and a half miles northeast to become Bandini Ave. The land uses in the vicinity are mostly residential uses with some commercial lots. It is controlled by a traffic signal at Jurupa Avenue and a stop sign at Rubidoux Ave.

State Route 91 (SR-91)

State Route 91 is the nearest freeway to the RERC project site. It is located approximately four miles to the south of the project site. It provides regional east/west throughout the region, beginning in Los Angeles and continuing east to Riverside where it ends at Interstate 215 (I-215). In the project area, it has 3-4 lanes per direction. Van Buren Boulevard provides a full interchange with this freeway.

State Route 60 (SR-60)

State Route 60 is also near to the RERC project site. It is located approximately six miles to the north of the project site. It provides regional east/west throughout the region, beginning in Los Angeles and continuing east to Beaumont where it ends at Interstate 10. In the project area, it has 3-4 lanes per direction. Van Buren/Mission Boulevard provides a partial interchange with this freeway.

B. Existing Traffic Volumes

Traffic conditions along urban and suburban roadways and highways are most significant during peak hours at signalized intersections. Traffic conditions are thus normally analyzed at these intersections during these times. Morning and evening peak hour traffic volumes were obtained for the study area intersections. These traffic volumes were obtained from traffic counts taken by a traffic counting specialist firm, Southland Car Counters, located in Santa Ana, California.

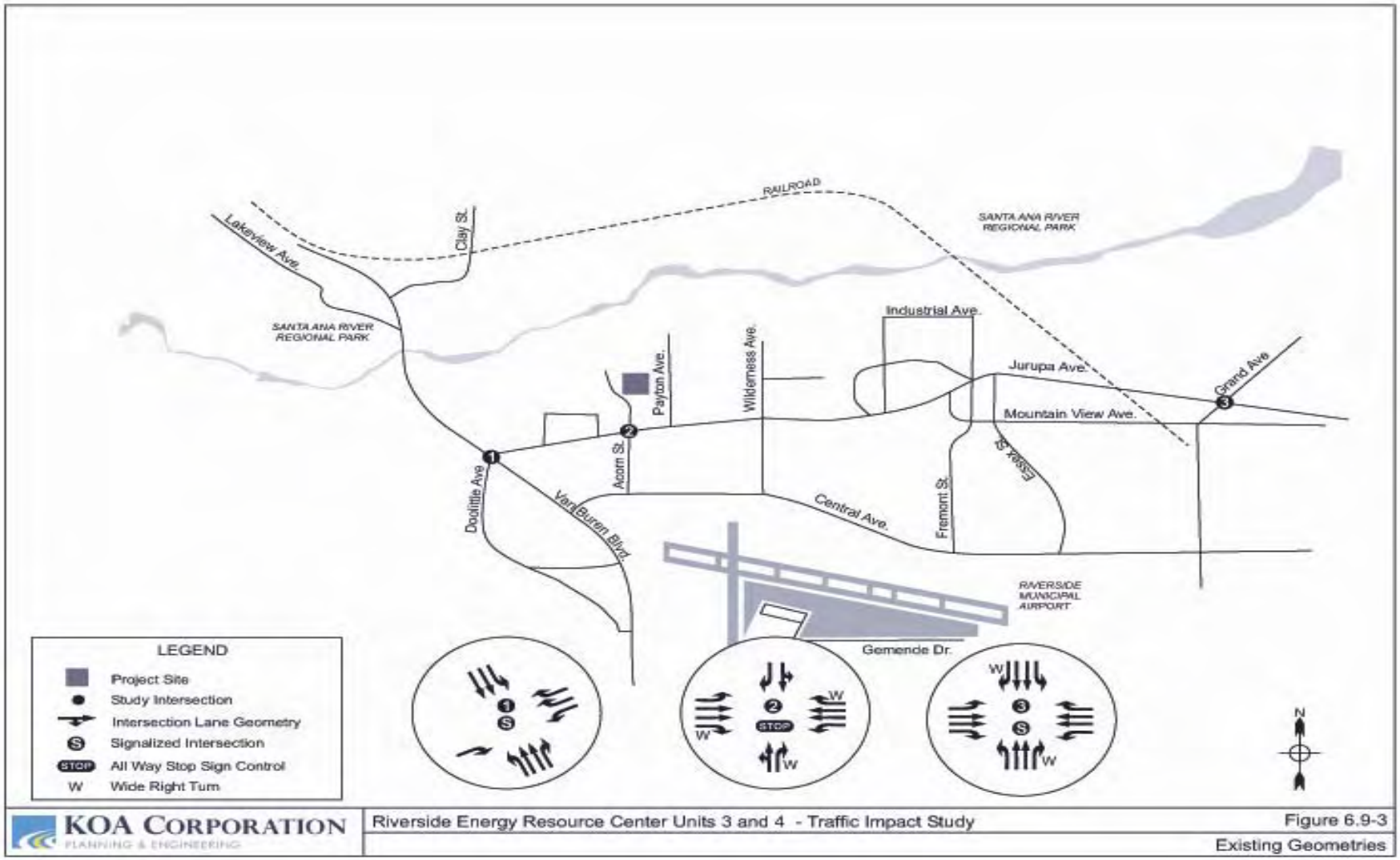
Table 6.9-4 AM/PM Peak Hour Intersection Performance for Existing Conditions (Year 2008)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.2	B	13.7	B
Jurupa Ave. at Van Buren Blvd.	55.7	E	61.4	E
Jurupa Ave. at Grand Ave.	31.4	C	35.3	D

Note: *Analyzed as an all-way stop

As shown in Table 6.9-4, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable Level of Service, LOS D. Appendix 6.9-B contains the analysis worksheets.

The study area was observed during both the morning and the evening peak hours. The indicated Levels of Service shown in Table 6.9-4 are representative of observed traffic conditions in the study area.



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-3
Existing Geometries

6.9.4 Future Baseline Conditions (Year 2009)

This section develops future traffic conditions in the study area with ambient growth added without the proposed project construction trips. The Year 2009 was selected for analysis based on correspondence with the applicant regarding the Project's construction and completion timeline. The Project is scheduled for completion before the end of the year 2009.

A. Future Growth

Based on discussions with the City of Riverside and County of Riverside staff, it has been established that traffic in the study area has historically increased at a rate of about 2% per year. Future increases in the background traffic volumes due to regional growth are expected to continue at this rate in the vicinity of the Project. Assuming a completion date within 2 years, the existing traffic volumes were adjusted upward by 4% (2% per year) to reflect area wide growth.

The future scenario should also consider additional traffic that may be generated by other developments that have been approved. The City of Riverside did not identify any development projects that would add traffic to the intersections analyzed in the study.

B. Peak Hour Intersection Level of Service

To simulate the Future Growth Conditions of the year 2009, the peak hour volumes in Figure 6.9-4 and Figure 6.9-5 were increased by 4%. Figure 6.9-6 illustrates the resulting AM peak hour volumes. Figure 6.9-7 illustrates the PM peak hour volumes. Table 6.9-5 summarizes the results of the Level of Service analysis for this scenario. The Level of Service worksheets are provided in Appendix 6.9-C.

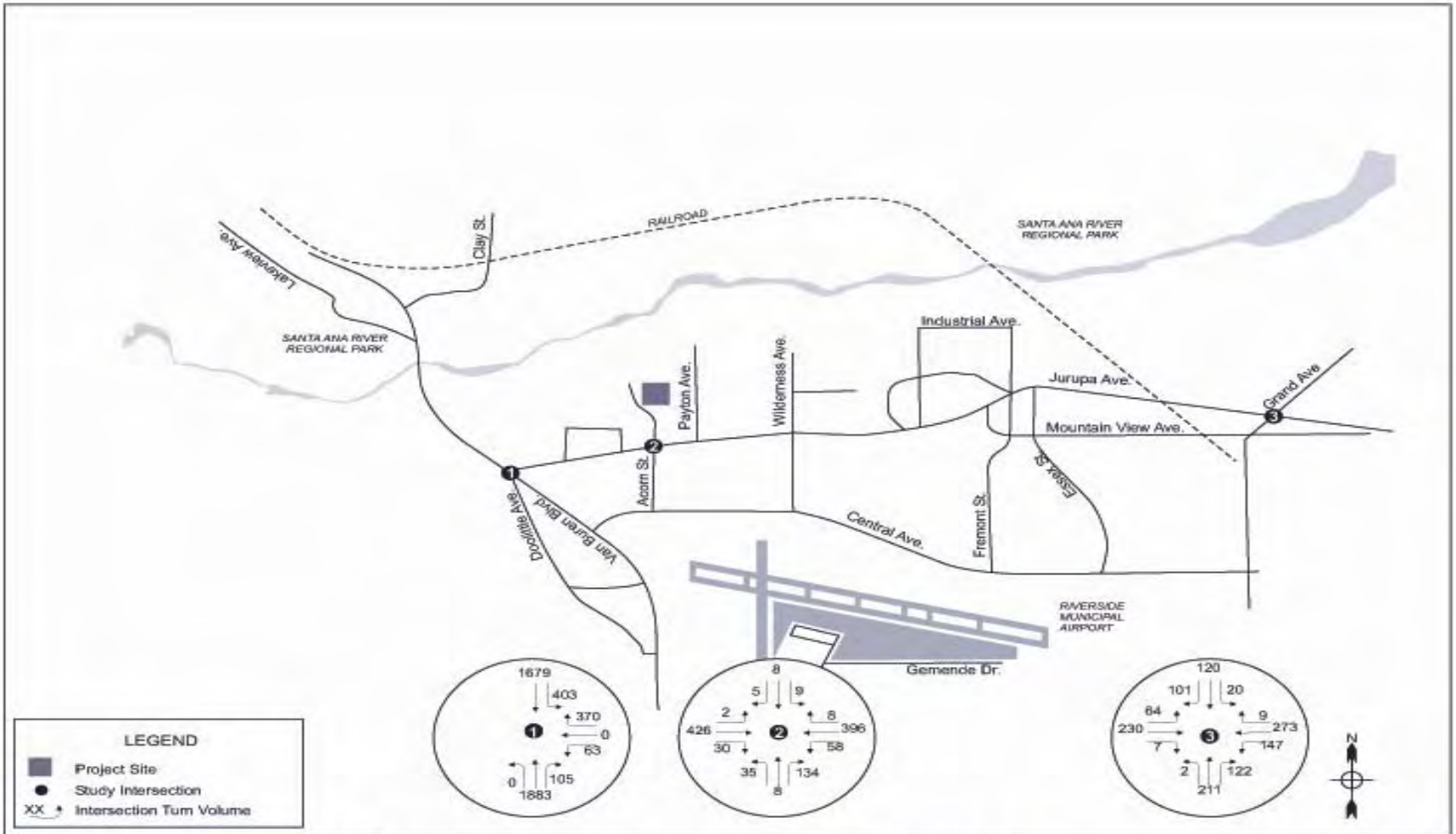
Table 6.9-5 AM/PM Peak Hour Intersection Performance for Future Conditions Without Project (Year 2009)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.6	B	14.4	B
Jurupa Ave. at Van Buren Blvd.	65.3	E	73.9	E
Jurupa Ave. at Grand Ave.	31.5	C	35.7	D

Note: *Analyzed as an all-way stop

As shown in Table 6.9-5, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable Level of Service, LOS D. The addition of area traffic volumes for forecast area growth does not change the letter grade Level of Service when compared to the Level of Service calculations for existing conditions.

Level of Service calculation worksheets for Future Baseline Conditions (Year 2009) are provided in Appendix 6.9-C.

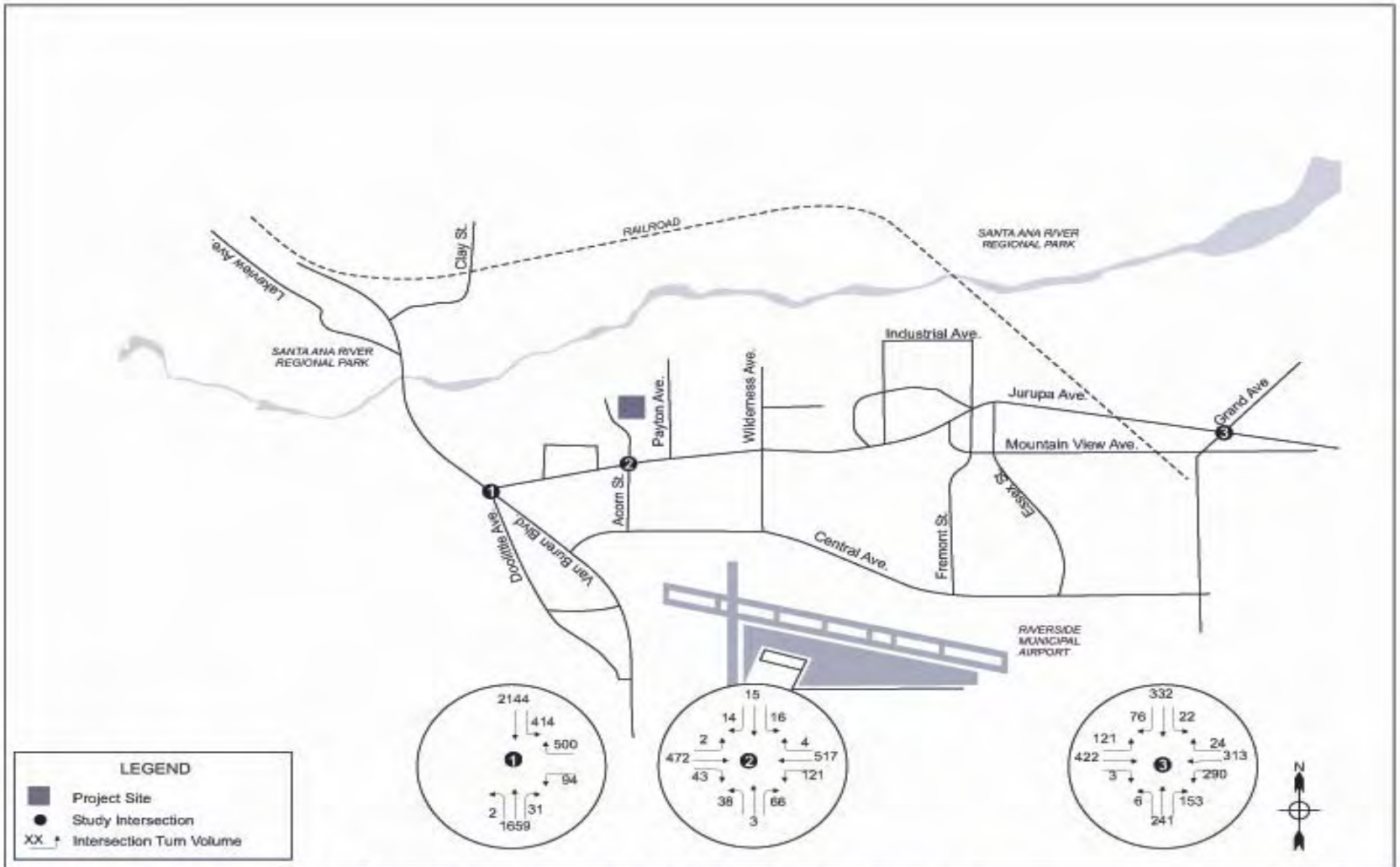


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-4

Existing (Year 2008) Traffic Volumes - AM Peak Hour

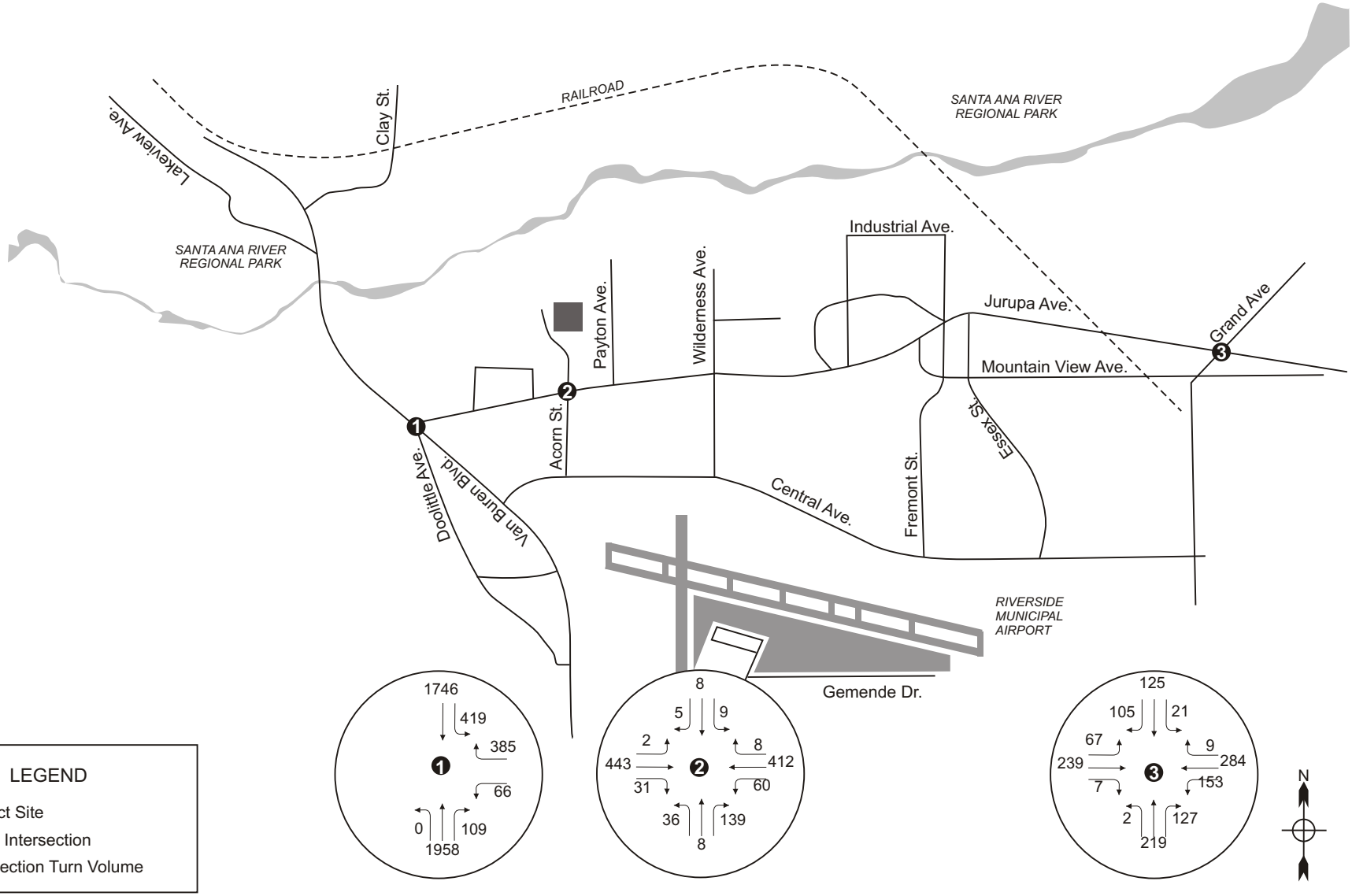


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-5

Existing (Year 2008) Traffic Volumes - PM Peak Hour

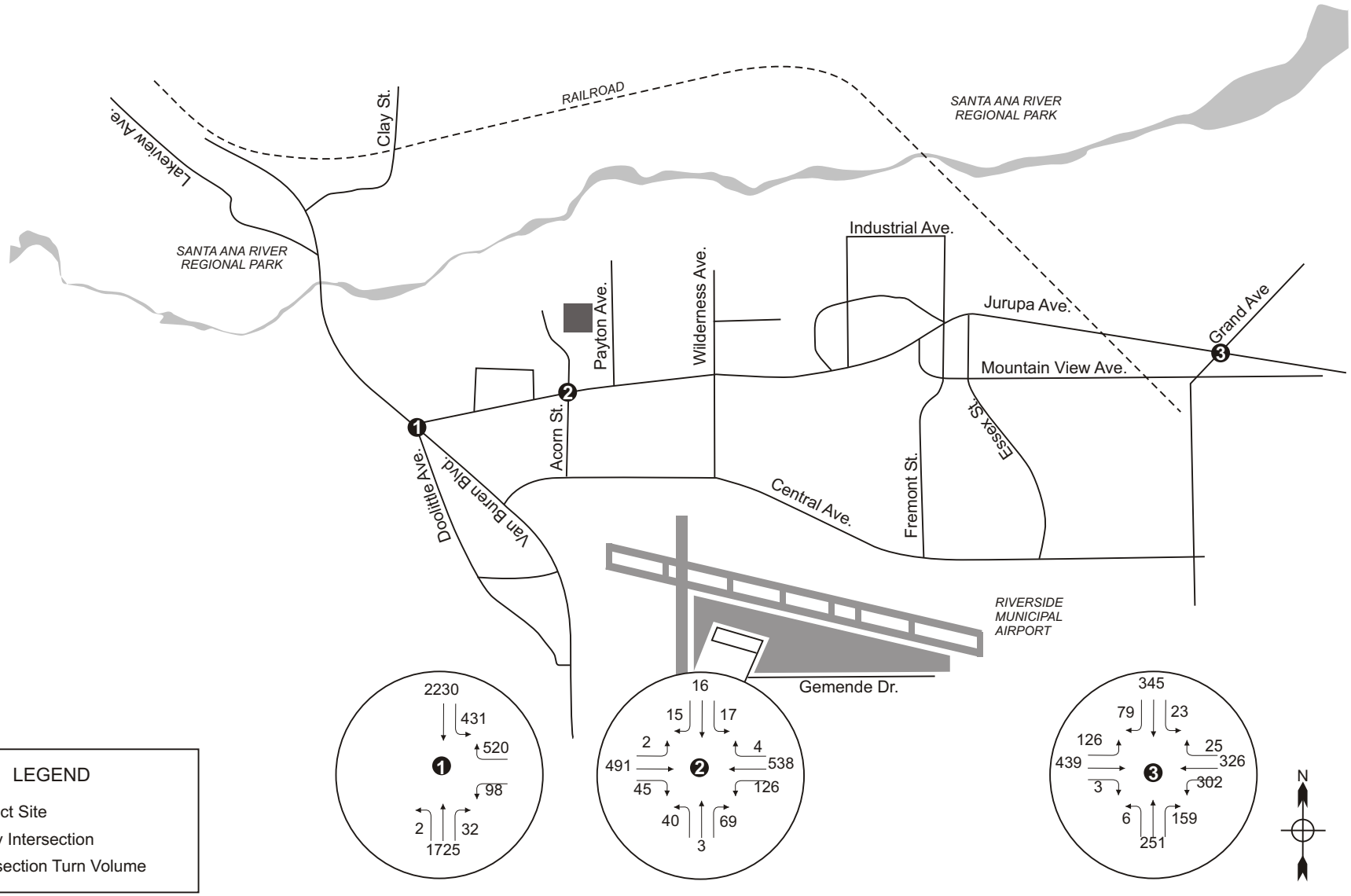


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-6

Future Baseline Conditions (Year 2009) Traffic Volumes - AM Peak Hour



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-7

Future Baseline Conditions (Year 2009) Traffic Volumes - PM Peak Hour

6.9.5 Project-Related Traffic

Project related traffic consists of trips on any portion of the street system that will begin or end on the project site because of the development of the proposed Project. Project related traffic is a function of the extent and type of development proposed for the project site. This information is used to establish traffic generation for the site.

6.9.5.1 Trip Generation

Trip generation is a measure or forecast of the number of trips that will be made to or from the Project. It is generally equal to the traffic volume expected at the project entrances.
Trip generation characteristics for projects are normally estimated based on rates published in *Trip Generation, Seventh Edition,* published by the Institute of Transportation Engineers (ITE). This report is widely used in Southern California and indicates the probable traffic generation rates for various land uses based upon studies of existing developments in comparable settings. However, it does not provide rates for small power plants.

Trip Generation Rates were calculated using office building rates and warehouse rates from the *Manual* as shown in Table 6.9-6. Because the power plant buildings will be operating primarily as office building and warehouse uses up to 10 trips per day (for arriving to and leaving from work only) are attributed to commuting by these employees. Additional vehicle trips per day will be generated by employees leaving for short periods, and additional standard office uses, such as deliveries, visitors, mailmen, etc.

6.9.5.2 Project Construction Trips

Once completed, the Project is not expected to generate a significant number of trips above those already generated by the exiting project site. However, the construction phase of the Project will include trips generated by up to 100 construction workers and supplies and equipment delivered by truck to the site. As such, this traffic analysis focuses on the traffic impacts that could occur during construction.

Construction of RERC Units 3&4 is anticipated to last approximately nine months following approval by the CEC and once all permits and authorizations are in place. Commencement of construction is anticipated in the third quarter of 2008, with commercial operation of the first unit anticipated in summer 2009. Completion of the second unit would follow as soon as possible after the first unit is available for dispatch.

A. Project Construction Trip Generation Forecast

The Project is expected to generate a maximum of 25 truck two-trips daily. Transport truck deliveries include heavy equipment and material deliveries. In addition, based on information obtained from the project proponent, the project site will employ a workforce of approximately 100 people during peak construction periods. The calculations below account for the heavier vehicles types such as trucks by converting truck trips to “passenger car equivalents”. A rate of 2.2 passenger car equivalents (PCEs) per truck trip was used in this analysis. This conversation rate falls within the guidelines set for in the Highway Capacity Manual.

Construction of the Project will take approximately 9 months. The Project will require an average construction workforce of approximately 50 workers at the beginning of construction and a peak of 100 workers in the 3rd through 7th months of construction and a tapering of fewer employees thereafter. The workforce vehicle trips associated with construction were calculated based upon these assumptions.

Construction of the Project will require the use and installation of heavy equipment and associated systems. Heavy equipment will be delivered via truck, using Van Buren Avenue from State Route 60 to the north. The number of trucks expected during construction is small. Approximately 5 trucks are estimated to be used daily during construction. Daily heavy equipment deliveries will vary from approximately 1 to 10. The peak of 10 would likely occur in months 5 and 6.

Peak hour traffic related to material deliveries would approximately be 15. Daily truck traffic will vary from approximately 3-15. The peak of 15 would likely occur in months 5 and 6.

1. **Peak Hour Trip Generation Forecast**

For purposes of forecasting future peak hour trip generation, it is assumed that the majority of the daily Project trips will occur during daylight hours. It is assumed that each employee arrives during the AM peak hour and departs during the PM peak hour and that some miscellaneous trips occur during this time. This assumption assumes that out of 100 employees; 75 employees arrive alone and 25 employees will carpool. It is also assumed that truck trips will occur randomly over a 10-hour workday. Based on these assumptions, a daily and peak hour trip generation calculation is provided below.

2. **Employee Trips**

It is estimated that 50 to 100 employees will work on the site during the construction phases. To evaluate a worst-case scenario, it is assumed that 75 employees arrive alone and 25 employees will carpool. This assumption on the level of carpooling is based on a) the increased cost of gasoline and b) common start and ending times. In addition it is assumed that half the employees go to lunch or some other errand therefore creating additional trips.

- 75 employees will drive alone = 75 inbound trips in the AM and 75 outbound trips in the PM
- 25 employees carpool (assumed two in a carpool) = 13 inbound trips in the AM and 13 outbound trips in the PM
- 42 employees go to lunch/run errands = 42 additional inbound and 42 additional outbound trips during the day

AM Peak Hour: 88 inbound employee trips
PM Peak Hour: 88 outbound employee trips
Total trips = (88*2) + (42*2) = 260 daily employee trips

The AM peak hour for the Project would be expected to occur as a result of workers arriving at the site at around 6:00 AM. This does not coincide with the AM peak hour of

the adjacent street, which occurs between 7AM and 9AM therefore was not used in the trip generation.

During the AM peak hour of adjacent street traffic, the Project would only generate trips from the delivery of supplies and equipment, and trip generation that would occur during normal construction activities, such as activities of supervisors and construction representatives.

3. Truck Trips

For the purposes of forecasting, it is assumed that 25 trucks per day will arrive and depart the site per day to deliver materials and equipment. This accounts for 50 one-way truck trips per day (110 PCEs). These trips will likely occur randomly during the day, assuming a 10-hour day.

- 25 daily two-way truck trips = 50 one-way truck trips at a PCE of 2.2 = 110 PCE truck trips per day.
- 110 PCE truck trips / 10-hour day = 11 PCE truck trips during the AM peak hour and 11 PCE truck trips during the PM peak hour.

AM Peak Hour: 6 inbound and 5 outbound truck PCE trips
PM Peak Hour: 5 inbound and 6 outbound truck PCE trips

4. Additional Work Related Trips

For the purposes of forecasting, it is assumed that other trips associated with the activities of supervisors, inspectors and vendors would be equal to 20% of the employee trips and would occur randomly over a 10-hour work day.

260 daily employee trips x 0.20 = 52 ancillary trips (PCEs) daily trips

AM Peak Hour: 3 inbound and 2 outbound ancillary trips
PM Peak Hour: 2 inbound and 3 outbound ancillary trips

Table 6.9-6 shows the traffic generation expected from the Project.

Table 6.9-6 Project Construction Traffic Generation Forecast

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Employee Trips	260	0	0	0	88	0	88
Truck Trips	110	11	6	5	11	5	6
Ancillary Trips	52	5	3	2	5	2	3
NET Project Trips (PCEs)	**422**	**16**	**9**	**7**	**104**	**7**	**97**

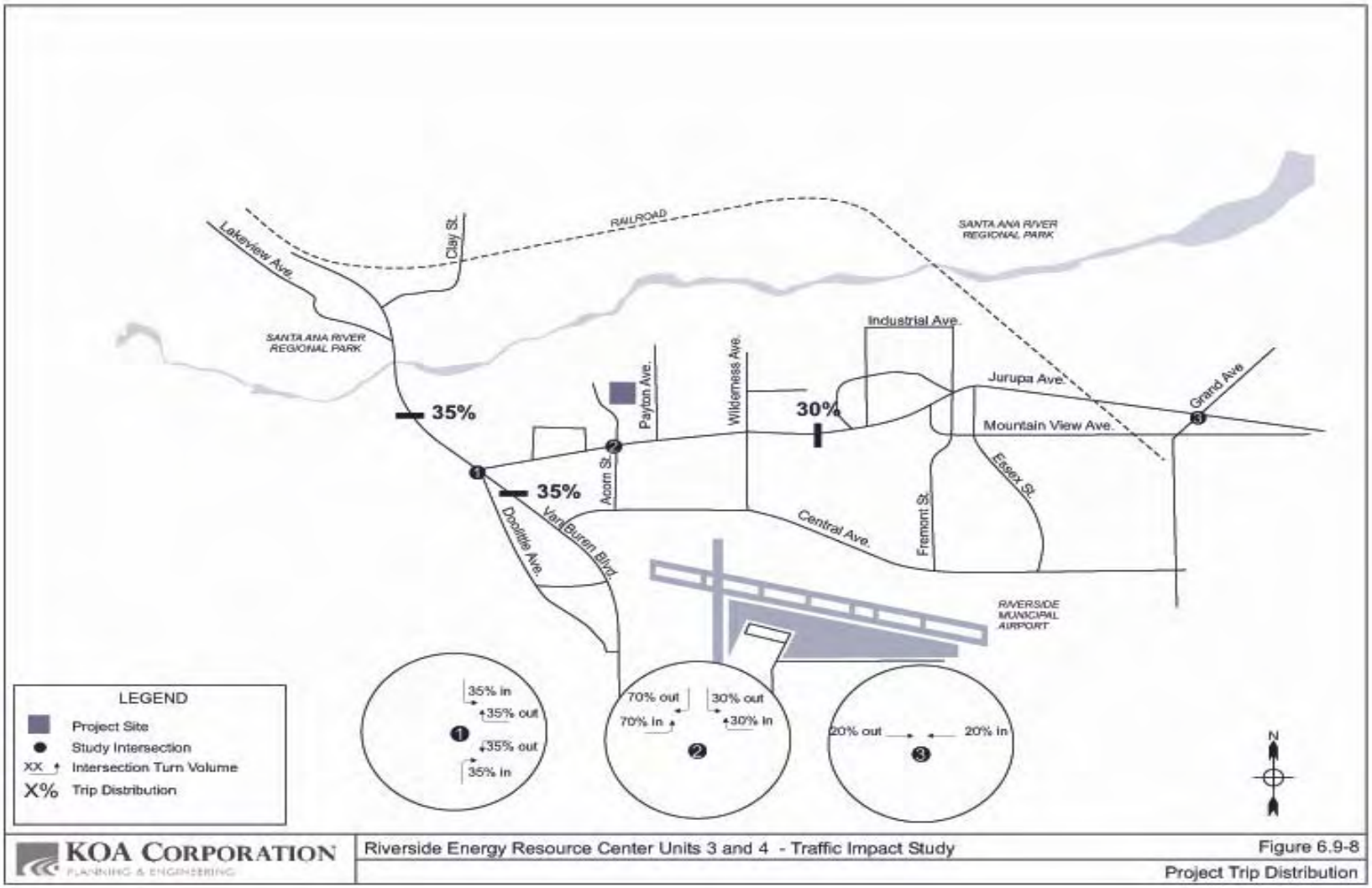
Note: AM Peak Hour does not coincide with the arrival time of employees

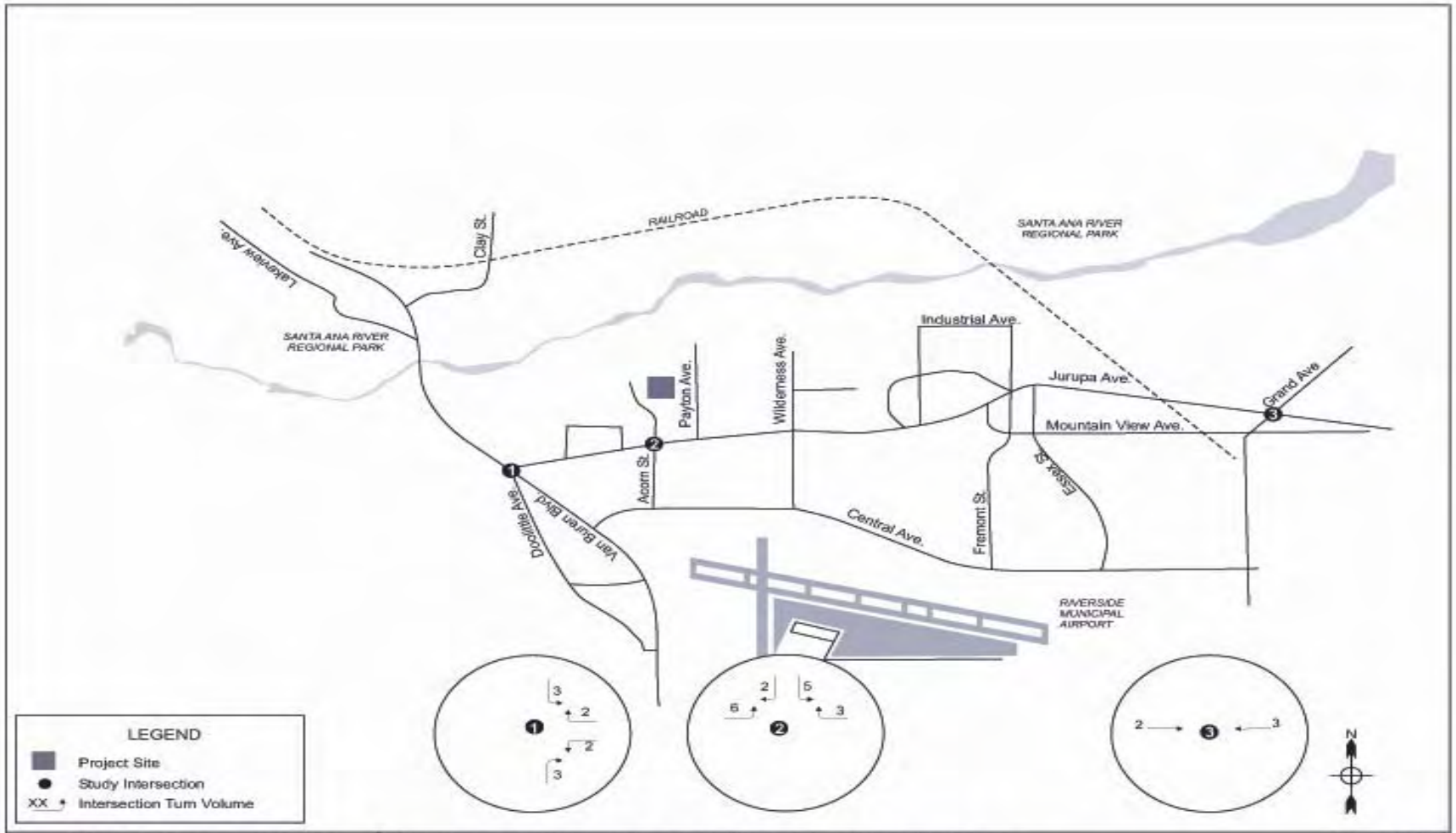
The Project will generate an estimated total of 422 trips daily, including16 trips during the AM peak hour and 104 trips during the PM peak hour.

5. Project Trip Distribution

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by project traffic. The potential interaction between the proposed land use and surrounding regional access routes are considered to identify the route where the project traffic will distribute.

The anticipated trip distribution for the proposed Project is presented on Figure 6.9-8. This figure indicates the proportion of project traffic which will use the street segments and turning movements indicated Figures 6.9-9 and 6.9-10 indicate the project related construction traffic volumes expected at locations within the study area, including use of driveways and local access routes. These figures show the direction of all traffic related to the project construction.


RAILROAD
SANTA ANA RIVER REGIONAL PARK
Lakeview Ave.
Clay St.
SANTA ANA RIVER REGIONAL PARK
Industrial Ave.
Jurupa Ave.
Grand Ave
Mountain View Ave.
Payton Ave.
Wilderness Ave.
35%
30%
35%
Acorn St.
Van Buren Blvd.
Doolittle Ave.
Central Ave.
Fremont St.
Essex St.
RIVERSIDE MUNICIPAL AIRPORT
LEGEND
Project Site
Study Intersection
XX Intersection Turn Volume
X% Trip Distribution
35% in
35% out
35% out
35% in
70% out
30% out
70% in
30% in
20% out
20% in
N
KOA CORPORATION
PLANNING & ENGINEERING
Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study
Figure 6.9-8
Project Trip Distribution

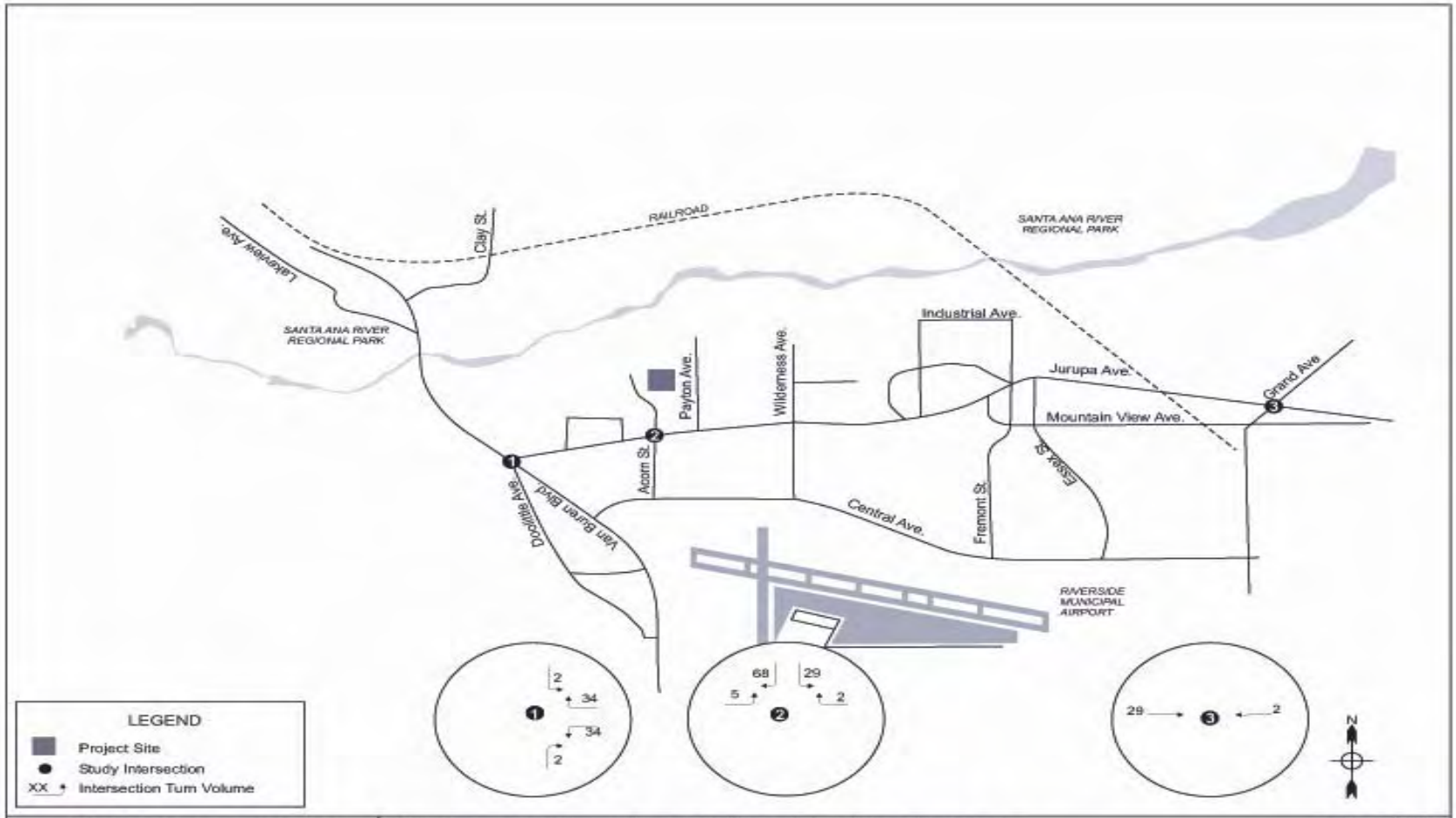


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-9

Project Related Traffic Volumes - AM Peak Hour



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-10

Project Related Traffic Volumes - PM Peak Hour

6.9.6 Future With Project Construction Conditions (2009)

The future traffic conditions are analyzed with the addition of project related construction traffic to the surrounding street system.

A. Future Peak Hour Intersection Level of Service

The Future "WITH Project" construction traffic volumes were derived by adding the project construction trips shown in Figures 6.9-11 and 6.9-12 to the forecast Baseline traffic volumes for the Year 2009. Table 6.9-7 summarizes the results of the Level of Service analysis for the Future "WITH Project" conditions.

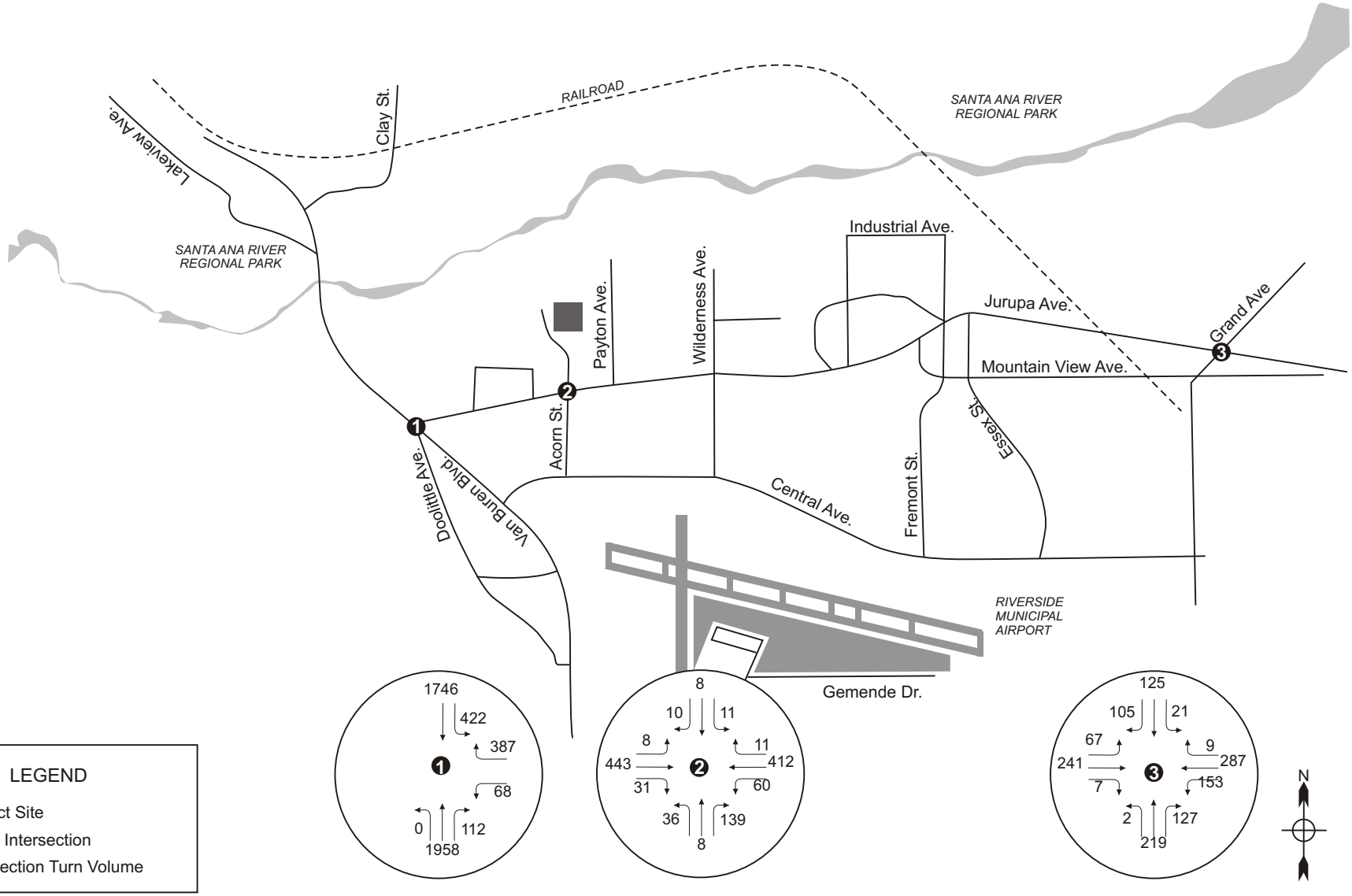
Table 6.9-7 AM/PM Peak Hour Intersection Performance Future WITH Project Construction Conditions (Year 2009)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.6	B	15.6	C
Jurupa Ave. at Van Buren Blvd.	66.1	E	79.6	E
Jurupa Ave. at Grand Ave.	31.5	C	35.8	D

Note: Delay based on seconds per vehicle average. LOS = Level of Service *Analyzed as an all-way stop

As shown in Table 6.9-7, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable Level of Service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth does not change the letter-grade Level of Service when compared to the Level of Service calculations for existing conditions or Year 2009 Baseline Conditions.

Traffic impacts are identified if the proposed Project will result in a significant change in traffic conditions on a roadway or intersection. A significant impact is normally defined when project related traffic would cause Level of Service to deteriorate to below the minimum acceptable level by a measurable amount. Impacts may also be significant if the location is already below the minimum acceptable level and project related traffic causes a further decline.

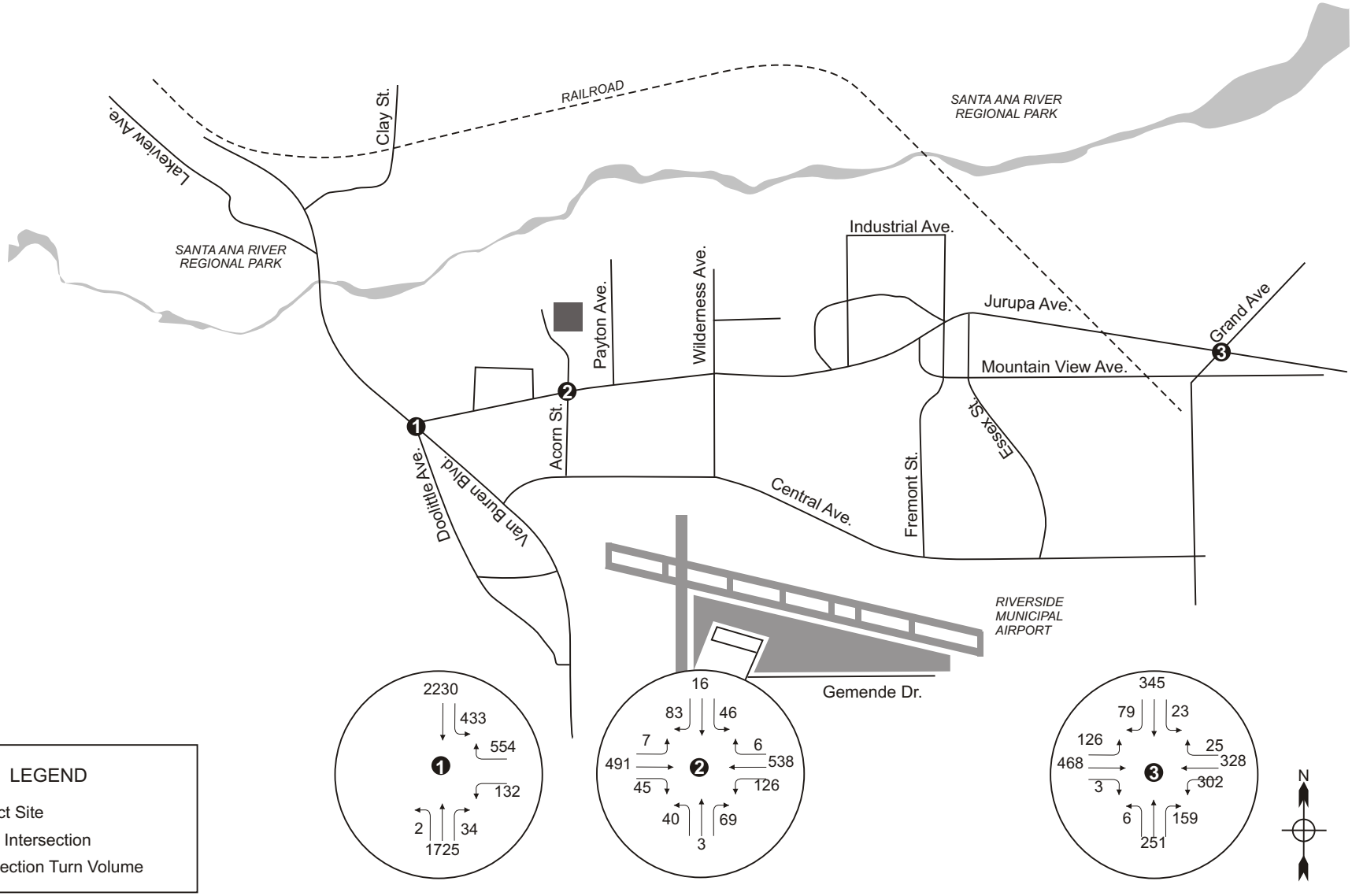


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-11

Future (Year 2009) With Proposed Project Construction Traffic Volumes - AM Peak Hour



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-12

Future (Year 2009) With Proposed Project Construction Traffic Volumes - PM Peak Hour

The City of Riverside does not have any guidelines but follows Riverside County Level of Service standards. The County's policy has identified a Level of Service D as the minimum allowable service level during peak hours at signalized intersections along all County-maintained roads and conventional state highways. Mitigation measures should be considered when traffic conditions are forecasted to decline to poorer levels of service. Unsignalized intersections are considered to be impacted if the Level of Service is poor, traffic signals are warranted, and delay is increased significantly. If signals are not warranted, mitigation measures other than signalization may be considered to improve stop control operation.

Table 6.9-8 Level of Service Analysis /Determination of Impacts for Future with Project Construction Conditions (Year 2009)

Intersection	Future Without Project		Future WITH Project		Increase	Impact?
Weekday AM Peak Hour (Delay/Level of Service)						
Jurupa Ave. at Acorn St.*	12.6	B	12.6	B	0.0	No
Jurupa Ave. at Van Buren Blvd.	65.3	E	66.1	E	0.8	No
Jurupa Ave. at Grand Ave.	31.5	C	31.5	C	0.0	No
Weekday PM Peak Hour (Delay/Level of Service)						
Jurupa Ave. at Acorn St.	14.4	B	15.6	C	1.2	No
Jurupa Ave. at Van Buren Blvd.	73.9	E	79.6	E	5.7	No
Jurupa Ave. at Grand Ave.	35.7	D	35.8	D	0.1	No

Note: Delay based on seconds per vehicle average. LOS = Level of Service. *Analyzed as an all way stop

Table 6.9-8 displays a comparison of future study scenarios (Year 2009) with and without the addition of forecast project construction traffic.

As shown in Table 6.9-8, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable Level of Service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth and project construction traffic does not change the letter-grade Level of Service when compared to the Level of Service calculations for existing conditions or Year 2009 Baseline Conditions.

The increases in intersection delay resulting from the addition of project trips is in all cases less than 10% for the periods with the heaviest construction activity. As previously stated, project impacts once construction is completed are expected to be nominal. Based on this analysis, the project construction and Project itself are not expected to have significant traffic impacts.

6.9.7 Impacts

6.9.7.1 Determination of Significant Traffic Impacts

Traffic impacts are identified if the proposed Project will result in a significant change in traffic conditions on a roadway or intersection. A significant impact is normally defined when project related traffic would cause Level of Service to deteriorate to below the minimum acceptable level by a measurable amount. Impacts may also be significant if the location is already below the minimum acceptable level and project related traffic causes a further decline.

6.9.7.2 School Impacts

The California Energy Commission has requested traffic information related to schools on similar projects. It is understood that the potential impacts of traffic, namely construction truck traffic may have some impact on school children in the area (children being picked up or dropped off on local roads near the proposed project site). The following indicates schools, their location, distance from project site, and bus routes designated by the school district as follows in Table 6.9-9.

None of these schools will experience significant traffic changes due to the temporary increases in traffic resulting from project construction. They are all remote from the Project and not located along roadways with project related traffic. The bus routes designated by the school district do not run along Jurupa Avenue within the project vicinity; therefore no school bus routes or bus stops will be affected by the Project.

Table 6.9-9 School Characteristics in the Project Vicinity

School Name	Distance from the Project Site	School Designated Bus Routes
Arizona Intermediate (La Sierra Avenue at Arizona Avenue)	6 miles south of the project site.	Bus Routes 10, 11, 12, 13, 15 & 23
Villegas Intermediate (Harvill Lane at Magnolia Avenue)	7 miles south of the project site.	Bus Routes 12, 13, 15, 19 & 20
Loma Vista Intermediate (La Sierra Avenue at Arlington Avenue)	5.5 miles west of the project site.	Bus Routes 9, 11, 12 & 13
Terrance Elementary (Rutland Avenue, North of Arlington Avenue)	3 miles west of the project site.	Bus Route 1
Alvord High School (Pierce Street, South of Magnolia Avenue)	5.5 miles south of the project site.	Bus Route 1
Foothill Elementary (Well Avenue, West of Van Buren Boulevard)	3 miles southwest of the project site.	Bus Route 2
Myra Linn Elementary (Meredith Street at Brannigan Court)	3.5 miles southwest of the project site.	Bus Routes 2 & 7
Rosemary Kennedy Elementary (Mitchell Avenue at Arlington Avenue)	4 miles west of the project site.	Bus Routes 3, 4 & 5
Norte Vista High School (Arlington Avenue at Tyler Street)	3 miles west of the project site.	Bus Route 7
Twinnhill Elementary (La Sierra Avenue at Campbell Avenue)	4 miles southwest of the project site.	Bus Route 7

6.9.7.3 Plume Impacts on Traffic Safety

The cooling towers at RERC Units 3&4 are to provide cooling for the inlet air chillers. As such the cooling towers are much smaller than the cooling tower associated with a combined cycle, geothermal, or other thermal power plant that uses a steam power cycle and a cooling tower.

During the summer months when the chiller and hence cooling towers are most likely to be in operation, the hot and dry environmental conditions preclude a mist plume from the cooling towers being an issue. During winter months the chiller load is minimal due to the low ambient temperatures. When a mist plume has been observed it has always been small and did not extend off the project site. Thus, a mist plume does not appear to have any impact on traffic safety or operations, based upon the location of the project site and proximity to heavily used roadways.

6.9.7.4 Impacts on Emergency Services

The California Energy Commission has requested information on similar projects to determine if there will be an impact to emergency service vehicles in the project area, due to increased traffic generated by the projects. Neither the daily traffic nor the construction traffic will be significant enough to cause delays, increase congestion, or inhibit access for emergency vehicles.

6.9.7.5 Public Transportation

Several types of public transportation are available in the City of Riverside. The Riverside Transit Agency (RTA) provides transit services available to all citizens in western Riverside County. RTA provides scheduled, fixed routes and on demand service through their Dial-A-Ride program. Regionally linked ground transportation providers include Amtrak and Greyhound. The nearest Amtrak station is in San Bernardino approximately nine miles north of Riverside. Greyhound has a bus terminal on University Avenue in Riverside. Impacts to public transportation would be less than significant.

6.9.7.6 Bicycle Facilities

Bicyclists use roadways and bicycle paths in the City of Riverside. The closest designated bicycle path to the proposed Project is associated with the Santa Ana River Trail (Riverside County Class 1 Bicycle trail). It is located on the north side of the wastewater treatment plant (RRWWCP) and the proposed plant site along the Santa Ana River. Impacts to bicycle facilities would be less than significant.

6.9.7.7 Railroad Operation

A single-track railroad alignment is located approximately one mile east of the project site where it crosses the Santa Ana River. The Union Pacific Railroad owns the rail line. Metrolink commuter rail service also runs on this rail line. Metrolink has a station located in downtown Riverside. The proposed Project is not anticipated to include any routine or periodic deliveries via local or regional railroads. No adverse impacts to rail services will

occur because any such deliveries would be non-routine and limited, additionally, no impacts to Metrolink rail services are anticipated.

6.9.7.8 Construction Impacts

The vehicles used to transport heavy equipment and construction materials will require transportation permits when they exceed the size, weight, width or length thresholds set forth in Section 35780 of the California Vehicle Code, Sections 117 and 660-711 of the California Streets and Highways Code, and Sections 1411.1 to 1411.6 of the California Code of Regulations. Affected vehicles will be required to obtain transportation permits from the City of Riverside and Caltrans.

Only a small percent of the truck trips are estimated to be consumable material deliveries including some small amount of hazardous materials (solvents, lube oils, paint, paint thinners, adhesives, batteries, construction gases, etc) in their original manufacturer containers. Of the estimated truck deliveries with hazardous materials, total quantities of hazardous materials and subsequent public risk should be relatively low. It is anticipated that hazardous wastes would be sent from the site to treatment storage or disposal facilities on a biweekly or monthly basis. Proper containers and transportation procedures that conform to applicable Caltrans requirements will be used for all material and waste shipments (i.e. 49 CFR Chapters II, III; California Vehicle code Section 31300, et seq.). No acutely hazardous materials will be used or stored onsite during construction. Because of the small quantities of hazardous materials involved, separate truck deliveries of hazardous materials during construction are unlikely.

The average increase of 5 additional daily truck trips (with 10 truck trips as a worst case scenario) on state routes in the project area is minor compared with existing truck traffic on these routes and will represent a minimal increase in truck traffic along the proposed routes of travel. Therefore, the impact of truck traffic on state routes is considered to be less than significant.

The average increase of 5 additional daily truck trips (with 10 truck trips as a worst case scenario) on state routes in the project area is minor compared with existing truck traffic on these routes and will represent a minimal increase in truck traffic along the proposed routes of travel. Due to the size and weight of these trucks, the increase in truck traffic will contribute to wear on the roads and will increase the need for regular roadway maintenance. The increase in project related roadway wear and tear is considered less than significant.

Construction debris and small quantities of hazardous wastes will be generated during construction. During construction, a minimal number of truck trips per month will be required to haul waste for disposal. Transportation of hazardous materials to and from the project site will be conducted in accordance with California Vehicle Code Section 31300. Because the transportation of hazardous wastes will be conducted in accordance with the relevant transportation regulations, less than significant impact is expected.

The proposed laydown area for the Project is located adjacent to and north of the Project on property. Construction equipment and materials will be stored and stockpiled within the potential laydown areas. Construction and safety measures moving equipment and materials to the project site from the laydown area would be implemented by the contractor.

6.9.7.9 Operation Impacts

During the operations of RERC Units 3&4, a minimal number of hazardous materials deliveries will be made to the project site. The anticipated travel routes for hazardous materials deliveries will be along SR 60, Van Buren Boulevard, and Jurupa Avenue. The same route is also expected to be used by the portable demineralizer truck trailers when they are delivered and removed from the project site. Potential long-term traffic impacts are expected to be less than significant with the delivery of hazardous and non-hazardous materials to the project site and hauling of waste generated during the Project's operations.

Facility operation is not anticipated to include any routine or periodic deliveries via local or regional railroads. Because any such deliveries would be non-routine and limited, no adverse impacts to rail services will occur.

6.9.8 Mitigation

6.9.8.1 Project Access and Internal Circulation

The Project will take access to Acorn Street, which will connect to Jurupa Avenue. No new driveways are planned as a part of the Project.

Parking stalls will be located an appropriate distance from entrance driveways based on City Standards, in order to allow unobstructed access to the project site. The Project will provide sufficient parking to meet the requirements of the City of Riverside based upon office and warehouse space. Additionally, this parking will meet the American with Disabilities Act (ADA) requirements for access and designated handicap parking spaces.

The proposed Project will be reviewed by the City of Riverside for compliance with applicable City standards. We anticipate that any minor internal circulation or parking issues will be addressed in conjunction with this review.

6.9.8.2 Traffic Impacts

The Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable Level of Service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth and forecast construction traffic does not change the letter-grade Level of Service when compared to the Level of Service calculations for existing conditions or Year 2009 Baseline Conditions.

6.9.8.3 Need for Any Improvements

Since the project construction will occur over a relatively short 9-month period and will

not be permanent, and does not change the letter-grade Level of Service during peak hours at any of the study intersections, specific traffic mitigation measures are not required.

6.9.8.4 CEQA Checklist

The California Environmental Quality Act requires that specific qualities be looked at to determine if the Project has a potentially significant impact on the surrounding system. The tests for traffic-related issues are included in Table 6.9-10 below.

Table 6.9-10 CEQA Checklist - Traffic-Related Issues

Would the Project	Potentially Significant Impact	Less Than Significant with Mitigation	Less than Significant	No Impact
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?			X	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?			X	
f) Result in inadequate parking supply?				X
g) Create a significant hazard to the public or the environment through the routine transportation of hazardous materials?			X	

6.9.9 Conclusions

The California Energy Commission will evaluate the site development analysis for the construction of two simple cycle units at an existing power plant facility in the City of Riverside. The proposed Project site is owned by the City of Riverside and is located adjacent to and on the east side of the City of Riverside's Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. The Project will connect to the 69 kV high voltage transmission system at the existing RERC Switchyard. The Project will create 97 daily trips, including 12 trips during the AM and 13 trips during the PM peak hour.

Once the Project is completed, the increase in staffing from 18 to 30 employees will not result in the generation of a significant number of additional trips. Support trips to the facility are also not expected to increase significantly. Therefore, this traffic study focused the potential impact of project construction traffic. Construction activities during peak periods will require 100 employees and be supported by truck supply and equipment deliveries. Construction will occur over a 9-month period. Based on the traffic analysis, no significant traffic impacts are anticipated as a result of construction activities.

6.10 Agriculture and Soils

6.10.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands as well as supporting the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the Project will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section evaluates the potential for Project impacts to agriculture and soil resources during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting agricultural and soil resources. Required permits and permitting agencies are also identified.

6.10.1.1 Project Description

The proposed site is owned by the City of Riverside and is located adjacent to the City of Riverside's Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. RERC Units 3&4 will consist of two more aero-derivative combustion turbine generators with SCRs, a two bay expansion of the on-site switchyard, and on-site ancillary buildings. RERC Units 3&4 will occupy approximately 2.2 acres of the 16 acre site. An additional 2 acres is reserved for construction laydown. The entire project area perimeter is already fenced with a combination of chain-link fencing and architectural block walls.

All construction will comply with the City of Riverside's "Best Management Practices for Typical Construction Activities". The construction contractor will be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) and monitoring as required by the State Storm Water Construction Permit for all phases of project construction. This plan will be submitted for review and approval to the CPM at least 30 days prior to site mobilization. The SWPPP will minimize erosion and sedimentation by:

- Minimizing disturbance to protective soil covers
- Treating disturbed, soil storage and similar areas with dust suppressants, windbreaks or water to reduce wind erosion and subsequent emissions as appropriate,
- Stabilizing disturbed, soil storage and similar areas. Stabilization techniques would include but not be limited to mulching, revegatation and erosion control matting.

- Properly maintaining access roads, parking lots and similar areas.
- Controlling site runoff by employing temporary drains, swales and diversions to direct water to sediment basins or traps.
- Employing sediment trapping and filtering measures such as silt fence, sand bag dikes and catchments.

6.10.2 Laws, Ordinances, Regulations and Standards

LORS applicable to agricultural and soil resources are summarized in Table 6.10-1

Table 6.10-1 Laws, Ordinances, Regulations and Standards - Agriculture

Jurisdiction	Authority	Administering Agency	Compliance
Federal	Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977 (including 1987 amendments)	Santa Ana Regional Water Quality Control Board	Establishes requirements for activities that would affect beneficial uses of waters of the U.S.
Federal	U.S. Department of Agriculture, Natural Resources Conservation Service, National Engineering Handbook	Natural Resources Conservation Service	Guidance providing standards for soils conservation during planning, Design and construction activities.
State	Porter-Cologne Water Quality Control Act of 1972, California Water Code, California Code of Regulations, Title 23, Sections 13000 et seq.		Protection of water quality by appropriate design, sizing and construction of erosion and sediment controls.
City	California Land Conservation Act of 1965 (Williamson Act)	City of Riverside	Voluntary tax incentive program to preserve agricultural and open space land.
City	City of Riverside General Plan, Open Space and Conservation Element	City of Riverside	Protection of soil resources and agricultural properties.
City	City of Riverside Municipal Code, Chapter 17.16.010 Grading Permit Application Requirements	City of Riverside	Requirements for grading permit.

6.10.3 Setting

6.10.3.1 Regional Setting

The Project is located east of the Los Angeles Basin in the northern end of the Peninsular Ranges geomorphic province. This province is characterized by the presence of numerous, northwestern trending, small mountain ranges and intervening plains and valleys. The ranges are generally subparallel to faults branching from the San Andreas Fault. Soils typically encountered include Alfisols, Entisols, Inceptisols, Mollisols, and Vertisols that formed in a warm, dry climate. The Peninsular Ranges are bounded on the northeast by the Transverse Ranges and on the southeast by the Colorado Desert.

The project area and vicinity have been significantly affected by urbanization. Much of the area in the vicinity of the project area was historically used to produce agricultural crops. The process of urbanization continues to shift land use patterns away from agricultural activities. No active commercial agriculture was identified on or adjacent to the project area based on-site investigation and aerial photography review.

6.10.3.2 Local Setting

Native soil materials have been removed from the project area. Up to approximately 25 feet of material was excavated and removed prior to development of RERC Units 1&2. The excavated material was used at the Tequesquite landfill. The current project area surface consists primarily of a thin layer of fill material and quartz diorite bedrock. The fill material consists primarily of silty sands that are light brown, dry and loose. Fill material is up to 1.5 feet thick. Below the fill material is slightly to moderately weathered quartz diorite bedrock. No agricultural activities were observed within the one mile of the project area.

According to the Soil Survey of Western Riverside Area California (NRCS, 1971) there were three soils mapping units present within the project area. These mapping units were:

- Buchneau loam, slightly saline-alkali, 2 to 8 percent slopes (map symbol BhC). Buchneau soils are moderately well drained, loamy soils on alluvial fans. These soils developed on mixed alluvium and are underlain by a platy calcareous hardpan.
- Fallbrook sandy loam, shallow, 15 to 35 percent slopes, eroded (map symbol FbF2). Fallbrook soils are well-drained, loamy soils on uplands. These soils developed on granodiorite and tonalite.
- Terrace escarpments (map symbol TeG). Terrace escarpments consist of unaltered, variable alluvium outwash on terraces or barrancas. These areas have various soil profiles that are typically truncated.

NRCS data indicate that soils delineated as map symbol HcC would be prime farmland if irrigated. Prime farmland status does not apply to these soils encountered by the Project for

two reasons. First, no irrigation has been observed in the project vicinity. Second, urban and suburban development has eliminated or significantly affected these soils.

NRCS data indicate that several soils would be Statewide Important Farmland if they were intact. These include map symbols BhA, BhC, FaD2, FfC2, and PtB. However the soils encountered by the Project would not be Statewide Important Farmland because urban and suburban development has eliminated or significantly affected these soils.

California Division of Land Resource Protection Farmland Mapping and Monitoring Program maps indicate that the Project would not affect Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. One parcel of land designated as Unique Farmland occurs near the Project. It is 23.9 acres in size and is located approximately 0.5 miles east of the RERC Units 3&4 project area and 0.25 miles north of Jurupa Avenue. Proposed Project activities would not affect this parcel of land.

6.10.4 Impacts

The construction and operation of the proposed facility would not result in significant impacts to soil resources. Native soils have essentially been eliminated from the RERC project area due to past excavation activities that preceded the development of RERC 1&2.

Although there is the potential for impacts related to wind and water erosion resulting from construction activities, the Project, as designed, will reduce any impacts to less than significant levels.

Operation of the proposed RERC Units 3&4 facility would not result in significant impact to soil resources. Access roads, parking lots and similar areas will be paved or covered with crushed rock. Landscaping will also contribute to the stability of the facility surroundings during operation. Emissions from the proposed facility are not expected to impact soils resources in the project vicinity. Highly sensitive areas, such as serpentine parent material derived soils and their associated unique plant communities, have not been identified in the project vicinity. Table 6.10-2 shows the results of the CEQA Environmental Checklist for soils.

Table 6.10-2 CEQA Environmental Checklist - Soils

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
Soils – Would the Project:				
Convert to non-agricultural use the Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps for the Farmland Mapping and Monitoring Program by the California Resources Agency?				X
Conflict with existing zoning for Agricultural use, or a Williamson Act contract?				X
Involve other changes in the existing environment which, due to their location or nature, could result conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use?				X
Impact jurisdictional wetlands?				X
Result in substantial soils erosion?			X	
Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code **(1994),** creating substantial risks to life or property?				X
Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X

6.10.5 Mitigation

Please refer to the Storm Water Pollution Prevention Plan (SWPPP) prepared for the Project to identify specific BMPs for implementation. These BMPs will minimize erosion and sedimentation by:

- Minimizing disturbance to protective soil covers
- Treating disturbed, soil storage and similar areas with dust suppressants, windbreaks or water to reduce wind erosion and subsequent emissions as appropriate
- Stabilizing disturbed, soil storage and similar areas. Stabilization techniques would include but not be limited to mulching, revegetation and erosion control matting.
- Properly maintaining access roads, parking lots and similar areas

- Controlling site runoff by employing temporary drains, swales and diversions to direct water to sediment basins or traps.
- Employing sediment trapping and filtering measures such as silt fence, sand bag dikes and catchments.
- Effective implementation of the mitigation measures discussed above would reduce any reasonably foreseeable direct, indirect, or cumulative adverse impacts to an insignificant level.

6.10.6 Permits Required

The City of Riverside would require a grading permit if project development activities result in moving more than 50 yards of material within the boundaries of the project area.

6.10.7 References

U.S. Department of Agriculture. Natural Resources Conservation Service, November 1971. Soil Survey Western Riverside Area California.

U.S. Department of Agriculture. Natural Resources Conservation Service, May 1993. Prime Farmland and Statewide Important Farmland for Western Riverside County.

U.S. Department of Agriculture. Natural Resources Conservation Service. Soil Survey Division. Official Series Descriptions [online WWW]. Available URL: http://.ortho.ftw.nrcs.usda.gov/osd [Accessed 3/4/04]

California Department of Conservation. Farmland Mapping and Monitoring Program. [online WWW]. Available URL: http://www.consrv.ca.gov/DLRP/fmmp

California Department of Conservation. Farmland Mapping and Monitoring Program, August 1995. Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance, Riverside County.

U.S. Department of the Interior Geological Survey. 1967 (photorevised 1980). Riverside West Quadrangle. 7.5 Minute Topographic Series.

6.11 Visual Resources

6.11.1 Introduction

Riverside Public Utilities (RPU) proposes to develop, build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the RERC will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to visual resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting, potential environmental impacts and proposed mitigation measures affecting these resources. Required permits and permitting agencies are also identified.

6.11.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. RERC Units 3&4 will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. RERC Units 3&4 and will occupy approximately 2.2 of 16 acres. An additional 2 acres are reserved for construction laydown. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

6.11.2 Laws, Ordinances, Regulations and Standards

6.11.2.1 Federal

No Federal LORS relating to visual resources apply to the proposed Project.

6.11.2.2 State

Scenic Highway Program

No eligible or designated state scenic highways are located within the viewshed of the proposed Project.

California Environmental Quality Act

The CEQA guidelines define "significant" effect on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance." (Cal. Code Regs, Tit. 14 §15382)

Under the CEQA Guidelines, significant visual impacts may result from:

- A substantial adverse effect on a scenic vista.
- Substantial damage to scenic resources, including, but not limited to trees, rock outcroppings and historic buildings within a state scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- A new source of substantial light or glare that would adversely affect day or nighttime views in the area.

6.11.2.3 Local

City of Riverside 2025 General Plan

The Project is located in the Manufacturing Park (BMP) zone, see Land Use Section 6.2.

Riverside County General Plan and Jurupa Area Land Use Plan

The lands immediately adjacent to the City of Riverside City limits are included within two "policy areas" of the Jurupa Area Land Use Plan. Policy areas are portions of an area plan that contain special or unique characteristics that merit detailed attention and focused policies. The two policy areas are the Santa Ana River Corridor and the Riverside Municipal Airport Influence Area. The project area is located south of the Santa Ana River Corridor designated in the 2003 Riverside County General Plan. The following policies are relevant to the Santa Ana River Corridor:

JURAP 7.2 – Require development, where allowable, to be set back an appropriate distance from the top of bluffs, in order to protect the natural and recreational values of the river and to avoid public responsibility for property damage that could result from soil erosion or future floods.

JURAP 7.3 – Encourage future development that borders the Policy Area to design for common access and views to and from the Santa Ana River.

6.11.3 Setting

6.11.3.1 Project Viewshed

The viewshed is the surface area that is visible from a specific viewpoint. Or it can be conversely described as the areas from which a specific point is visible. The Project's viewshed has been estimated as an aid in identifying the views that could be affected by implementing the Project.

In general, the distance of potential visibility from a subject is considered to be about 3 miles from it. This is because elements of a view that are 3 miles or more away are considered to be a part of the background, the landscape zone in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become less apparent (USDA, 1973). A potential viewshed with a 3-mile radius is a conservative approach because it does not take into account land use activities such as buildings or existing vegetation that may obscure a view; thus, it overstates project visibility.

For the Project, a much smaller viewshed or study area of 1-mile was considered primarily because of the developed nature of the area. Refer to Figure 6.11-1, Photo Location Map. However, a study area of a 2-mile radius was used due to the higher elevations of the river bluffs and hills to the north of the Project. Figure 6.11-2, Key Observation Point (KOP) Location Map, shows areas studied within the 2-mile distance that have unobstructed views of the Project as well as areas that have partially or fully obstructed views of the project site.

Within the viewshed study area there are three highways that bound the project site: Limonite Avenue to the north, Van Buren Boulevard to the west, and Jurupa Avenue to the south. As deducted from Figure 6.11-2, only intermittent and/or partially obstructed views of the project site occur along Van Buren Boulevard. Due to commercial and residential development no views of the site are evident. And along Jurupa Avenue, only three partially obstructed view windows are evident due to the developing industrial development throughout the adjacent project area. Any view experiences around the site depict an industrialized setting (e.g., water tanks, warehouses, wastewater treatment facilities and other industrial buildings).

6.11.3.2 Visual Character of Regional Landscape, Project Site and Vicinity

Our understanding of the visual environment is based on the visual character of objects in the environment and the relationships between those objects. Two attributes comprise visual character: pattern elements and pattern character.

Pattern elements include the form, line, color and texture of an object. The form is the visual mass, bulk, or shape of the object. The edges of objects or parts introduce the line objects. The color of an object is its reflective brightness (light or dark) and its hue (red, blue, or yellow). Texture is the surface coarseness of the object. Awareness of patterns of elements decreases with distance from a seen object.

The visual contrast of an environment can be traced to its components of pattern character: dominance, scale, diversity and continuity. Elements in a landscape may be visually dominant because of position, extent, or contrast of basic pattern elements. Scale is the size relationship between a landscape element and its surroundings. Visual diversity is the number, variety and intermixing of visual pattern elements. Continuity is the uninterrupted flow of pattern elements of a landscape and the maintenance of the visual relationship between connected or related landscape components.

The primary forms in the project vicinity are: the existing facilities of the RPU plant project site; the industrial buildings to the east, west and south of the project site; the wastewater treatment facility to the west; and the distant residential hills of the Pedley community to the north. To the immediate north of the project site, the primary forms are the trees, river and riparian area. These features provide a variety of angled, vertical and horizontal lines as well as form, color and texture variety.

The variety in colors in the project vicinity is demonstrated by the brown hues at the undeveloped project site; the dark greens of the tree and the riparian area to the north; the nearby industrial buildings; and the brightness provided by the reflection of the sun off the mostly white buildings. Texture is provided by the industrial facility and bare soil at the project site.

The dominant feature near the project site is the City of Riverside Wastewater Treatment Plant. This feature immediately adjacent the project site is the largest landscape element in terms of scale. Other urban development near the project site is typical of an industrial environment. North of the site, the dominant visual feature is the Santa Ana River and its riparian corridor.

Visual diversity is provided in the area by the mixture of the natural and human-made environment, and the variety of form, line, color and texture provided by the ground surface and vegetation.

Continuity is demonstrated by the inter-relatedness of the forms in the landscape, (i.e., the concentration of industrial development within the immediate area to the east, south and west. It is also exhibited by strong lines provided by the natural and human-made structures in the area: the combination of colors; and the textures provided by nearby areas with a natural appearance.

6.11.3.3 Visual Resources

The visual resource inventory categories are: landforms, types of water bodies, vegetation communities, land use and the types of urban development present. The City of Riverside is located in southern California within the ‘Inland Empire’ region, an area that is characterized by a combination of uses that includes urban, agriculture and open space uses. Other uses include the system of aqueducts, freeways/highways and railroads within the region. Cities occur along the freeways within the region, and beyond these urbanizing areas, agricultural areas and open spaces exist.

State Routes 60 and 91, and Intrastate Highway 215 cross the City of Riverside. The urbanized area consists of residential, commercial and industrial land uses. Limited agricultural areas surround portions of the city with the Santa Ana River forming its northern boundary and Estelle Mountain Reserve forming the southern boundary. The landscape in the immediate vicinity of the City contains periodic rolling hills and foothills. The City's landscape exhibits the urban character of a medium sized city (population

255,166 Riverside, 2004) that has retained its own identity and uniqueness in comparison to the surrounding region.

6.11.3.4 Visual Quality

Aesthetics includes not only the character of the visual experience (pattern elements and pattern character) but also its quality. The enjoyment or interpretation of a landscape is subjective, yet there is public agreement that the visual resources of certain landscapes have high visual quality. For example, high visual quality is recognized in both natural landscapes (such as the Grand Canyon) and urban landscapes (such as the San Francisco skyline). Therefore, the character of a landscape and its components may vary greatly, and both landscapes may be considered exceptional. A project in an area with high visual quality should not be assumed to have an adverse effect on the visual quality of that landscape.

Three criteria have been used to evaluate the visual quality of the project area and vicinity: vividness, intactness and unity. None of these by itself is equivalent to visual quality; all three must rate high to indicate quality. Vividness is the memorability of contrasting landscape components as they combine in striking and distinctive visual patterns. Intactness is the visual integrity of the natural and human-made landscape and the degree to which the landscape is free from visual encroachment. Unity is the visual harmony of the landscape (compatibility of landscape elements) considered as a whole.

Vividness of the project area and vicinity includes an assessment of the landforms, land cover and human-made development of the area. The vividness rating of the project area and vicinity is considered low-to-moderate. Some landform relief exists to contribute to the memorability of the view to the north. In addition, no natural water bodies are present at the project site, and the water bodies immediately west of the site are wastewater treatment ponds.

The Santa Ana River directly north of the site isn’t visible due to terrain that obstructs its view.

Intactness of the project area and vicinity is seen within the concentration of industrial development near the site (on Jurupa Ave) and along Limonite Avenue located in the community of Pedley to the north of the site. The intactness is considered moderate because of the inter-relatedness of the urban landscape near the project area.

There is minimal connection between the undeveloped project area, riparian and river corridor area to the north and the urban facilities (industrial facilities, airport, railroads, pipelines, roadways and transmission lines). Overall, the landscape elements of the project area and vicinity have low visual unity.

The overall visual quality of the project area and immediate vicinity, when considered in its predominant surrounding industrial context, is considered low.

6.11.3.5 Viewer Characteristics, Viewer Groups, Exposure and Sensitivity

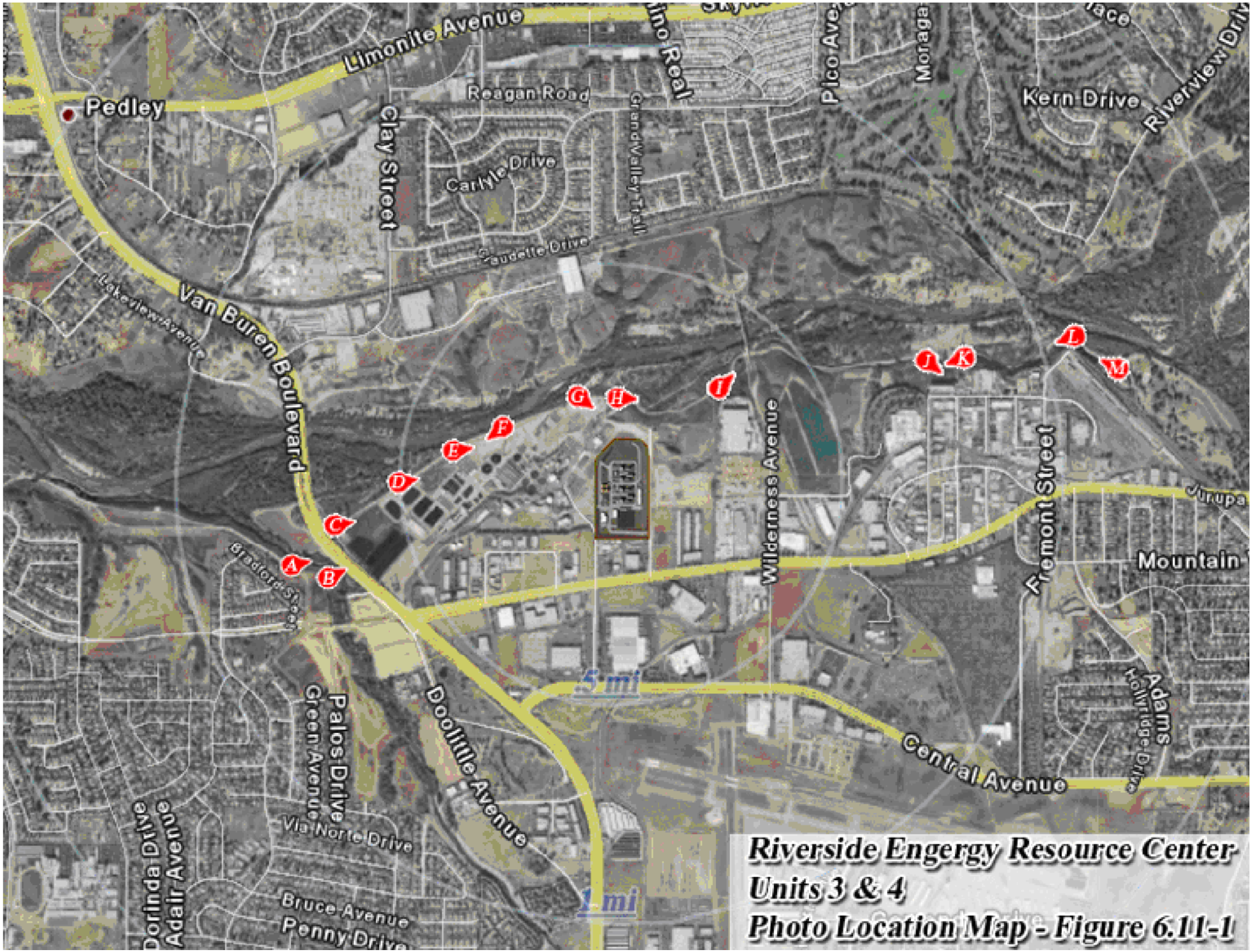
The quality of the visual experience depends on the visual resources and the viewer response to those resources. When characterizing viewers, the following must be considered: the type of viewer group; the viewer exposure (their location, number of people in group, and duration and frequency of their view); and viewer sensitivity (viewer activity, awareness and values). The viewer groups can be classified as three types:

- People living in residential neighborhoods to the west of the Project, and residents in the Pedley community to the north;
- Recreationists visiting the Santa Ana River Trail to the north of the project site;
- Drivers and passengers (motorists) traveling along Jurupa Avenue, Van Buren Boulevard, Clay Street and General Road.

Photos demonstrating the views, landscape character and visual quality seen by the various viewer types (receptors) were taken during the site reconnaissance visits of December 2007. The locations where these photos were taken and the direction that the camera was focused are shown on Figure 6.11-1. These photos and their associated viewers and view locations are listed below:

- **Photo A / Figure 6.11-1a** shows the project area view looking east from the trail adjacent to the nearest residential subdivision west of the site. Looking east across Van Buren Boulevard and elevated above the highway, the industrial character of the area with the wastewater treatment plant in the foreground dominate the view.
- **Photo B / Figure 6.11-1b** shows the project area view again looking east adjacent to Van Buren Boulevard. The natural gas pipeline crossing structure and the MWD aqueduct are visible in the middle ground.
- **Photo C / Figure 6.11-1c** shows the recreationist view looking east. This characterizes the separation of viewer experience along the wastewater facility to the south and the river environment to the north.
- **Photo D / Figure 6.11-1d** shows the trail experience looking east. The trail adjacent to the wastewater plant gives the trail user a closed in feeling with the fencing on both sides creates a hallway experience.
- **Photo E / Figure 6.11-1e** looking southeast into the wastewater treatment plant.
- **Photo F / Figure 6.11-1f** looking west on the trail shows the distinction of viewer experience between the river view to the north and the wastewater/industrial view to the south side of the trail.
- **Photo G / Figure 6.11-1g** shows the trail view looking southeast across the wastewater treatment plant with the project area beyond.

- **Photo H / Figure 6.11-1h** this trail view is looking east at the end of the wastewater treatment plant and thus the terminus of the trail-adjacent fencing defining the trail experience on both sides. The yellow pipeline and support structure is a natural gas pipeline crossing above the trail.
- **Photo I / Figure 6.11-1i** shows the trail view looking east where a Metropolitan Water District Upper Feeder Aqueduct crosses above the trail.
- **Photo J / Figure 6.11-1j** shows the trail experience looking east with industrial buildings and storage sited at the edge of a bluff above the trail. Also a 69kV transmission line is shown crossing the trail.
- **Photo K / Figure 6.11-1k** shows the trail view looking west with an industrial building sited at the edge of a bluff above the trail.
- **Photo L / Figure 6.11-1l** shows the recreationist views from the Juan Bautista de Anza National Historic Trail heading west. The Union Pacific Railroad Bridge is shown crossing above the trail.
- **Photo M / Figure 6.11-1m** shows a trailhead sign delineating the De Anza trail with the trail heading west along the southern bank of the Santa Ana River and the industrial uses adjacent the trail to the south. The hills of Pedley are seen in the background.



Riverside Engergy Resource Center
Units 3 & 4
Photo Location Map - Figure 6.11-1

Photo "A" - Figure 6.11-1a
Riverside Energy Resource Center, Units 3 & 4

Photo "B" - Figure 6.11-1b
Riverside Energy Resource Center, Units 3 & 4

Photo "C" - Figure 6.11-1c
Riverside Energy Resource Center, Units 3 & 4

Photo "D" - Figure 6.11-1d
Riverside Energy Resource Center, Units 3 & 4

Photo "E" - Figure 6.11-1e
Riverside Energy Resource Center, Units 3 & 4

Photo "F" - Figure 6.11-1f
Riverside Energy Resource Center, Units 3 & 4

Photo "G" - Figure 6.11-1g
Riverside Energy Resource Center, Units 3 & 4

Photo "H" - Figure 6.11-1h
Riverside Energy Resource Center, Units 3 & 4

Photo "I" - Figure 6.11-1i
Riverside Energy Resource Center, Units 3 & 4

Photo "J" - Figure 6.11-1j
Riverside Energy Resource Center, Units 3 & 4

Photo "K" - Figure 6.11-1k
Riverside Energy Resource Center, Units 3 & 4

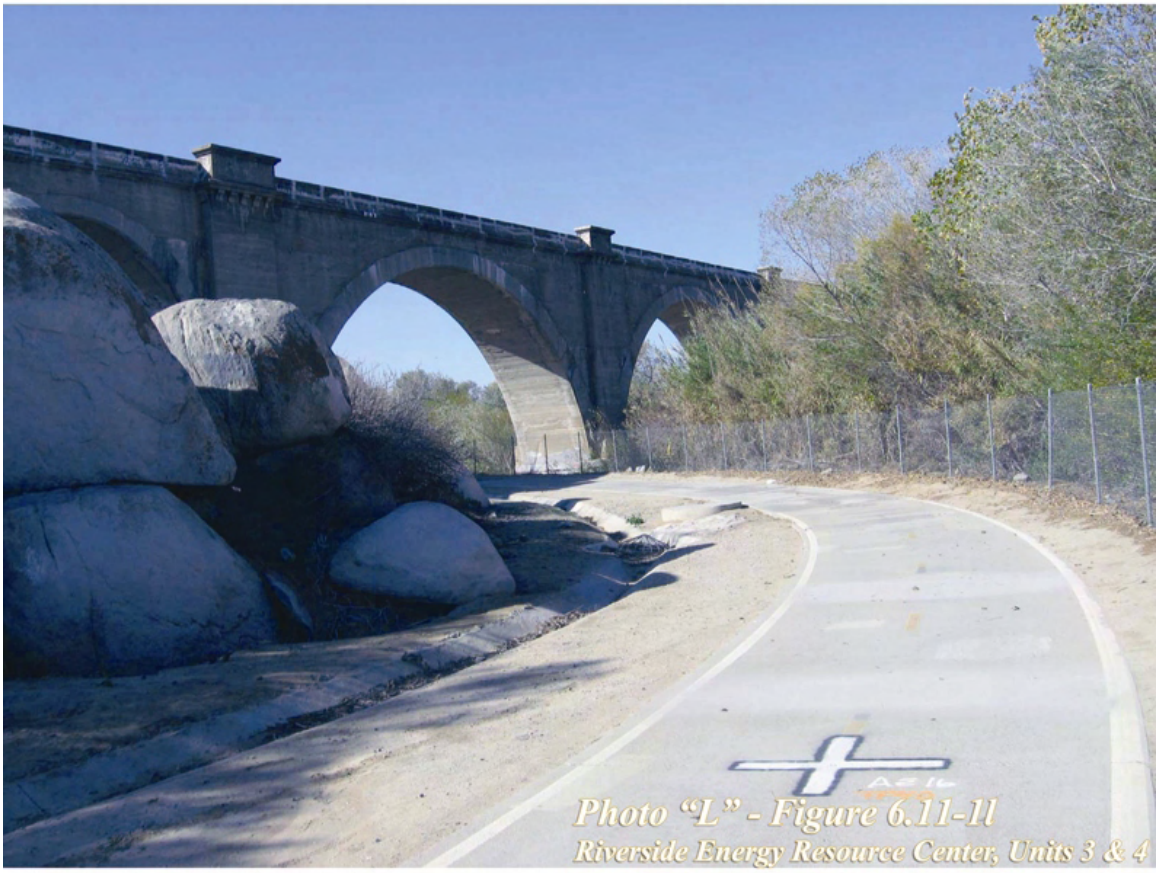


Photo "L" - Figure 6.11-1l
Riverside Energy Resource Center, Units 3 & 4

Photo "M" - Figure 6.11-1m
Riverside Energy Resource Center, Units 3 & 4

Residents' Existing Views
Residents are typically considered a sensitive viewer group because of the long-term nature of the Project and the sensitivity with which people regard their places of residence. In addition, residents have frequent opportunities to experience the views from their homes, and view duration can be fleeting or lengthy (lasting hours). The qualities of the residential views toward the project area are considered low.

Residents along Bradford Street west of the project area have views of varying landscapes and quality, depending on the direction they are facing (Photo A/Fig 6.11-1a). Being over ¾ mile from the project area, the Bradford Street residents have only a middleground view and all of the homes are oriented with back yard and over the fence view opportunities.

Likewise the residents of David Way, Claudette Drive, Thunder Bay Trail and Candlelight Drive also have middleground views being ½ to ¾ mile distance from the project area and also all are orientated with only backyard, over-the-wall views toward the project area. (KOP4/Fig 6.11-2.4) Additionally, all of these residents are likely to avoid their southern views due to the fact that their rear yard walls are located on the Union Pacific Railroad right-of-way.

The residents of the hills in Pedley north of the Project were also considered. (KOP3/Fig 6.11-2.3) Although the quality of the views are worth consideration given their elevation, this KOP and the residences represented was also considered to be low. Being an average 1-1/2 miles from the Project, the background view experiences and impact from these neighborhoods was found to be slight.

Recreationists' Existing Views
Recreationists are considered a sensitive viewer group because they generally value and are more aware of the aesthetic quality of their surroundings than commuters or people at work. This is because their focus is usually on their surroundings and recreational activities. In addition, the recreation activity they are engaging in is usually enhanced by the surroundings. However, the qualities of the recreationist views from the Santa Ana River Trail as displayed in KOP5/Fig 6.11-2.5 and in Photos A, E and G/Fig 6.11-1a, e and g, are considered low. The intermittent trail views from the west of the project area are typically diffused or filtered by the wastewater treatment plant. Trail views toward the project area from the east are mostly negated by the juxtaposition of the terrain and rising bluffs up toward the project area. Finally, considering the characteristic of the recreationist to focus on quality surroundings, it is likely that the viewer would focus attention away from the south side of the trail and predominately to the north and higher river view values. To the recreationist, the experience of the trail is two distinct view values and sensitivities. The north and south side of the trail do not seem to interact or influence the other.

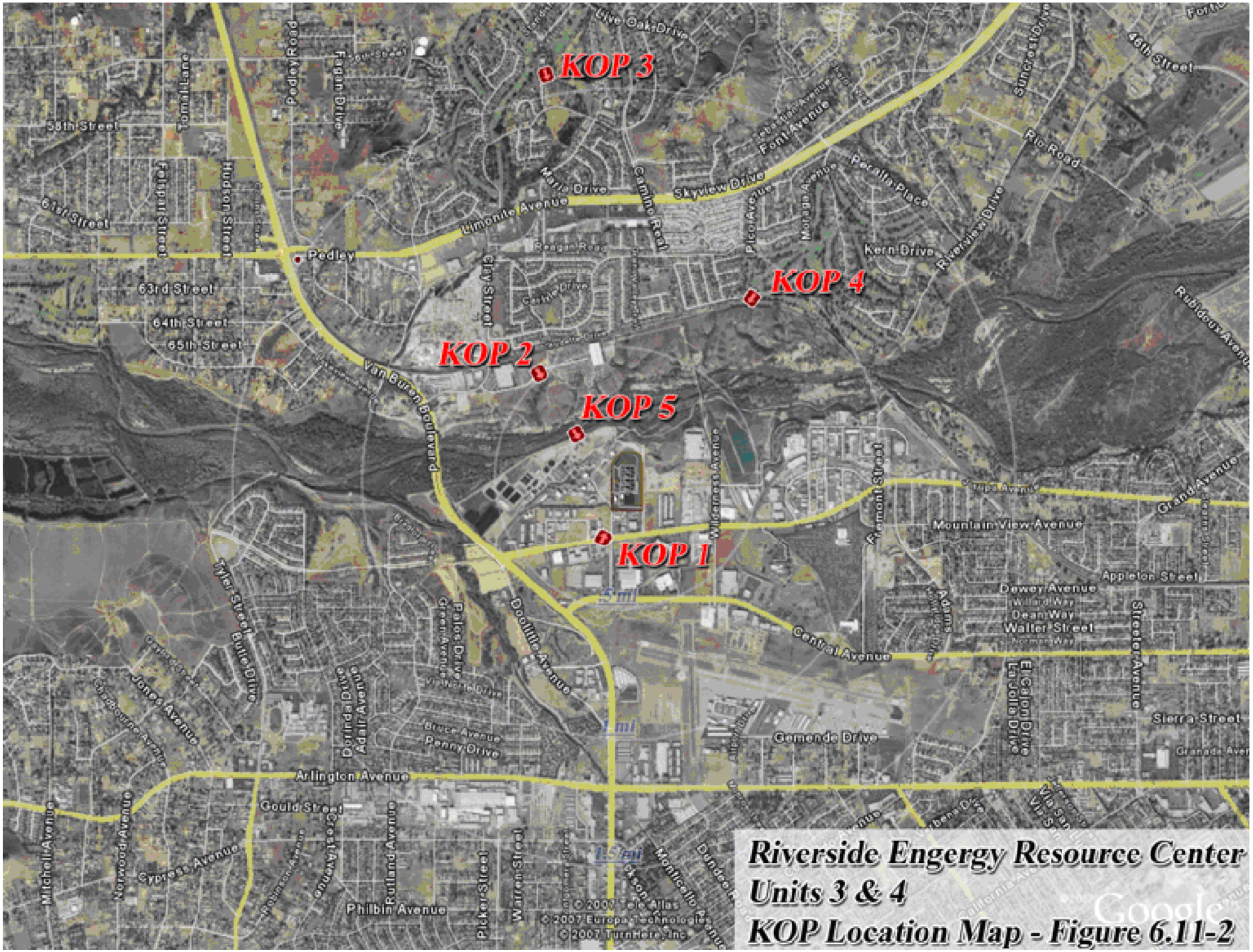
Motorists' Existing Views
Drivers are considered to have lower viewer sensitivity because views from the roadway are short-term, are obstructed by their vehicle, and the drivers' attention is primarily concentrated on maneuvering the roadway. Although passengers have a longer view opportunity than drivers, they are also considered to have low sensitivity due to view

obstructions caused by the vehicle, which shortens their view (KOP1/Fig 6.11-2.1 and Photo B/Fig 6.11-1b). Because of the industrial nature of the area, it is not a popular area for scenic viewing. The few streets in Riverside and Pedley that do provide direct views of the project area are views of short duration. Thus, motorists are considered viewers of low sensitivity.

6.11.3.6 Key Observation Points

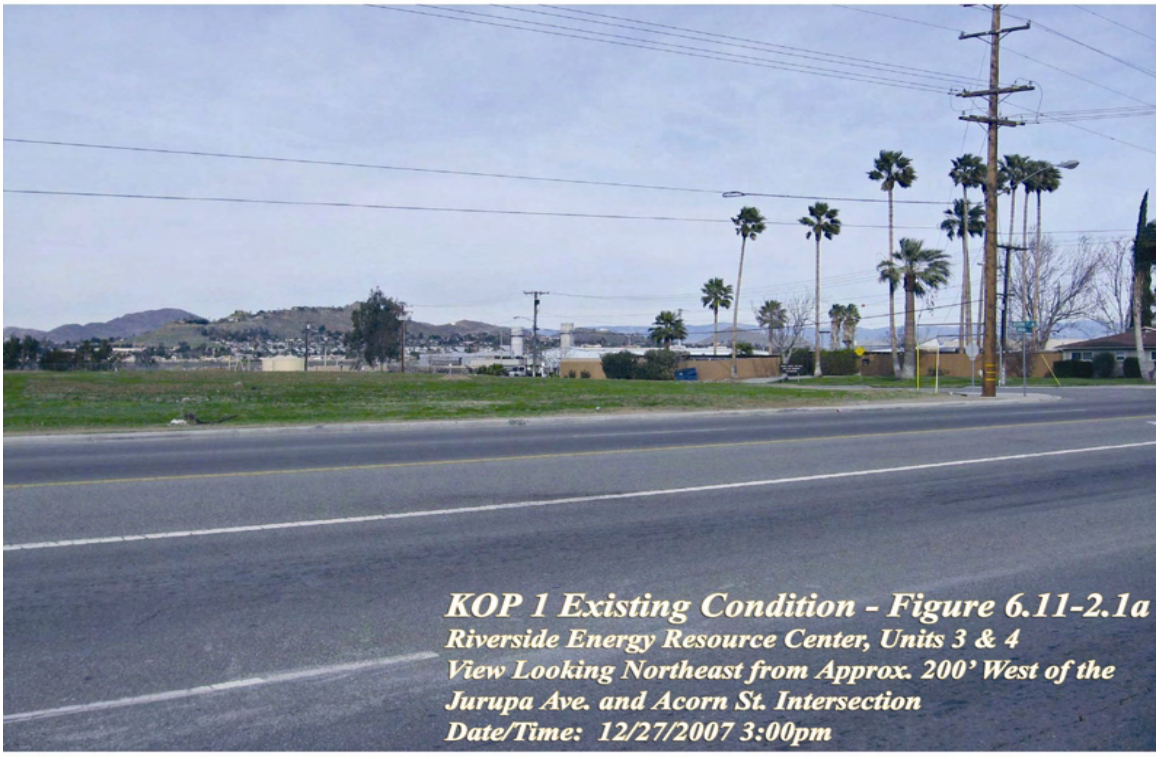
Few nearby sensitive receptors (viewers) were identified during the project area reconnaissance visit conducted in December 2007. This is because the Project is proposed to be located in an area zoned as Business Manufacturing Park according to the City's General Plan (City of Riverside, 2025). Industrial land uses exist adjacent to all sides (every direction) of the project area.

Views from sensitive receptor locations are considered Key Observation Points (KOPs). The KOPs described below are the current or “before” views of the project area. Figure 6.11-2 shows the locations where the five KOP photos were taken and the direction that the camera was focused for each photo.

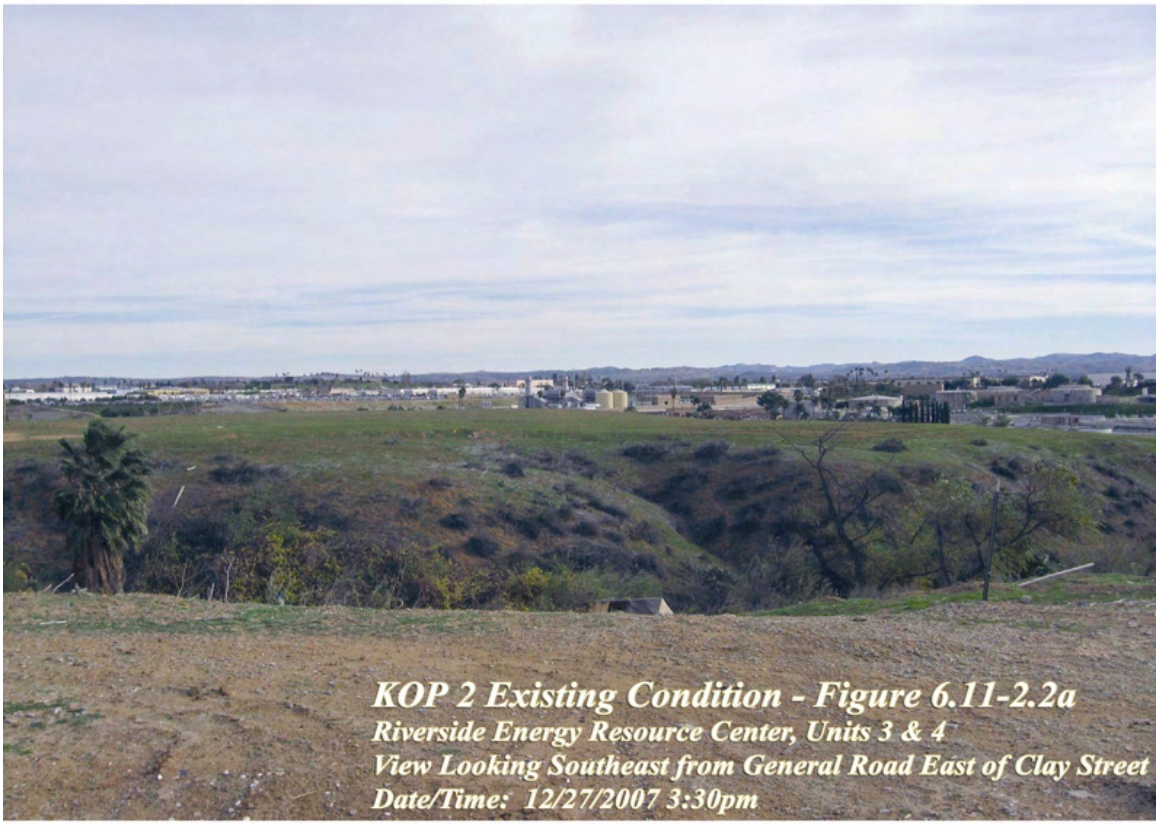


Riverside Engergy Resource Center
Units 3 & 4
KOP Location Map - Figure 6.11-2

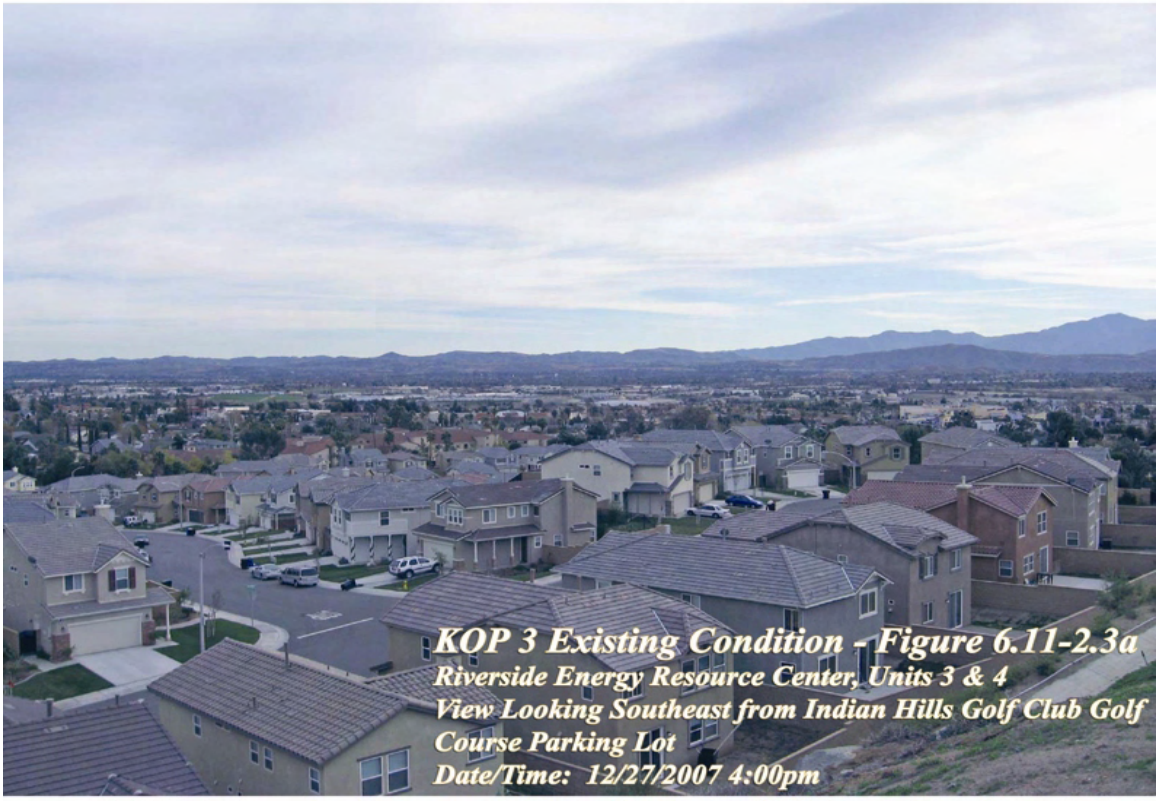
- KOP 1 (Figure 6.11-2.1) is a view toward the project area from approximately 0.25 mile south of the site, just west of the Acorn Street/Jurupa Avenue intersection. This photo was taken from the south side of Jurupa Avenue simulating the experience of an east-bound vehicle.
- KOP 2 (Figure 6.11-2.2) is a view of the project area from approximately 0.5 mile northwest of the site, from General Road. This view is representative of what is currently seen by both motorists and future developed industrial experiences.
- KOP 3 (Figure 6.11-2.3) is a view of the project area from the parking lot of the Indian Hills Golf Club. This view is approximately 1.5 miles north of the site. The view was selected to represent any intermittent views from the golf course as well as from the residential neighborhood of Pedley hills and the clubhouse at Indian Hills Golf Club.
- KOP 4 (Figure 6.11-2.4) is a view of the project area from the Jurupa Hills Country Club approximately 0.75 mile northeast of the site. Although it is not a typical golfer's view experience taken from the edge of the property, it also serves to represent the rear-yard residential view of the neighborhood west of the golf course.
- KOP 5 (Figure 6.11-2.5) is a view from the Santa Ana River trail looking southeast toward the project area. The experience of the viewer along this project edge is characterized by the 8 foot chain link fencing and the industrial uses and the wastewater treatment plant adjacent to the trail.


KOP 1 Existing Condition - Figure 6.11-2.1a
Riverside Energy Resource Center, Units 3 & 4
View Looking Northeast from Approx. 200' West of the
Jurupa Ave. and Acorn St. Intersection
Date/Time: 12/27/2007 3:00pm

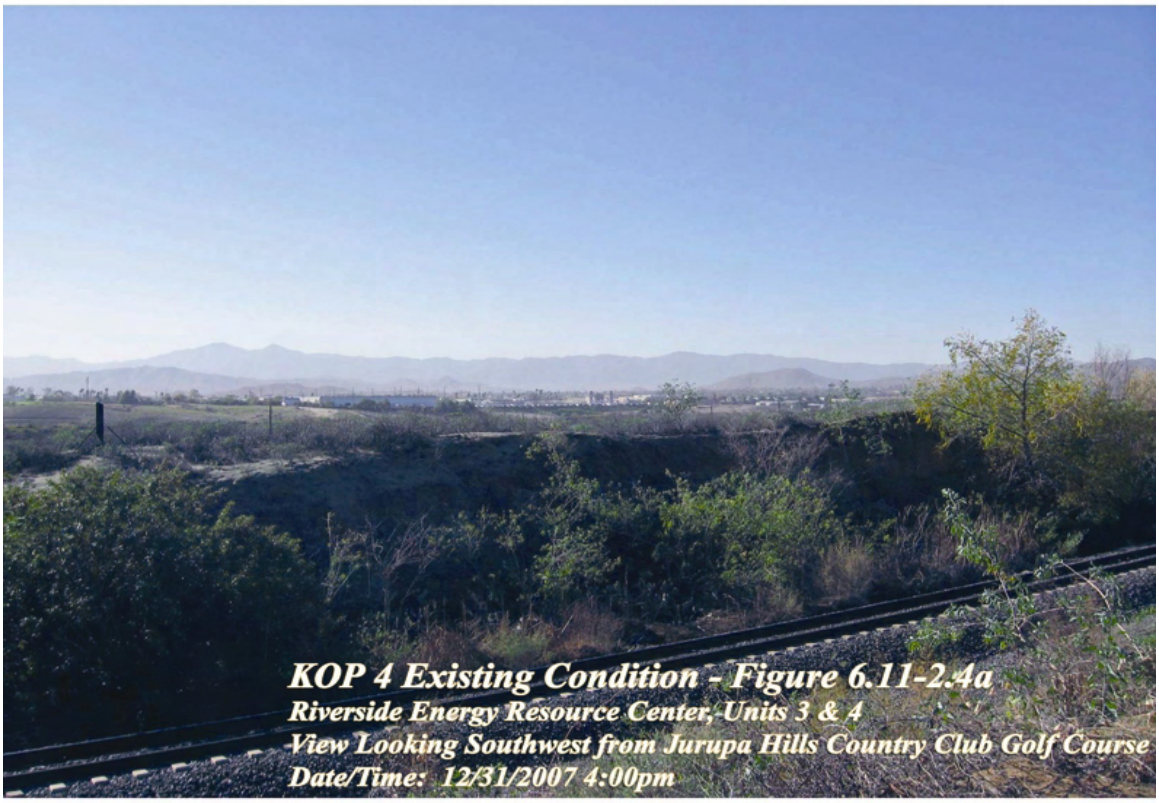
KOP 1 Simulated Condition - Figure 6.11-2.1b

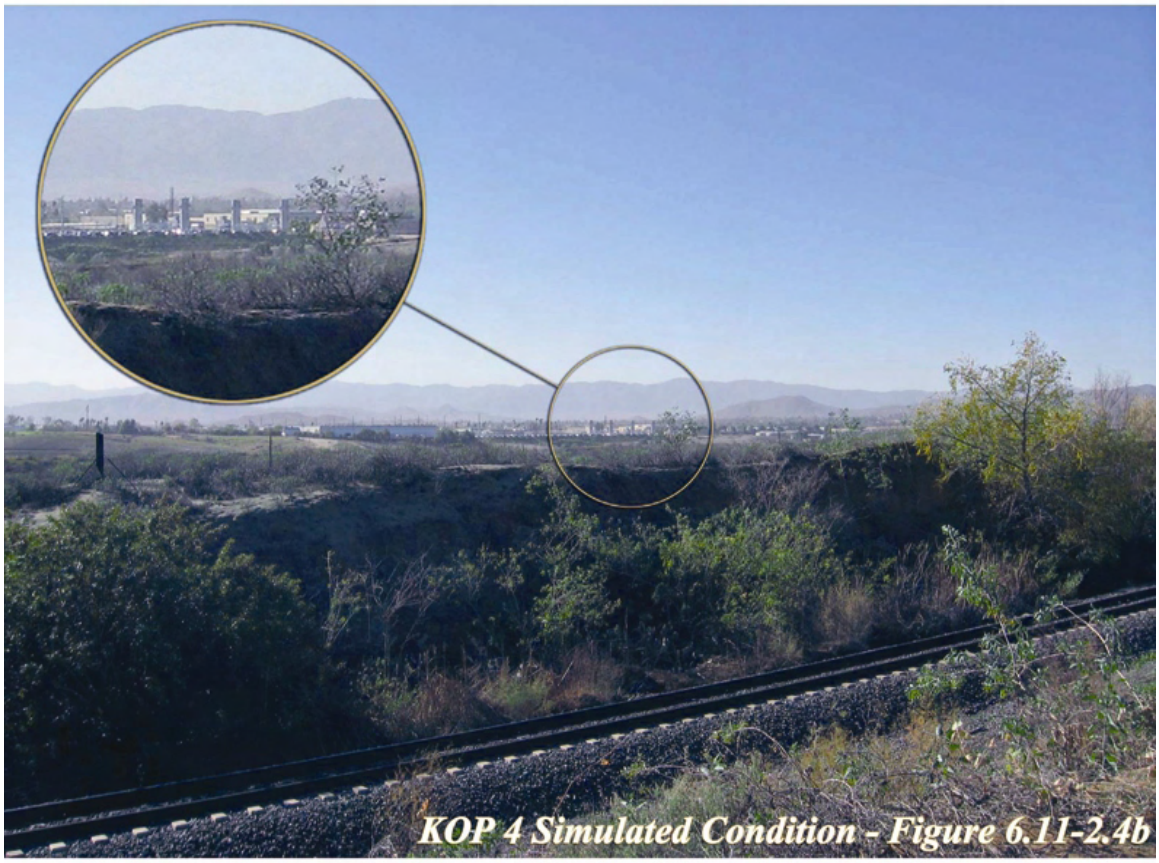

KOP 2 Existing Condition - Figure 6.11-2.2a
Riverside Energy Resource Center, Units 3 & 4
View Looking Southeast from General Road East of Clay Street
Date/Time: 12/27/2007 3:30pm

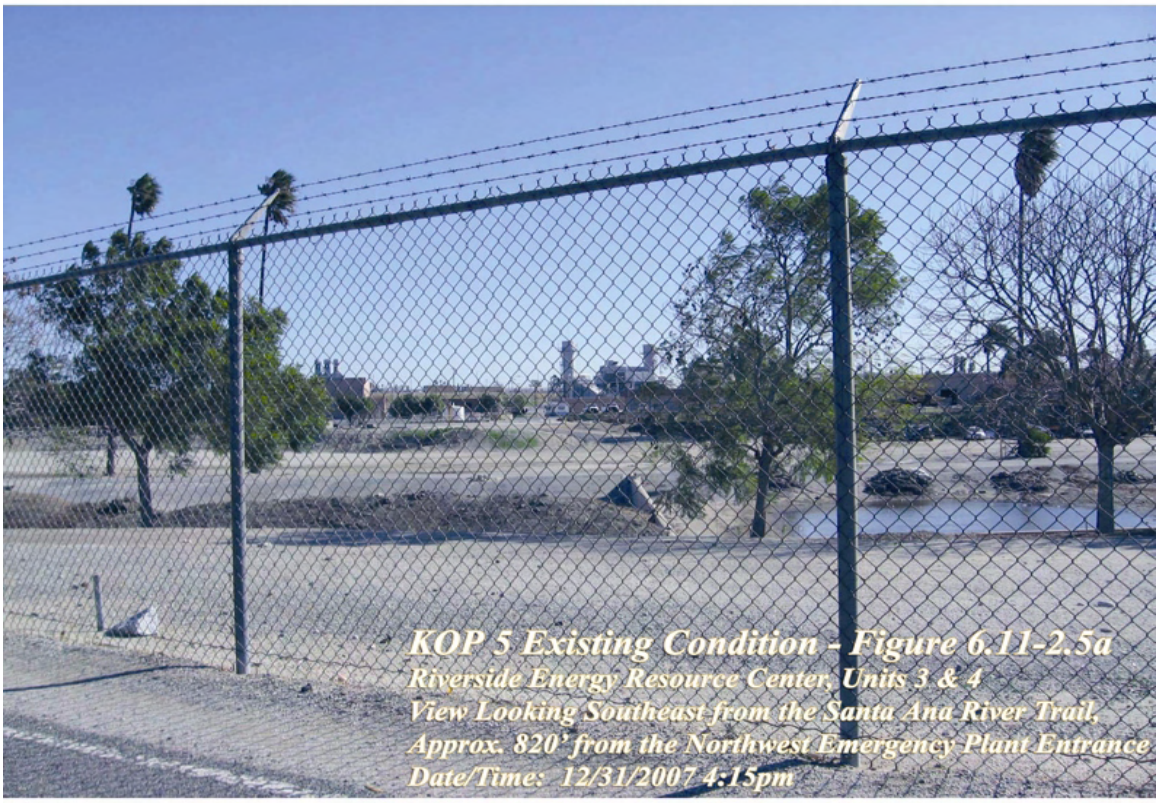
KOP 2 Simulated Condition - Figure 6.11-2.2b


KOP 3 Existing Condition - Figure 6.11-2.3a
Riverside Energy Resource Center, Units 3 & 4
View Looking Southeast from Indian Hills Golf Club Golf Course Parking Lot
Date/Time: 12/27/2007 4:00pm

KOP 3 Simulated Condition - Figure 6.11-2.3b


KOP 4 Existing Condition - Figure 6.11-2.4a
Riverside Energy Resource Center, Units 3 & 4
View Looking Southwest from Jurupa Hills Country Club Golf Course
Date/Time: 12/31/2007 4:00pm


KOP 4 Simulated Condition - Figure 6.11-2.4b


KOP 5 Existing Condition - Figure 6.11-2.5a
Riverside Energy Resource Center, Units 3 & 4
View Looking Southeast from the Santa Ana River Trail,
Approx. 820' from the Northwest Emergency Plant Entrance
Date/Time: 12/31/2007 4:15pm

KOP 5 Simulated Condition - Figure 6.11-2.5b

6.11.4 Impacts

6.11.4.1 Environmental Checklist

Table 6.11-1 provides the CEQA Checklist questions that are used in this SPPE Application to assess the significance of potential impacts.

Table 6.11-1 CEQA Environmental Checklist – Aesthetics

Environmental Checklist	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Aesthetics – Would the Project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?			X	

6.11.4.2 Discussion of Impacts

The impact assessment considers the criteria presented in Table 6.11-1. A discussion of the expected impacts on visual resources from Project implementation is provided below.

Scenic Vistas
One scenic vista of high visual quality was identified within the viewshed (area of potential visual effect) during the site reconnaissance of the project area. This vista includes the Santa Ana River Corridor.

The Project would comply with goals set forth in the 2003 Riverside County General Plan. The Jurupa Area Land Use Plan (a project applicable portion of the General Plan) goals

come as close as practicable to protecting views both to and from the river corridor. The goals and their applicability to the Project include:

The JURAP 7.2 goal requires that development, where allowable, to be set back an appropriate distance from the top of bluffs, in order to protect the natural and recreational values of the river and to avoid public responsibility for property damage that could result from soil erosion or future floods. The Project's generation facility would be located quite some distance from any bluff top and therefore would not intrude into the scenic or recreational values found along the Santa Ana River Corridor.

The JURAP 7.3 goal encourages future development that borders the Policy Area to design for common access and views to and from the Santa Ana River. The Project's generation facility would not block any common access already provided by both the Juan Bautista de Anza National Historic Trail (a Riverside County Class I Bicycle Trail) or the multi-use trail located upon the northern bank of the Santa Ana River. Additionally, no viewers would have to look through the generation facility to see views of the Santa Ana River. Views of the Santa Ana River are generally provided by the Juan Batista trail. Views from this portion of trail are restricted and do not include the generation site, because the local topography quickly climbs above the trail and forms a bench that restricts outward views.

The Project would thus not have a substantial adverse effect on a scenic vista.

Scenic Resources and Routes

As indicated in the discussion of LORS above, there are no state scenic highways within the project viewshed. The Project would thus not have a substantial adverse effect on scenic resources and routes.

Visual Character/Quality of Project Site and Vicinity

The Project would not degrade the existing visual character or quality of the project viewshed, project area, or its surroundings. Project implementation would not change the existing vividness, intactness and unity of the project site and vicinity. This is because the Project would be developed in an industrial setting adjacent to other industrial development.

In addition, the City of Riverside General Plan of 2025 and Zoning Ordinance indicate that industrial development is planned on the vacant parcels located to the east of the project site.

The Project will include two 80-foot-high exhaust stacks, two 43-foot-high combustion turbine generators (CTG), a 40-foot-high cooling tower, and a 96-foot-high communications tower. A 10-foot-high architectural block wall or non-reflective chain-link fence, topped with one foot of barbed wire surrounds the Project.

As depicted in the photo-simulation from KOP 1 (Figure 6.11-2.1), showing a currently undeveloped parcel of land between the viewer and project area, the Project would be visible from this viewpoint. Although visible, the Project would not significantly degrade

the view or visual quality of the area, nor would it change the vividness, intactness, or unity ratings of the current view. Views of the Project would not be out of character with the existing view.

As shown in KOP 2 (Figure 6.11-2.2), the project area does not dominate the current or proposed character of the area. In this rapidly developing area, eventually the Project would be largely screened from KOP 2 viewers by intervening industrial and commercial facilities. Where visible to viewers, the Project would present a subordinate level of contrast in the context of an already developed industrial setting of low visual quality. No significant impacts from the RERC plant are anticipated. The addition of Project features to this view would not significantly degrade the view or visual quality of the area, nor would it change the vividness, intactness, or unity ratings of the current view.

KOP 3 (Figure 6.11-2.3) illustrates the distance of any significant residential views toward the Project. Even though the elevation of this KOP is above the project area, the distance and existing industrial character negate the proposed project additions. The addition of project features to this view would not significantly degrade the view or visual quality of the area, nor would it change the vividness, intactness, or unity ratings of the current view.

KOP 4 (Figure 6.11-2.4) provides the proposed view experience representative from the Jurupa Hills golf course and its adjacent residential views. The distance of the view allows the proposed Project to blend into the current industrial uses and character. This view represents the nearest residential or open space/recreation views, but given the juxtaposition of the residences to adjacent rail road tracks to the south, the current over-the-wall rear-yard view are not considered to be of a high value experience.

KOP 5 (Figure 6.11-2.5) exemplifies the highest impact view experience from the Santa Ana River trail. Although this view is a foreground view and the structure of the new towers will be seen, the inherent viewer experience on this part of the river trail is the view toward the river and thus viewer experiences are drawn directly away from the Project. The experience is also accented by 8 foot high chain link fencing on both sides of the trail, and the view looks across the RRWQCP facilities in order to see the project site. Given the current values of the trail experience, the addition of project features to this view would not significantly degrade the view or visual quality of the area, nor would it change the vividness, intactness, or unity ratings of the current view.

The combustion turbine generators utilize a common chiller that will have a pre-engineered and prefabricated cooling tower. The cooling tower will be located on a steel frame above the common chiller package. The total height of the cooling tower and the chiller located beneath it is 43 feet. The height of the cooling tower itself is 20 feet.

Because of the: (1) industrial nature of the area in which the Project would be constructed; (2) relatively few sensitive receptors that would have views of the Project; (3) existing large structures in the vicinity of the project area that partially obstruct views of the proposed Project; potential visual impacts due to RERC Units 3&4 would be less than significant.

There would be occasional visible vapor plumes emitted by the Project. Plumes emitted from the cooling tower would not be present in warm weather. Plumes tend to form in the winter months, at night, and during early morning hours when the temperatures are very low and humidity is relatively high. If fog is present, plumes will not be discernible. Because of the measures RPU would implement to reduce lighting at the RERC, nighttime plumes that are created will not be illuminated at night and, therefore, will not be highly visible during nighttime hours.

Because of the industrial character of the area and because plumes are emitted from other sources in the vicinity, local sensitive receptors are likely accustomed to seeing them. Therefore, the presence of plumes that would occur occasionally at the proposed project area would not result in a significant impact on the visual character of the area. Plumes occasionally emitted from the proposed Project would not significantly detract from views of the area.

The proposed Project would create a new source of light at the RERC from the installation of some additional facility lighting. Levels of daytime glare at the project site are not expected to increase noticeably from existing glare. To minimize project facility lighting being visible offsite, RPU will install lights that are shielded and directed downward along the walkways. Due to the industrial character of the project vicinity, the lack of sensitive receptors adjacent to the project site, and project features that minimize light emissions offsite, the Project would not create a new substantial source of light and would thus result in a less-than significant impact on visual resources.

6.11.4.3 Cumulative Impacts

No significant cumulative visual impacts due to the Project are anticipated. RERC Units 3&4 would not result in a significant contribution to cumulative impacts on the landscape character of the project vicinity. This is because the proposed Project would be sited east of and adjacent to existing industrial development (City of Riverside's RRWQCP and RERC Units 1&2, Santa Ana River aerial crossings of aqueduct pipelines, the Union Pacific railroad and the City of Riverside municipal airport).

As discussed above and in Section 6.2, Land Use, the land adjacent to and west of the project site is designated and zoned for Business Manufacturing Park and Single-Family Residential Development according to the General Plan and Zoning Ordinance of 2025.(Single family?)

Plumes from the proposed Project would likely occur at the same time as the plumes that are emitted from the other plume sources in the project vicinity. This is because plumes form only under certain climatic conditions that are conducive to plume formation (i.e., low temperatures and high humidity). The overall frequency of visually dominant plumes seen within the viewshed is not expected to increase from what is currently seen; however, the number of plumes emitted in the viewshed would increase with implementation of the proposed Project. The number of viewers exposed to occasional visually dominant plumes is not expected to increase significantly. Thus, the overall landscape character of the

affected environment is expected to remain essentially unchanged.

6.11.5 Mitigation

Because no significant impacts have been identified, no mitigation is necessary.

6.11.6 Agency Contacts

California Energy Commission
1516 9th St. MS 40
Sacramento, CA 95814

6.11.7 References

City of Riverside. 1998. *The City of Riverside General Plan 2035.* Adopted September 15.

City of Riverside. 2002. *City of Riverside Zoning Ordinance.* January 2000 and September 2001; updated through June 2002.

U. S. Department of Agriculture (USDA) Forest Service. 1973. *National Forest Landscape Management Volume 1.* Washington D.C.: Superintendent of Documents.

U. S. Department of Transportation, Federal Highway Administration. Undated. *Visual Impact Assessment for Highway*

6.12 Socioeconomic Resources

6.12.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demand periods and will also support the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the RERC will be exported outside of the City.

The RERC project area is located at the northern terminus of Acorn Street in the City of Riverside, Riverside County, California. This section discusses potential impacts to socioeconomic resources related to the proposed Project during construction and operation. This document presents a summary of relevant laws, ordinances, regulations and standards (LORS), the Project's setting and potential environmental impacts. Required permits and permitting agencies are also identified. There will be no significant environmental impacts resulting from plant construction and operation.

6.12.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. RERC Units 3&4 Project will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. Units 3&4 and will occupy approximately 2.2 of 16 acres. An additional 2 acres are reserved for construction laydown. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

The technical area of socioeconomics addresses several interrelated areas of interest and concern regarding the proposed Project. This socioeconomic assessment evaluates the likely short-term and long-term project related effects on public services such as wastewater, emergency health services, and fire protection, as well as the likely effects on local fiscal conditions and capability of local government to accommodate the needs presented by any population increases caused by the Project. This socioeconomic assessment also evaluates issues of environmental justice, or whether any project impacts fall disproportionately upon low-income or minority populations.

6.12.2 Laws, Ordinances Regulations and Standards

6.12.2.1 Federal

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environmental and human conditions of minority populations and calls on agencies to

develop strategies to achieve environmental justice as part of this mission. The U.S. Environmental Protection Agency (U.S. EPA) subsequently developed guidelines to assist all federal agencies to develop strategies to address the issue (U.S. EPA, 1996). Federal agencies are required to address disproportionately high and adverse human health or environmental effects of their programs, policies and activities on low-income populations and minority populations.

6.12.2.2 State

Under the California Environmental Quality Act (CEQA), California Code of Regulations, Section 15131, states that "Economic or social factors of a project may be used to determine the significance of physical changes caused by the project" (14 CCR Section 15131[b]) and "Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce and/or avoid significant effects on the environment" (14 CCR Section 15131[c]).

6.12.3 Setting

6.12.3.1 Project Summary

Due to the proximity of the Project to the northwest boundary of the City of Riverside, the area of influence (and consequently study area) for socioeconomic impacts includes the City of Riverside, as well as the adjacent incorporated cities of Norco, Corona and Moreno Valley, and areas of unincorporated Riverside County within six miles of the project facilities. A six mile radius was established to comply with California Energy Commission (CEC) requirements for Environmental Justice studies addressing demographics (CEC 2006). However, Riverside County as a whole is also used to provide context for local conditions. Socioeconomic issues relevant to the affected environment include population, public services, housing and employment/income.

6.12.3.2 Population and Demographic Characteristics

The Project is located in the City of Riverside, which is the county seat of Riverside County, California, located at the western end of the San Jacinto Valley. The City of Riverside was founded in 1870 by John North and a group of easterners who wished to establish a colony dedicated to education and culture. In 1873, the citrus industry began to thrive in the area especially with the development of refrigerated railroad cars and irrigation technique innovations. By 1895, Riverside had the highest per capita wealth in California. Surrounding areas were extensively developed for citrus cultivation. During this era, the City became popular as a tourist destination (City of Riverside, undated). The population of the City and Riverside County have steadily grown throughout the 1900s, particularly since 1970. The City of Riverside more than doubled in population between 1970 and 2007, while the County's population more than quadrupled (Department of Finance [DOF] 2007). Population trends are shown in Table 6.12-1.

Riverside County encompasses 7,207 square miles with a population density of 282 persons per square mile (based on 2007 population data). Riverside County has experienced a high growth rate for the past 20 years, increasing 76.5 percent between

1980 and 1990, then by 32 percent from 1990 to 2000. Between 1990 and 2000, Riverside County experienced the fifth highest county population growth rate, compared to all 58 counties in the state; during the 2006/2007 fiscal year, Riverside County was the fourth largest county in the state in terms of population.

The City of Riverside's population has also grown steadily, but at a lower rate than that of the County. Some of this growth, shown in Table 6.12-1, has been due to annexations; the most extreme growth in the City occurred between 1950 and 1970 when the land area nearly doubled from 39.2 to 71.5 square miles. The City's estimated January 1, 2007, population was 291,398, or 3,731 persons per square mile (78.1 square miles).

Table 6.12-1 Historical population trends, Riverside County, City and State

	1970	1980	1990	2000	2006	2007
Riverside County	459,074	663,166	1,170,413	1,545,387	1,966,607	2,031,625
City of Riverside	140,089	170,876	226,505	255,166	289,747	291,398
California	19,953,134	23,667,902	29,758,213	33,871,648	37,195,240	37,662,518

Source: U.S. Census Bureau, decennial census counts, 1970-2000, and State of California Department of Finance, Demographic Research Unit, 2005-2007 E-4.

The City of Riverside is part of an urbanized area, bordered by the cities of Norco and Corona to its west and Moreno Valley to the east. Also bordering the City of Riverside is the unincorporated area of Jurupa (the "Jurupa Census County Division" [CCD], as named by the U.S. Census Bureau) to its north, and the Lake Matthews CCD and Woodcrest "Census Designated Place" (CDP) to its south. All of these communities are within Riverside County. Like the City of Riverside, population growth in these areas has been lower than for Riverside County as a whole because they have become more built-up. The populations of these communities are shown in Table 6.12-2. San Bernardino County is also included.

As with much of Southern California, the City of Riverside populations, as well as the populations of adjacent incorporated cities and Riverside County, are diverse in terms of racial and ethnic heritage, with large Hispanic populations. Table 6.12-3 shows year 2006 ethnicity data for these jurisdictions and Figure 6.12-1 graphs the data in Table 6.12-3 in terms of population proportion.

Table 6.12-2 Historical populations and communities adjacent to the City of Riverside 2007

	1970	1980	1990	2000	2006	2007	City Land Area, square miles, 2007	City Population Density (persons per square mile), 2007
Norco City	14,511	21,126	23,302	24,157	n/a	27,361	14.1	1,713
Corona City	27,519	37,791	76,095	124,966	161,998	146,164	35.1	3,560
Moreno Valley City	–	–	118,779	142,381	–	180,466	51.2	2,781
Woodcrest CDP	–	–	7,796	8,342	–	–	–	–
Jurupa CCD	–	–	–	85,106	–	–	–	–
Mira Loma CDP	8,462	8,707	15,786	17,617	–	–	–	–
Pedley CDP	n/a	n/a	8,896	11,207	–	–	–	–
Rubidoux CDP	13,959	16,763	24,367	29,180	–	–	–	–
Lake Matthews CCD	–	–	–	16,351	–	–	–	–
San Bernardino County	684,072	895,016	1,418,380	1,709,434	1,999,332	2,028,013		

Source: U.S Bureau of the Census, decennial census counts, 1970-2000 and 2006 State of California, Department of Finance, Demographic Research Unit, 2007 E-4.

Note: The Mira Loma, Pedley and Rubidoux CDPs are within the Jurupa CCD

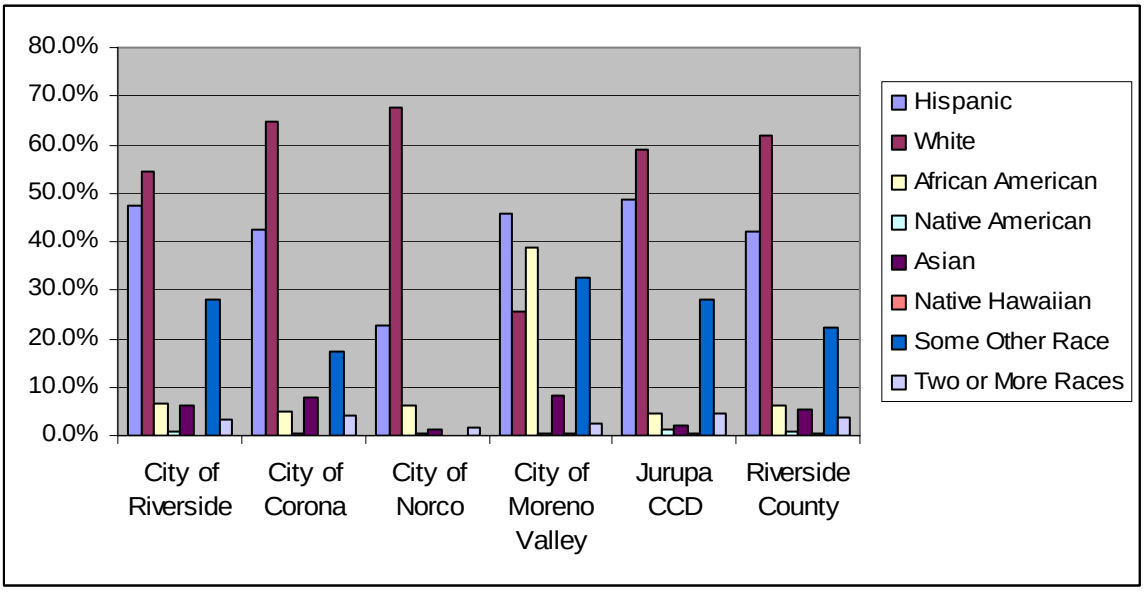
Table 6.12-3 Racial and Ethnic Heritage Profiles 2006 (as available)

	Total Population	Hispanic	White	African American	Native American	Asian	Native Hawaiian	Some Other Race	Two or More Races
City of Riverside[1]	311,575	148,070	169,962	20,916	2,794	19,518	533	87,129	10,723
City of Corona[1]	161,998	68,627	104,756	8,139	899	13,004	322	27,997	6,881
City of Norco[2]	24,157	5,504	16,334	1,468	112	274	23	24	418
City of Moreno[1] Valley	179,585	81,945	45,881	69,836	537	14,448	705	58,560	4,568
Jurupa CCD[2]	85,106	41,415	50,213	3,935	1,167	1,819	203	23,817	3,952
Riverside County[1]	2,026,803	855,408	1,252,046	121,790	16,606	105,064	4,979	453,431	72,887

[1]Source: U.S. Bureau of the Census, 2006.
[2]Source: U.S. Bureau of the Census, 2000 (2006 data not available)

Note: Jurupa CCD data are compiled on a different basis from the cities regarding assignments of Hispanic population, which is distributed across three counties and therefore is double counted in totals.

Figure 6.12-1 Racial and Ethnic Heritage, percentage of total population 2006



Source: U.S. Bureau of the Census, 2006 for cities of Riverside, Corono and Moreno Valley, and Riverside County.
Source: U.S. Bureau of the Census, 2000 (2006 data not available) for City of Norco and Jurupa CCD
Note: Jurupa CCD data are compiled on a different basis from the cities regarding assignments of Hispanic population, which is distributed across other counties and therefore is double counted in totals.

Population projections for Riverside County predict continued rapid population growth through the year 2020, nearly doubling from 2000. This rapid rate of population growth is much higher than the projected statewide population growth rate. San Bernardino County is projected to grow at a slightly lower, but nonetheless high, rate, as shown in Table 6.12-4.

Future population growth within the City of Riverside is unlikely to be high, since City lands are near build-out, and barriers such as the City of Moreno Valley to the east, the cities of Norco and Corona to the west, and the Santa Ana River Regional Park at the City's north will act as physical constraints for any potential, future annexations. Thus, future population growth in the City of Riverside is expected to be a result of infill and redevelopment.

Table 6.12-4 Population projections, Riverside, San Bernardino Counties, State

	2000	2007	2010	2020
Riverside County	1,545,387	2,031,625	2,239,053	2,904,848
San Bernadino County	1,709,434	2,028,013	2,177,596	2,581,371
State of California	33,871,648	37,473,500	39,135,676	44,135,923

Source: California Department of Finance, Demographic Research Unit 2001 and U.S. Census 2000

6.12.3.3 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," signed on February 11, 1994, required all federal agencies to develop strategies to develop environmental justice strategies. The U.

S. Environmental Protection Agency (U. S. EPA) subsequently developed guidelines to assist all federal agencies to develop strategies to address the issue (U.S. EPA, 1996). Federal agencies are required to address disproportionately high and adverse human health or environmental effects of their programs, policies and activities on low-income populations and minority populations.

Table 6.12-3 and Figure 6.12-1 show ethnic and racial distributions for areas within approximately 6 miles, on a broader geographical unit basis. Table 6.12-13 and Table 6.12-14, located at the end of this baseline section, show the ethnic and income distributions, respectively, by Census block for areas within six miles of the Project. The data are derived from the 2000 census, as specified by the U.S. EPA (1996) guidelines. According to the Guidelines, a significant minority population exists if minorities comprise 50 percent or more of the affected areas general population.

6.12.3.4 Housing

The housing market in the City of Riverside exhibits a moderate degree of tightness. Tightness in the housing market is characterized by difficulty investing, and relative ease in selling or removing investments from the market; the higher the level of the tightness, the more expensive, less common, and less reliable the market becomes. In the year 2006, 4.3 percent, or 4,421 of housing units were vacant, according to the U.S. Census Bureau (vacancy rates under 5 percent indicate some housing market tightness). Vacancy rates for homeowner units and renter units were 1.7 and 3.8 percent, respectively. In the larger area of Riverside County as a whole, there were 89,194 vacant units, or 12.1 percent of the total County housing stock. This higher vacancy rate reflects, in part, the broader County's relatively large stock of "seasonal, recreational, or occasional use" housing. Housing data are displayed in Table 6.12-5.

Table 6.12-5 Housing Data, City of Riverside and Riverside County, 2006

	City of Riverside	Riverside County
Total Units	100,572	732,433
Total Vacant	4,421	89,194
Vacancy Rate	4.3%	12.1%
Vacancy Rate, Owner	1.7%	2.7%
Vacancy Rate, Renter	3.8%	5.7%
Vacant for Sale	880	9,098
Vacant for Rent	1,774	12,303
Vacant, Seasonal, Recreational, or Occasional Use	245	38,241
Total Occupied	96,151	643,239
Single Unit	67,728	526,979
Multiple Unit	29,921	128,845
Mobile Home	2,867	74,695
Vacant, Seasonal, Recreational, or Occasional Use	53	1,914
Occupied, Renter	41,889	198,403
Occupied, Owner	54,262	444,836
Median Value, Owner-Occupied	$430,100	$414,000
Median Contract Rent, Renter-Occupied	$1,018	$1,015

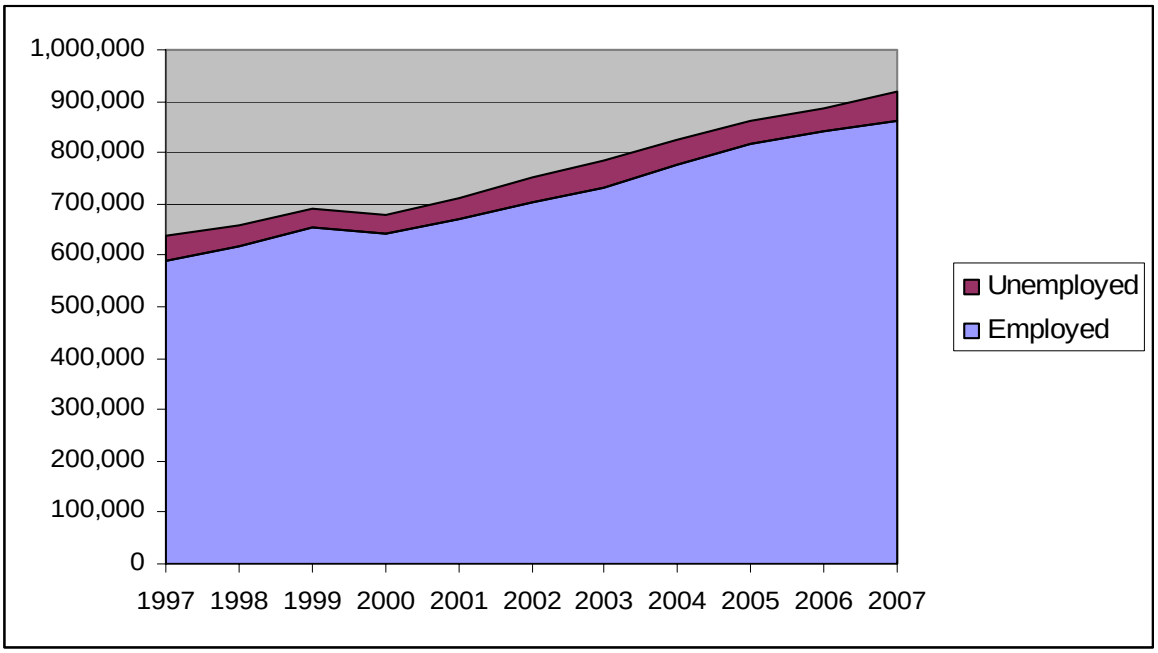
Source: U S Census Bureau, American Family Survey 2006
1 U.S. Census Bureau, 2000 Census

6.12.3.5 Employment and Economy

Because the Project will draw on a variety of construction and operation specialties, the relevant study area used for the description of employment and economy is the Riverside/San Bernardino County Metropolitan Statistical Area (MSA). This MSA is used as the relevant labor market area, from which the Project is expected to draw most, if not all, of its construction and operation labor forces. Riverside and San Bernardino Counties are addressed individually in this section in regards to employment and unemployment trends in the county. Employment data for the City of Riverside and proximate cities are also addressed.

Riverside County has a relatively large, diverse and historically rapidly growing economy. Since, 1997, County employment has grown for the period at a rate of roughly 31 percent. In October 2007, the County unemployment rate was 6.5 percent (California Employment Development Department [CEDD] 2007). Historical County employment and unemployment data are depicted in Figure 6.12-2.

Figure 6.12-2 Historical employment and unemployment, Riverside County (1997–2007)



Source: CEDD, 2007.
Note: 2007 data available through October only.

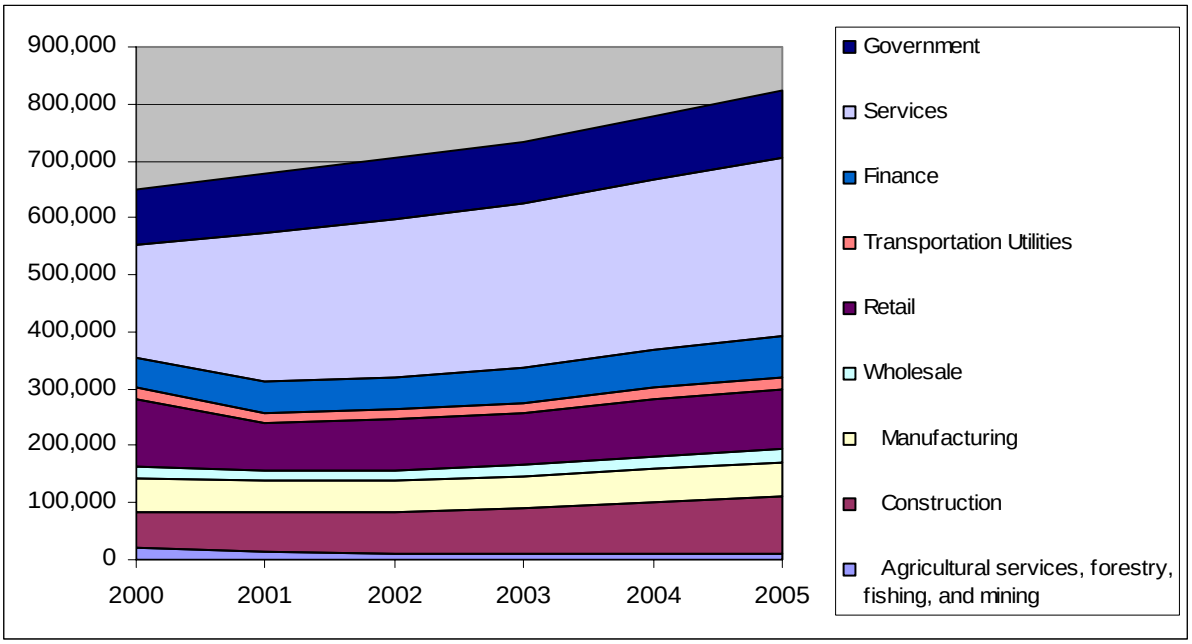
Originally the Riverside County economy was primary agricultural; however, agriculturally related employment has been shrinking as the County has urbanized. Farm and agricultural services, forestry, fisheries and mining accounted for only about 1.5 percent of total County employment in 2006 (U.S. Census 2006). However, services, retail trade and construction are the largest three private sectors in Riverside County employing more than 65 percent of the total population in the County. Employment by industry data is shown in Table 6.12-6, and historical trends are depicted in Figure 6.12-3.

Table 6.12-6 Riverside County Employment by Industry, 2006

	2006	Percent of total
Agricultural services, forestry, fishing, and	13,824	1.5%
Construction	112,297	12.7%
Manufacturing	90,885	10.3%
Transportation, warehousing, and public utilities	40,334	4.5%
Wholesale trade	32,279	3.6%
Retail trade	119,795	13.6%
Finance, insurance and real estate	58,680	6.6%
Services	360806	41.0%
Public administration	35,430	4.0%
Total full-time and part-time employment	881,303	100.0%

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, 2006.

Figure 6.12-3 Historical employment by industry, Riverside County 2005

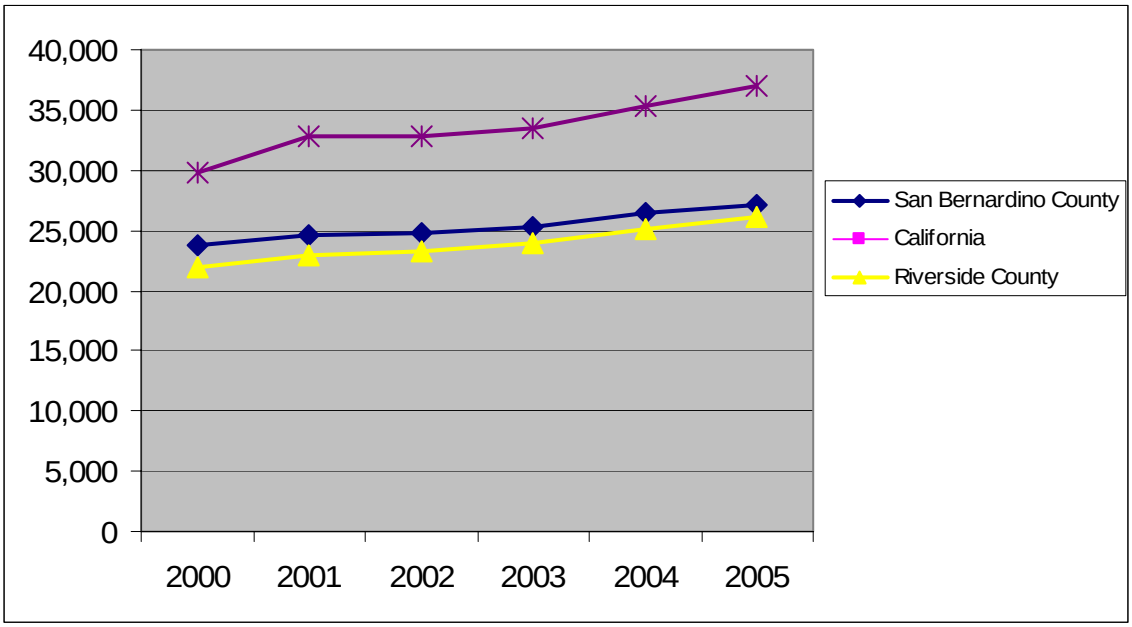


Source: CEDD 2007.

Per capita personal income in Riverside County grew steadily between 2000 and 2005, reaching $27,167 in 2005, an increase of 19.5 percent over 2000[1] (CEDD 2007). However, Riverside County's per capita income was still well below the State average of $32,458. San Bernardino County per capita personal income was below that of Riverside County over this period, but the two counties' percentage growth trends were nearly identical, as shown in Figure 6.12-4.

[1] Although county-level inflation factors are unavailable, the U.S. Bureau of Labor Statistics estimated that nationally, inflation for all urban residents rose 35.5 percent between 1990 and 2001, indicating that in terms of real purchasing power, Riverside County residents may not have made per capita real-income gains over the period. However, it should be emphasized that the national inflation factors are not necessarily applicable in the study area of the Project.

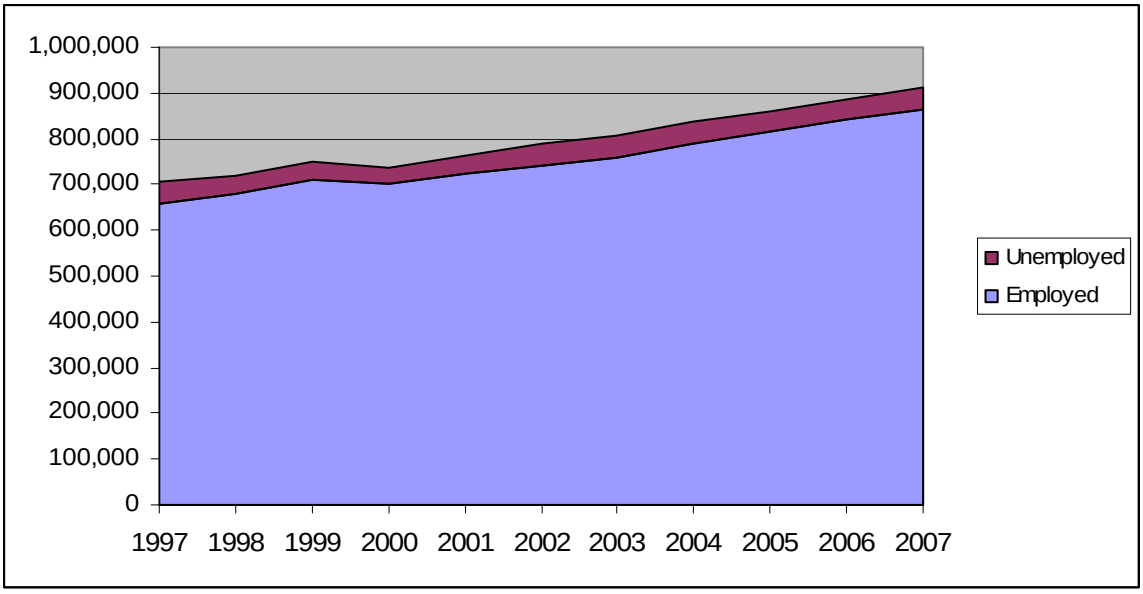
Figure 6.12-4 Per Capita Income, Riverside and San Bernardino Counties and State of California, 2000–2005.



Source: CEDD 2007

San Bernardino County has the fourth largest economy of all California counties and has grown every year since 2000. In October 2007 the County unemployment rate was 5.7 percent (CEDD, 2007). Historical employment and unemployment for the County are pictured in Figure 6.12-5.

Figure 6.12-5 Historical employment and unemployment, San Bernardino County (1997–2007)



Source: CEDD 2007

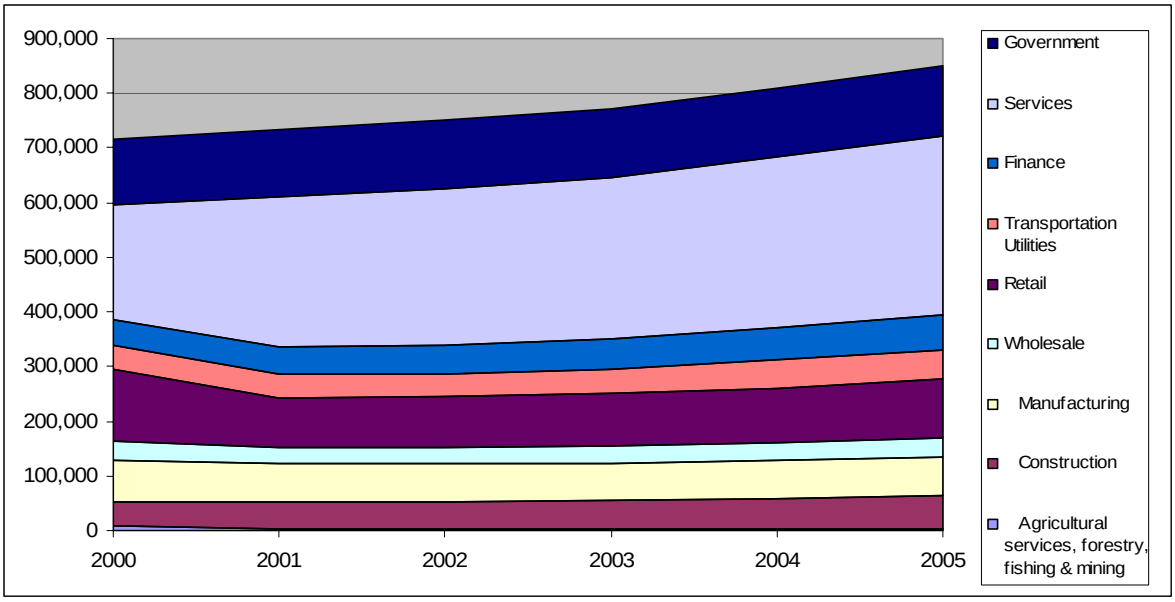
Much of the employment in San Bernardino County is located in its western and central areas, though development is spreading eastward into areas of the County that have historically been very rural and still depend heavily on agriculture. The County has a well-diversified economy, with services, retail trade and manufacturing the three largest sectors, which contribute to more than 70 percent of total employment in the County, as shown in Table 6.12-7. San Bernardino County also maintained a relatively large construction sector from 2000–2005, reflecting both its rapid growth and its role as a source of construction resources, as shown in Figure 6.12-6.

Table 6.12-7 San Bernardino County Employment by Industry 2006

	2006	Percent of total
Agricultural services, forestry, fishing, and mining	4,838	<1%
Construction	82,395	9.6
Manufacturing	94,835	11.1
Transportation, warehousing, and public utilities	69,919	8.2
Wholesale trade	35,343	4.1
Retail trade	109,057	12.7
Finance, insurance and real estate	52,533	6.1
Services	409881	48.0
Public administration	47,225	5.5
Total full-time and part-time employment	853,493	100%

Source: U.S. Census 2006

Figure 6.12-6 Historical employment by industry, San Bernardino County 2005



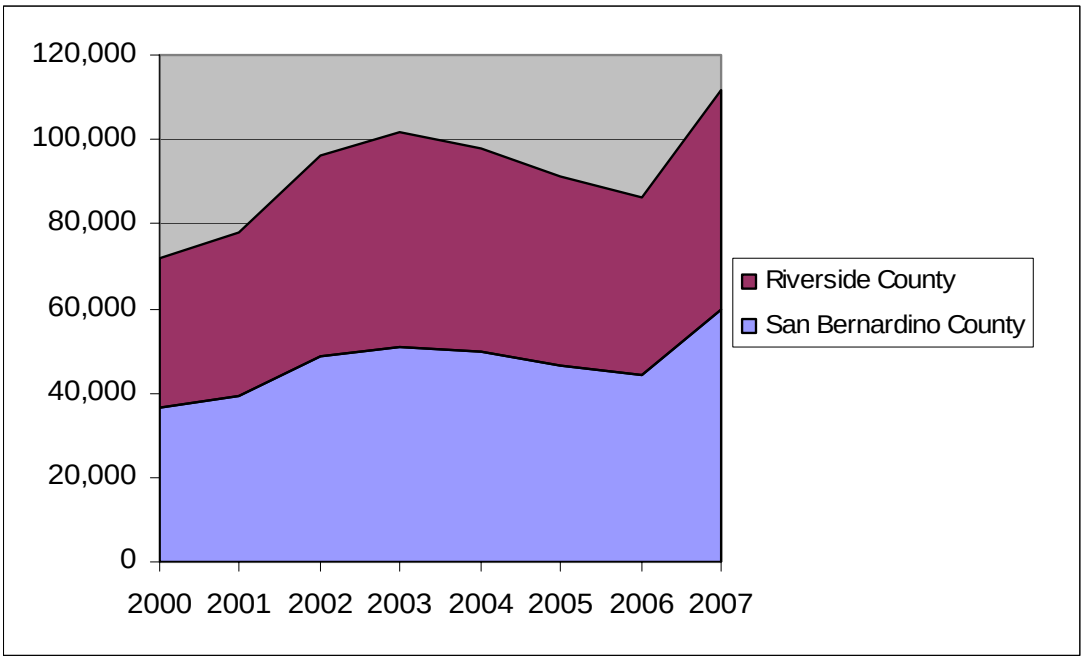
Source: CEDD 2007.

As noted above, construction employment is an important sector in both Riverside and San Bernardino Counties. In addition, local construction employment is important to

understanding the impact of the Project, particularly since the Project's construction and operation work forces are most likely to be drawn primarily from this area.

Riverside and San Bernardino Counties total employed work force data are important to understanding the likely impact of employment that would be created by this Project. Between 2000 and 2007, the combined unemployed work force has varied from a low of about 70,000 to a high of just under 110, 000, averaging about 85,000 over the past seven years (Figure 6.12-7).

Figure 6.12-7 Total Historical Unemployed Work Force, Riverside and San Bernardino Counties 2007



Source: CEDD 2007.

Although the two-county area represents the appropriate labor market area for this assessment, it is also useful to understand employment and unemployment trends in the immediate vicinity of the City of Riverside, including the cities of Riverside, Norco, Corona, Moreno Valley, and Mira Loma, Pedley and Rubidoux CCD's (CEDD 2007) (Table 6.12-8). Between 2000 and 2007, the number of unemployed persons in this local area has ranged from 15,000 to 24,700, on an average annual basis.

Table 6.12-8 Employment and Unemployment Trends in the cities of Riverside, Norco, Corona, Moreno Valley, and Mira Loma, Pedley and Rubidoux CCD's 2007

Year	Labor Force	Employed	Unemployed	Unemployment Rate
2000	284,100	269,100	15,000	6.1
2001	296,900	280,900	16,000	5.3
2002	313,400	293,400	20,000	6.3
2003	326,800	305,700	21,100	6.4
2004	344,600	324,300	20,400	5.9
2005	360,100	336,100	19,000	5.2
2006	369,900	351,800	18,100	4.9
2007	385,200	360,500	24,700	6.4

Source: CEDD 2007

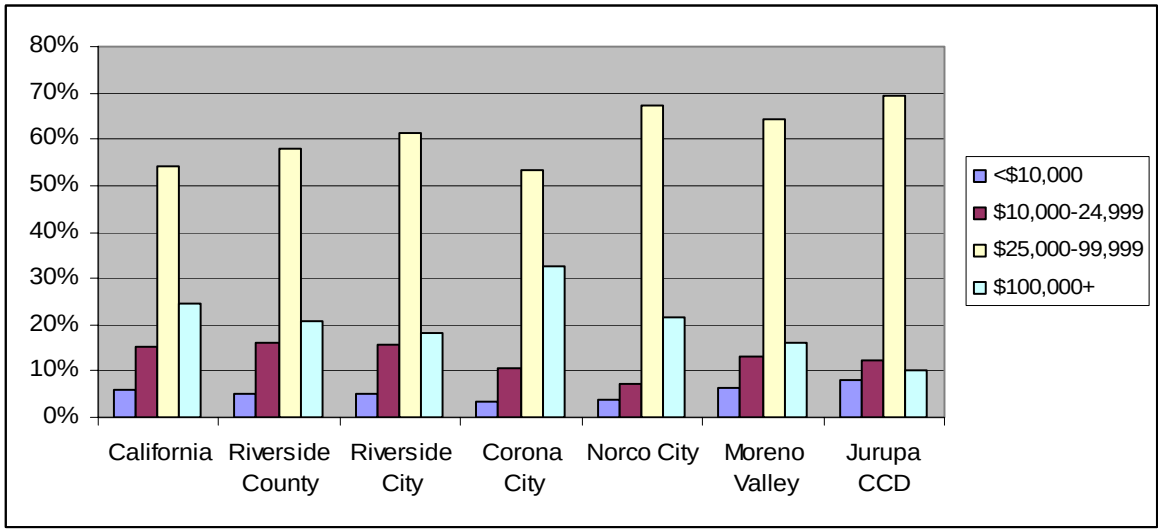
Household income in the City of Riverside in 2006 closely resembled that of Riverside County as a whole, both in its median and its distribution: 5.1 percent of households in the City had incomes below $10,000, 15.7 percent from $10,000 to $24,999, and 18.0 percent of households earned $100,000 or more. Of the communities in the area examined with 2006 Census data, the City of Riverside had the lowest median income, while the City of Corona ($72,162) had the highest median income. Income distribution data for Riverside County, the City of Riverside and adjacent cities and the Jurupa CCD are shown in Table 6.12-9 and Figure 6.12-8, with the State of California for comparison.

Table 6.12-9 Recent Income Distribution of Households in the City of Riverside and adjacent Communities 2006

	California	Riverside County	Riverside City	Corona City	Norco City*	Moreno Valley City	Jurupa CCD*
Under $10,000	5.9%	5.0%	5.1%	3.2%	4.0%	6.2%	8.2%
$10,000-24,999	15.3%	16.0%	15.7%	10.5%	7.1%	13.1%	12.4%
$25,000-99,999	54.0%	58.2%	61.2%	53.5%	67.3%	64.5%	69.3%
$100,000 or more	24.6%	20.6%	18.0%	32.7%	21.5%	16.1%	10.1%
Median household income	56,645	$53,508	$52,023	$72,162	$62,652	52,426	$43,795

Source: U.S. Census 2006 (*Norco City and Jurupa CCD figures are taken from the 2000 Census).

Figure 6.12-8 Income Distribution 2006



Source: U.S. Census 2006 (*Norco City and Jurupa CCD data us only available from the 2000 Census).

Employment projections for Riverside County show that its employment is expected to continue to grow through the year 2014. Total non-farm employment is projected to increase by 2014 by 25.4 percent relative to the base year of 2004. The wholesale trade, mining, Projections of employment for San Bernardino County are identical to Table 6.12-10, which identifies continued growth over the next few years, averaging 25.4 percent for total non-farm employment from 2004 (the base year) to 2014 (California Employment Development Department, 2007). Wholesale trade, mining, and construction sectors are projected to experience the largest percentage growth by the year 2006.[2]

[2] California Employment Development Department 2007 data reflect only ES-202 covered employment, and hence are not directly comparable with the Regional Economic Information System (REIS) data also presented in this report. However the projected percentage changes in Table 6.12-12 are quite useful

Table 6.12-10 Projected Employment by Industry, Riverside and San Bernardino Counties MSA's

Industry	Annual Averages		Absolute Change	Percent Change
	2004	2014		
Total Nonfarm	1,160,000	1,454,700	294,700	25.4
Mining	1,200	1,600	400	33.3
Construction	111,800	145,300	33,500	30,0
General Building Contractors	17,500	30,200	12,700	72.6
Heavy Construction	11,200	12,500	1,300	11.6
Special Trade	9,200	12,500	3,300	35.9
Manufacturing	120,100	129,000	8,900	7.4
Transportation & Public Utilities	254,900	334,200	79,300	31.1
Wholesale Trade	45,600	64,000	18,400	40.4
Retail Trade	153,800	195,600	41,800	27.2
Finance Activities	45,700	54,800	9,100	20.0
Services	360,600	469,200	61,600	30.1
Government	212,500	256,600	44,100	20.8

Source: CEDD, 2004.

6.12.3.6 Public Services

Schools

Riverside Unified School District, 14th largest school district in California, enrolls approximately 42,500 students in kindergarten through grade 12. It serves a 92-square mile area including a major portion of the City of Riverside, as well as the Highgrove and Woodcrest areas outside the City.

The District operates 45 schools: 29 elementary, 1 special education pre-school, 6 middle schools (grades 7-8), 5 comprehensive high schools (grades 9-12), 2 continuation high schools, and 2 alternative schools. The Riverside Unified School District employs 3,373 persons of whom 2,119 are certificated (as of October 2002). Forty-two percent of the teaching staff holds master's degrees and several hold doctorates (Riverside Unified School District, 2005).

Law Enforcement

Law enforcement for the City is provided by the Riverside Police Department. The Department provides a variety of services, including patrol (vehicular and by bicycle), investigation, public information, special weapons and tactics (SWAT) and internal affairs and is staffed by 345 sworn, and 206 non-sworn employees.

Fire Protection

The Riverside Fire Department has 14 stations located throughout the City. The City opened the new Airport Fire Station in late 2005, which directly serves the project site. The Department has an Insurance Services Office rating of 2 (high on a 10-point scale, with a rating of one being the highest). The Department has 14 engines, three truck companies (100-foot reach) and three rescue squads. The Department operates three shifts, 24 hours a day every day, and employs 220 total emergency personnel in addition to clerical staff. Hydrants in the City of Riverside are spaced at 300 feet in an interlocking grid pattern (Chris Jensen, Division Chief, Planning Division, Riverside Fire Department, personal communication, December 3, 2003). Sprinkler regulations and other City fire regulations would be applied and followed by the Project. (Phone update – Fire Department Staff January 2008.)

Hazardous Materials

The City of Riverside's Emergency Management Office, which is within the Riverside Fire Department, coordinates the City's response to hazardous material spills, as well as assisting residents to prepare for major events such as earthquakes, floods, plane crashes, train derailments, Africanized honey bees, and civil unrest, and would be likely to respond in case of a hazardous materials spill at the project site.

Hazardous waste spill events are directly under the purview of the Hazmat Unit within the City Fire Department, which is fully trained to contain hazardous materials events, including providing medical service.

Hospitals and Emergency Medical Services

Emergency medical services provided by the City of Riverside Fire Department, which responded to 26,701 rescue and emergency medical services (EMS) calls in the year 2006 (City of Riverside, undated). The ambulances are contracted to American Medical Response, a private contractor, but City Paramedics always accompany ambulances. The City has a goal of responses within 7 minutes for its own units, and American Medical Response is contracted to maintain response times under 11 minutes. Victims are generally taken to Riverside Community Hospital, or occasionally, Kaiser Hospital, Parkview Hospital, or rarely, to Riverside County Regional Medical Center.

Water Supply

The sources of water for the City of Riverside are wells located in two local groundwater basins–the Bunker Hill Basin in San Bernardino and the Riverside North and South Basins supplying 98.6 percent of the total supply with the remaining 1.4 percent of water purchased from the Western Municipal Water District. There were 49 domestic wells and 16 active reservoirs; reservoir capacity was 100.4 million gallons for Fiscal Year (FY) 2005–2006, and the historical daily peak demand (which occurred in 8/9/2005) was 118.8 million gallons.

The Riverside Public Utilities has a service area of 74.05 square miles, approximately 69 of which are within the City, and serves approximately 278,800 customers (63,431

meters), which comprises of residential, commercial, other, and wholesale users. In FY 2006–2007, combined sales accounted for 76 percent of total operating revenues of $46.9 million for the water utility (2007 Independent Auditor Report, MHM P.C.).

Wastewater Systems

Wastewater treatment in Riverside is provided by the City of Riverside Public Works Department; the Sewerage Systems Services Program collects, treats and disposes of all City generated wastewater, while complying with State and Federal requirements governing the treatment and discharge of wastewater. Primary, secondary and tertiary treatment of wastewater is also provided for the Jurupa, Edgewater and Rubidoux Community Service Districts, to the north of the City.

The City's Riverside Regional Water Quality Control Plant (RRWQCP), located just to the west of the Project, has a capacity of 40 million gallons per day (mgd), with usage averaging about 30 mgd. The system also includes 18 wastewater pump stations, three of which are storm water pump stations. Most of the wastewater lift stations are designed for flows of 100 to 400 gpm. There are two large lift stations with design capacities in excess of 2,000 gpm. The three storm water pump stations have design capacities of approximately 500 gpm each (City of Riverside Public Works Department 2004).

The RRWQCP provides recycled tertiary treated water to some portions of Riverside. This water is largely used for irrigation with some industrial use, including RERC Units 1&2. The City's goal is to provide 100 percent wastewater reuse in about 10 years.

Solid Waste

City staff collects trash from approximately 38,500 city residents (two-thirds of the City), which include both automated, and manual collection service. Automated collection is once per week. Manual collection occurs twice per week. The remaining portion of the City is collected by a private contractor, Burrtec Waste Industries. The private collector services approximately 20,000 customers in the areas of La Sierra, University and Orangecrest. Commercial establishments throughout the City are serviced by one of three private contractors (City of Riverside Public Works Department 1996–2007). For construction waste, there is a crushing facility located roughly seven miles from the Project.

Fiscal Resources

The total General Fund revenue approved for the City of Riverside for fiscal year (FY) 2006–2007 was estimated at $204,104,272. Due to City growth, this represents an 8.85 percent increase from FY 2003–2004. Other FY 2006-2007 funds were Enterprise Funds ($449,756,300), Special Revenue Funds ($28,445,334), Capital Projects Funds ($19,671,592), Internal Services ($22,035,508) and Debt Service Funds ($29,713,175) (City of Riverside, 2007). These non-General Fund portions have their own dedicated sources of funding through various mechanisms, such as water, sewer and parking fees, grants, fees and special district levies. The breakdown of General Fund projected revenues is shown in Table 6.12-11. These data show that the sales and use tax is the

largest source of General Fund revenues, at 29.51 percent of the total; property taxes, the second largest source of General Fund revenues, represent a marginally smaller City tax base, at 23.40 percent of the total.

Table 6.12-11 Fiscal Year 2006-2007 General Fund Breakdown by Source*

Revenue Type	Amount	Percent of Total
Sales & Use Taxes	$60,230,000	29.51%
Property Taxes	$47,757,000	23.40%
Utilities Users Tax	$24,987,000	12.24%
Charges for Services	$11,156,135	5.47%
Other Taxes	$8,903,000	4.36%
Licenses and Permits	$8,402,200	4.12%
Fines and Forfeits	$2,355,000	1.15%
Special Assessments	$3,905,000	1.91%
Revenue from Other Governments	$2,580,000	1.26%
Other	$3,460,500	1.70%
Interfund Transfers	$30,368,437	14.88%
Total	$204,104,272	100.00%

Source: City of Riverside 2007.

6.12.4 Impacts

Potential socioeconomic impacts of construction and operation of the proposed Project are examined in this section. Socioeconomic impacts arise mostly from the proposed Project's requirements for mobilizing and deploying labor, capital and material resources. Application of these factors of production to the project area and setting addresses changes in the levels and patterns of peoples' activities in the area, including employment, housing, commercial activities, and public services and infrastructure (such as public safety and health services).

The impact assessment begins with a description of the proposed Project's relevant construction and operation resource requirements. These are then compared with the proposed project area's socioeconomic characteristics. The proposed Project's requirements are superimposed upon the project area's socioeconomic baseline. The difference between expected baseline conditions and conditions with the Project comprise the project impacts. Whether these changes are significant--either beneficial or adverse--largely depends on (1) the degree, or intensity, magnitude, duration, and reversibility of changes in the baseline levels of utilization and (2) the capacity of the project area's resources to accommodate changes in demand. The project area is addressed at four geographic levels, in order of size: (1) the City of Riverside, (2) areas within 6 miles of the Project, (3) Riverside County, and (4) the combined area of Riverside and San Bernardino Counties.

6.12.4.1 Construction

Constructing the Project would be a relatively small undertaking in terms of socioeconomic resource requirements and impacts. The total project costs are estimated at $110 million including:

- RPU labor
- Environmental, engineering, construction management, and testing consultants
- Major purchases directly by RPU including the combustion turbine and emission control module packages, chiller, emissions monitoring, fuel gas compressors, generator step up transformers, power distribution center, demineralized water storage tanks, air compressors, and 69 kV breakers
- Construction contracts labor, materials, construction equipment rental, and the remaining plant equipment for site preparation, foundations, structural, mechanical, electrical, and controls aspects of RERC Units 3&4 and the switchyard expansion
- Construction of the Scheduling & Dispatch building and Water Laboratory

Planning and design for the project began in 2007. The total time frame from design to completion of construction is projected to continue until fourth quarter 2009. The actual construction period is expected to be nine months, beginning in fourth quarter 2008.

Project construction would require a peak of about 100 workers. Table 6.12-12 depicts the expected labor force for project construction. In addition to the figures presented in Table 6.12-12, as previously noted, the City of Riverside will assign a limited number of employees to the Project, who can also be included within the new demands for labor of the Project. Consultant personnel will be located offsite except for periodic site visits. For this analysis, about 100 employees are assumed to be required at the peak of construction, including those shown in Table 6.12-12 and the City's employees assigned to the Project.

Table 6.12-12 Summary of Projected Construction Labor Force Requirements

	Months After Notice to Proceed								
Job Category	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Insulation Workers							3	3	2
Welders		2	4	6	6	4	2	1	
Carpenters	3	6	8	8	8	6	4	1	
Electricians		6	8	10	12	12	6	3	2
Ironworkers		4	8	8	10	8	4		
Laborers	4	4	10	17	27	30	20	8	2
Millwrights			2	4	4	4	2	1	1
Operating Engineers	3	3	5	5	5	5	5	3	1
Painters							2	4	4
PipeFitters	2	2	4	8	12	12	10	7	4
Craft Subtotal	**12**	**27**	**49**	**66**	**84**	**81**	**58**	**31**	**16**

	Months After Notice to Proceed								
Job Category	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Construction Manager	5	5	5	5	5	5	5	5	5
Field Engineer	1	1	3	6	6	6	6	4	2
Document Control Clerical	2	2	2	2	2	2	2	2	2
Commissioning Group					3	4	6	6	6
Staff Subtotal	**8**	**8**	**10**	**13**	**16**	**17**	**19**	**17**	**15**
Total Project	**20**	**35**	**59**	**79**	**100**	**98**	**77**	**48**	**31**

The bulk of the payments for labor and capital goods would "leak" out of the project area via payments to non-local and out-of-state sources for most of the power plant equipment, specialty contractors and their personnel and equipment suppliers. For this analysis, it is assumed that 70 percent of on-site after-tax workers' wages, and 20 percent of project capital purchases, would be expended within the Study Area. Assuming an average direct labor rate of $50 per hour and the labor distribution shown in Table 6.12-12, construction workers would earn approximately $4,800,000. In addition, there is the local direct labor portion of the RPU personnel and their environmental, engineering, construction management, and testing consultants estimated to be another $2,000,000 for a total of $6,800,000 in the total local wage bill. Thus, approximately $4,760,000 in wages would be re-spent by project workers in the Study Area. Furthermore, capital purchases made within the Study Area are assumed to total approximately $5-10 million for purposes of this analysis

6.12.4.2 Operation

Once construction is completed and operation begins, the Project would employ only a few workers (less than 5 on a full-time equivalent basis) to operate and maintain the power plant. The operating life of the Project is projected to be 30 years after commencement of operations in 2009. Expenditures on operation and maintenance would be so small as to be insignificant and are not addressed in this analysis.

Impacts on Employment and Income

Placed in the socioeconomic context of the project area, the City of Riverside, areas within six miles of the project (CEC requirements for Environmental Justice [2006]), and Riverside and San Bernardino Counties, a mostly urbanized area with a relatively large economy, the infusion of workers' local spending and local construction procurements would place an unnoticeable burden on the capacity of the local economy. These expenditures would be beneficial, albeit largely unnoticeable.

Workers' local consumer goods purchases and contractors' procurements of construction supplies would be the principal economic benefits accruing to the local economy. Providers of transient accommodations, eating and drinking establishments, automotive services, construction materials vendors (e.g., sand and gravel, concrete, lumber, etc.),

and equipment leasing establishments in communities near the project area would be the main beneficiaries. The benefits would be short term, however, with the project construction schedule running for only about nine months.

Economic multiplier effects would be from the local expenditures for project related labor, capital facilities and supplies; as these moneys are spent within this region, the total increment to the original direct project payments becomes a multiple of those direct payments. Multiplier analyses are out of the scope of this analysis, but experience with similar projects in areas such as Riverside and San Bernardino Counties indicate that multipliers on the order of 1.5 to 2.0 are reasonable. Therefore, due to construction, approximated 90-120 jobs could be created by the project employment of about 60 workers in the two-county region of Riverside and San Bernardino Counties, most of which would be likely to be created in Riverside County, particularly the City of Riverside. This positive impact would be transient, however, due to the short timeframe of construction.

Operation employment, wage payments and purchases of materials would be minimal, and therefore are not addressed in this analysis.

6.12.4.3 Impacts on Population

Increases in employment in an area generally lead to increases in population, as some of those who take jobs associated with a project move to the area, some with dependents. As noted, the short-term construction work force is likely to be drawn from the project vicinity and region; however, those who relocate to the project area for construction are unlikely to bring dependents. Since many jobs induced by the Project by repeated re-spending of project expenditures will likely be assimilated into the local economy, some very minimal in-migration of job-holders and their dependents is likely to occur even as a result of short-term construction.

Between 2000 and 2005, based on U.S Bureau of Economic Analysis (Regional Economic Information System) population and employment estimates and regression analysis, the change in population divided by the change in employment in the combined area of Riverside and San Bernardino Counties was just under 0.8: Year-to-year changes showed that, for each increase in employment, population changed by 0.8 persons. Construction employment would be short-term and would unlikely result in a change in the permanent population in the project vicinity or region. However, the additional 30 to 60 jobs projected in the economy from multiplier effects would be diffuse, and could result in such average population increases. Thus, an increase of about 32 to 48 people in the Study Area population (not including project construction workers living in temporary quarters), can be expected. Such a small population increase would not be noticeable in light of the total Study Area population.

Operational employment may also indirectly cause some of these indirect population increases. However, the level of employment and expenditures for operations would be so minimal that population increases would be minimal (no more than a handful of persons), if they occur at all.

6.12.4.4 Environmental Justice

Table 6.12-13 and Table 6.12-14 show the ethnic and income distribution, respectively, by Census block for areas within 6 miles of the project area. Table 6.12-3 and Figure 6.12-2 show ethnic and racial distributions on a broader geographical unit basis. The data are derived from the 2000 Census within six miles of the City of Riverside. As specified by the U. S. EPA (1996) guidelines, a significant minority population exists if minorities comprise 50 percent or more of the affected areas general population (3,493,079 in the year 2006).

Table 6.12-13 Race/Ethnic Characteristics, 2000 Census Tracts within Six Miles of the Project

Census Tract	Race; Total population; Count	Race; Total population; One race; White; Count	Race; Total population; One race; White; Percent	Minority Population; Count	Percent Minority	Hispanic or Latino; Total population; Hispanic or Latino; Count	Hispanic or Latino; Total population; Hispanic or Latino; Percent
301	7,907	3,784	47.9	4,123	52.1	4,385	55.5
302	4,682	3,293	70.3	1,389	29.7	1,302	27.8
303	4,845	2,933	60.5	1,912	39.5	1,789	36.9
304	5,966	1,473	24.7	4,493	75.3	4,308	72.2
306.01	4,324	3,398	78.6	926	21.4	408	9.4
306.02	3,478	2,886	83.0	592	17	384	11
306.03	2,841	2,497	87.9	344	12.1	266	9.4
307	5,463	4,212	77.1	1,251	22.9	1,198	21.9
308	6,402	4,505	70.4	1,897	29.6	1,662	26
309	3,070	1,630	53.1	1,440	46.9	1,396	45.5
310.01	4,787	3,613	75.5	1,174	24.5	1,175	24.5
310.02	4,116	2,076	50.4	2,040	49.6	2,164	52.6
311	4,638	3,419	73.7	1,219	26.3	1,015	21.9
312	6,504	4,494	69.1	2,010	30.9	2,128	32.7
313	2,606	701	26.9	1,905	73.1	2,394	91.9
314.01	6,008	3,816	63.5	2,192	36.5	2,205	36.7
314.02	6,026	4,118	68.3	1,908	31.7	1,899	31.5
315.01	6,219	4,119	66.2	2,100	33.8	2,048	32.9
315.02	7,091	4,912	69.3	2,179	30.7	2,338	33
316	9,087	5,352	58.9	3,735	41.1	3,791	41.7
317.01	2,764	1,268	45.9	1,496	54.1	1,195	43.2
317.02	2,402	1,839	76.6	563	23.4	699	29.1
317.03	2,914	2,011	69.0	903	31	963	33
317.04	4,714	2,907	61.7	1,807	38.3	1,902	40.3
401	8,005	3,803	47.5	4,202	52.5	4,675	58.4
402.01	4,356	2,406	55.2	1,950	44.8	2,077	47.7

Census Tract	Race; Total population; Count	Race; Total population; One race; White; Count	Race; Total population; One race; White; Percent	Minority Population; Count	Percent Minority	Hispanic or Latino; Total population; Hispanic or Latino; Count	Hispanic or Latino; Total population; Hispanic or Latino; Percent
402.02	2,501	1,709	68.3	792	31.7	855	34.2
402.03	3,785	1,767	46.7	2,018	53.3	2,708	71.5
402.04	3,508	1,245	35.5	2,263	64.5	2,605	74.3
403.01	6,634	3,396	51.2	3,238	48.8	3,933	59.3
403.02	6,484	4,271	65.9	2,213	34.1	2,220	34.2
403.03	2,526	1,358	53.8	1,168	46.2	1,347	53.3
404.01	7,606	5,026	66.1	2,580	33.9	2,346	30.8
404.02	3,837	2,634	68.6	1,203	31.4	1,598	41.6
404.03	4,441	2,703	60.9	1,738	39.1	2,390	53.8
405.01	5,764	3,496	60.7	2,268	39.3	2,665	46.2
405.02	4,323	2,430	56.2	1,893	43.8	2,524	58.4
405.03	3,886	2,563	66.0	1,323	34	1,454	37.4
406.02	4,510	2,996	66.4	1,514	33.6	1,999	44.3
406.03	2,136	1,395	65.3	741	34.7	1,096	51.3
406.04	5,150	3,923	76.2	1,227	23.8	1,561	30.3
406.05	2,804	1,421	50.7	1,383	49.3	1,737	61.9
406.06	2,850	1,671	58.6	1,179	41.4	1,625	57
407.01	2,358	2,051	87.0	307	13	368	15.6
407.02	2,695	2,287	84.9	408	15.1	565	21
407.03	2,648	2,334	88.1	314	11.9	402	15.2
408.03	6,303	5,269	83.6	1,034	16.4	1,511	24
408.04	3,557	2,996	84.2	561	15.8	633	17.8
408.05	5,391	3,977	73.8	1,414	26.2	1,829	33.9
408.09	2,768	1,825	65.9	943	34.1	880	31.8
408.1	11,407	6,193	54.3	5,214	45.7	2,523	22.1
408.11	8,033	4,128	51.4	3,905	48.6	1,736	21.6
409.01	3,282	1,829	55.7	1,453	44.3	1,528	46.6
409.02	4,814	3,351	69.6	1,463	30.4	1,289	26.8

Census Tract	Race; Total population; Count	Race; Total population; One race; White; Count	Race; Total population; One race; White; Percent	Minority Population; Count	Percent Minority	Hispanic or Latino; Total population; Hispanic or Latino; Count	Hispanic or Latino; Total population; Hispanic or Latino; Percent
409.03	2,550	1,527	59.9	1,023	40.1	1,143	44.8
409.04	3,472	1,918	55.2	1,554	44.8	1,741	50.1
410.01	2,822	1,282	45.4	1,540	54.6	1,767	62.6
410.02	2,994	1,693	56.5	1,301	43.5	1,500	50.1
410.03	2,176	1,401	64.4	775	35.6	829	38.1
410.04	4,255	2,549	59.9	1,706	40.1	1,690	39.7
411	8,026	3,491	43.5	4,535	56.5	5,611	69.9
412.01	3,781	2,143	56.7	1,638	43.3	1,839	48.6
412.02	3,986	2,084	52.3	1,902	47.7	2,652	66.5
412.03	3,317	1,697	51.2	1,620	48.8	1,956	59
413	7,105	3,443	48.5	3,662	51.5	4,437	62.4
414.03	2,738	1,930	70.5	808	29.5	814	29.7
414.04	3,244	1,942	59.9	1,302	40.1	1,362	42
410.05	3,874	2,577	66.5	1,297	33.5	1,287	33.2
414.06	4,196	2,698	64.3	1,498	35.7	1,344	32
414.07	5,041	2,785	55.2	2,256	44.8	2,244	44.5
414.08	3,832	2,153	56.2	1,679	43.8	1,367	35.7
414.09	7,149	4,948	69.2	2,201	30.8	1,754	24.5
414.1	2,922	1,147	39.3	1,775	60.7	2,708	92.7
414.11	3,074	1,485	48.3	1,589	51.7	2,249	73.2
414.12	4,130	2,483	60.1	1,647	39.9	1,394	33.8
416	6,883	2,925	42.5	3,958	57.5	5,615	81.6
417.02	4,292	2,937	68.4	1,355	31.6	1,907	44.4
417.03	5,226	2,517	48.2	2,709	51.8	3,644	69.7
417.04	3,417	1,343	39.3	2,074	60.7	2,787	81.6
418.1	3,719	2,577	69.3	1,142	30.7	756	20.3
418.11	6,423	4,413	68.7	2,010	31.3	1,313	20.4
419.09	4,754	3,388	71.3	1,366	28.7	1,759	37

Census Tract	Race; Total population; Count	Race; Total population; One race; White; Count	Race; Total population; One race; White; Percent	Minority Population; Count	Percent Minority	Hispanic or Latino; Total population; Hispanic or Latino; Count	Hispanic or Latino; Total population; Hispanic or Latino; Percent
420.03	2,975	2,360	79.3	615	20.7	525	17.6
420.04	3,022	2,487	82.3	535	17.7	471	15.6
420.05	2,404	1,957	81.4	447	18.6	412	17.1
420.06	12,996	8,913	68.6	4,083	31.4	2,751	21.2
420.07	3,533	2,921	82.7	612	17.3	743	21
420.08	4,029	3,344	83.0	685	17	683	17
16	7,206	2,639	36.6	4,567	63.4	6,268	87
19	18,326	10,678	58.3	7,648	41.7	7,007	38.2
22.01	10,842	5,946	54.8	4,896	45.2	4,544	41.9
22.03	4,795	2,218	46.3	2,577	53.7	1,990	41.5
22.04	5,244	2,256	43.0	2,988	57	3,555	67.8
26.01	5,030	2,677	53.2	2,353	46.8	2,883	57.3
26.02	7,409	3,189	43.0	4,220	57	4,638	62.6
26.03	17,896	6,825	38.1	11,071	61.9	10,233	57.2
40	12,760	6,927	54.3	5,833	45.7	8,274	64.8
Totals	**495,081**	**294,522**	**59.50%**	**200,559**	**40.50%**	**212,139**	**42.85%**

Table 6.12-14 Income Distribution, Census Tracts within Six Miles of the Project

Census Tract	Count; Total Households	Count; Less than $10,000	Percent of Total	Count; $10,000 to $24,999	Percent of Total	Count; over $100,000	Percent of Total	Median income (dollars)
301	2,249	208	9.20%	489	21.70%	174	7.70%	$38,410
302	1,913	260	13.60%	369	19.30%	228	11.90%	$38,271
303	1,540	371	24.10%	564	36.60%	31	2.00%	$19,929
304	1,582	289	18.30%	455	28.80%	70	4.40%	$25,955
306.1	1,392	44	3.20%	75	5.40%	643	46.20%	$95,378
306.2	1,161	55	4.70%	69	5.90%	433	37.30%	$83,564
306.3	1,168	22	1.90%	50	4.30%	514	44.00%	$89,564
307	2,126	226	10.60%	417	19.60%	253	11.90%	$38,333
308	2,364	216	9.10%	371	15.70%	188	8.00%	$45,523
309	833	70	8.40%	129	15.50%	75	9.00%	$43,155
310.01	1,815	157	8.70%	356	19.60%	161	8.90%	$41,206
310.02	1,112	57	5.10%	219	19.70%	82	7.40%	$37,933
311	1,688	88	5.20%	334	19.80%	151	8.90%	$42,452
312	2,134	186	8.70%	239	11.20%	268	12.60%	$50,714
313	608	52	8.60%	244	40.10%	26	4.30%	$26,176
314.01	2,136	207	9.70%	466	21.80%	92	4.30%	$38,422
314.02	2,277	235	10.30%	490	21.50%	97	4.30%	$37,256
315.01	2,092	268	12.80%	437	20.90%	150	7.20%	$36,914
315.02	2,530	297	11.70%	539	21.30%	200	7.90%	$34,405
316	2,861	291	10.20%	621	21.70%	69	2.40%	$34,968
317.01	747	61	8.20%	157	21.00%	104	13.90%	$43,487
317.02	711	13	1.80%	46	6.50%	142	20.00%	$61,830
317.03	862	42	4.90%	138	16.00%	166	19.30%	$55,357
317.04	1,599	182	11.40%	237	14.80%	123	7.70%	$39,659
401	1,926	182	9.40%	346	18.00%	137	7.10%	$43,132
402.01	1,272	54	4.20%	229	18.00%	122	9.60%	$48,659
402.02	777	22	2.80%	181	23.30%	52	6.70%	$49,306
402.03	1,043	225	21.60%	288	27.60%	38	3.60%	$25,327

Census Tract	Count; Total Households	Count; Less than $10,000	Percent of Total	Count; $10,000 to $24,999	Percent of Total	Count; over $100,000	Percent of Total	Median income (dollars)
402.04	840	167	19.90%	289	34.40%	25	3.00%	$22,857
403.01	1,770	240	13.60%	414	23.40%	82	4.60%	$34,221
403.02	1,886	59	3.10%	127	6.70%	320	17.00%	$61,319
403.03	684	81	11.80%	111	16.20%	89	13.00%	$43,750
404.01	2,252	39	1.70%	218	9.70%	423	18.80%	$62,782
404.02	1,003	62	6.20%	147	14.70%	53	5.30%	$49,046
404.03	1,084	42	3.90%	187	17.30%	124	11.40%	$49,730
405.01	1,592	110	6.90%	261	16.40%	106	6.70%	$48,837
405.02	1,127	80	7.10%	285	25.30%	104	9.20%	$41,517
405.03	1,769	385	21.80%	491	27.80%	109	6.20%	$25,299
406.02	1,249	67	5.40%	324	25.90%	142	11.40%	$37,568
406.03	617	14	2.30%	142	23.00%	35	5.70%	$44,199
406.04	1,376	19	1.40%	136	9.90%	324	23.50%	$66,172
406.05	731	45	6.20%	137	18.70%	44	6.00%	$36,339
406.06	690	50	7.20%	113	16.40%	53	7.70%	$37,823
407.01	730	0	0.00%	70	9.60%	245	33.60%	$85,999
407.02	893	88	9.90%	85	9.50%	108	12.10%	$51,409
407.03	832	12	1.40%	72	8.70%	165	19.80%	$54,375
408.03	2,034	89	4.40%	270	13.30%	335	16.50%	$55,045
408.04	1,064	19	1.80%	88	8.30%	324	30.50%	$75,417
408.05	156	0	0.00%	0	0.00%	70	44.90%	$94,297
408.09	825	41	5.00%	75	9.10%	153	18.50%	$68,565
408.1	3,767	159	4.20%	292	7.80%	620	16.50%	$63,685
408.11	2,700	119	4.40%	181	6.70%	516	19.10%	$60,350
409.01	944	94	10.00%	211	22.40%	34	3.60%	$36,923
409.02	1,533	64	4.20%	242	15.80%	316	20.60%	$53,472
409.03	766	31	4.00%	151	19.70%	65	8.50%	$45,676
409.04	906	7	0.80%	162	17.90%	145	16.00%	$57,656
410.01	772	68	8.80%	206	26.70%	24	3.10%	$32,254

Census Tract	Count; Total Households	Count; Less than $10,000	Percent of Total	Count; $10,000 to $24,999	Percent of Total	Count; over $100,000	Percent of Total	Median income (dollars)
410.02	742	28	3.80%	92	12.40%	36	4.90%	$50,263
410.03	670	31	4.60%	80	11.90%	143	21.30%	$60,347
410.04	1,352	86	6.40%	226	16.70%	106	7.80%	$42,333
411	1,942	233	12.00%	516	26.60%	84	4.30%	$32,614
412.01	901	62	6.90%	242	26.90%	59	6.50%	$38,384
412.02	984	39	4.00%	132	13.40%	84	8.50%	$45,458
412.03	911	49	5.40%	213	23.40%	42	4.60%	$36,602
413	1,782	154	8.60%	278	15.60%	154	8.60%	$41,615
414.03	980	57	5.80%	174	17.80%	115	11.70%	$49,286
414.04	848	17	2.00%	132	15.60%	79	9.30%	$54,743
414.05	1,178	39	3.30%	199	16.90%	116	9.80%	$50,250
414.06	1,532	72	4.70%	179	11.70%	112	7.30%	$41,759
414.07	1,651	149	9.00%	345	20.90%	87	5.30%	$35,214
414.08	1,382	112	8.10%	337	24.40%	76	5.50%	$33,771
414.09	2,177	59	2.70%	136	6.20%	882	40.50%	$85,023
414.1	541	49	9.10%	130	24.00%	27	5.00%	$36,681
414.11	795	16	2.00%	124	15.60%	60	7.50%	$41,906
414.12	1,371	128	9.30%	163	11.90%	107	7.80%	$48,778
416	1,703	253	14.90%	488	28.70%	63	3.70%	$27,553
417.02	1,243	56	4.50%	144	11.60%	145	11.70%	$60,417
417.03	1,525	166	10.90%	509	33.40%	36	2.40%	$28,125
417.04	821	58	7.10%	278	33.90%	14	1.70%	$29,229
418.1	1,070	6	0.60%	34	3.20%	439	41.00%	$89,254
418.11	1,894	17	0.90%	95	5.00%	477	25.20%	$76,864
418.09	1,332	83	6.20%	87	6.50%	285	21.40%	$61,190
420.03	938	62	6.60%	113	12.00%	228	24.30%	$59,470
420.04	929	19	2.00%	46	5.00%	354	38.10%	$83,573
420.05	704	0	0.00%	107	15.20%	193	27.40%	$60,700
420.06	3,824	95	2.50%	157	4.10%	1015	26.50%	$72,057

Census Tract	Count; Total Households	Count; Less than $10,000	Percent of Total	Count; $10,000 to $24,999	Percent of Total	Count; over $100,000	Percent of Total	Median income (dollars)
420.07	1,188	89	7.50%	142	12.00%	307	25.80%	$59,569
420.08	1,277	59	4.60%	73	5.70%	368	28.80%	$72,128
16	1,585	297	18.70%	395	24.90%	44	2.80%	$28,821
19	4,645	173	3.70%	398	8.60%	1186	25.50%	$65,421
22.01	3,255	66	2.00%	306	9.40%	445	13.70%	$58,703
22.03	481	7	1.50%	68	14.10%	32	6.70%	$46,750
22.04	1,340	103	7.70%	291	21.70%	120	9.00%	$36,122
26.01	1,411	214	15.20%	203	14.40%	224	15.90%	$40,343
26.02	1,922	60	3.10%	185	9.60%	142	7.40%	$49,312
26.03	4,629	182	3.90%	353	7.60%	418	9.00%	$57,992
40	3,227	267	8.30%	850	26.30%	189	5.90%	$36,569
Totals	**143,792**	**10,343**	**7.20%**	**23,062**	**16.00%**	**19,035**	**13.20%**	**$45,523**

Table 6.12-13 shows that the project area includes 40.5 percent minorities and 42.85 percent Hispanic persons. Of the 97 Census tracts in this area, 19 contained over 50 percent minority population, and 21 contained over 50 percent Hispanic population. In terms of what could be considered low-income households[3], 23.2 percent of the households in Census tracts within 6 miles of the Project had incomes of under $25,000 annually in the year 2000, as shown in Table 6.12-14. Households with incomes under $10,000 comprised 7.2 percent of all households. Twenty eight Census tracts contained households with over 30 percent incomes below $25,000, and two Census tracts had more than 20 percent households with incomes under $10,000 annually. As these percentages are well below the EPA guideline value of 50% for establishing that a significant minority population exists, environmental justices was deemed not to be a significant issue for the Project.

6.12.4.5 Impacts on Housing

As described in Section 6.12.3.4 (Housing), the project vicinity and region's supply of rental and for-sale units is considered somewhat tight. However, workers on short-term construction projects who relocate to the project area are most likely to choose transient accommodations such as hotel/motel rooms or RV parks, rather than to rent or buy homes. Direct socioeconomic impacts would primarily take the form of increases in demand for transient accommodations from the non-local workforce recruited to work on the construction of the Project. This might be regarded as a cost in the sense that they might overload available space or displace customary users of motels and campgrounds near the Project. However, there are over 150 hotel/motels located within 25 miles of Riverside, 78 of which are within 10 miles, 34 of which are located in the City of Riverside itself. This level of transient accommodations suggests that there would be space for up to 60 non-local project workers within reasonable commuting distance of the project area. The project vicinity and region's service industry (e.g., hotel/motel/RV park, food, retail) is well developed, and the number of people employed at the Project would create a minimal impact on the level of demand for these accommodations. These additional businesses for local motels, RV parks, etc., would represent a short-term economic benefit for the project vicinity and region, mostly in the City of Riverside and Riverside County.

Just as the Project's impact on population is expected to be minimal, the impact on the project vicinity and region's permanent housing supply would be correspondingly small. There were 89,194 vacant housing units in Riverside County in the year 2006 (see Table 6.12-5), 4,421 of which were in the City of Riverside. With an expected project related population maximum of 48 people (or approximately 20-35 households) in addition to the temporary construction workforce, the local available housing supply has more than adequate capacity to accommodate such a population increase. After completion of

---

[3]Census data are provided for "under poverty level" status only at county levels, since local costs of living can vary significantly. For smaller units such as Census tracts or blocks, income distribution data are useful but do not address the specific concept of "below poverty" status. Therefore, income distribution information, focused on lower-income categories, is presented herein.

construction, project operation and maintenance activities would have essentially no socioeconomic effects on the proposed project area. Personnel requirements would be negligible, and would place no additional burden on the project vicinity and region's housing supply.

6.12.4.6 Impacts on Public Services

Due to the low level of population change associated with the Project (up to about 20 people), no significant impacts on public services such as sewer, water, schools, police, or fire are expected. The most direct potential demands would likely be, if they occur at all, incidents of fire, worker accidents at the site, oil or hazardous materials events, or, construction materials theft and vandalism.

In addition, construction would cause increases in road traffic for materials delivery and worker commuting. The traffic demands described earlier in this section show existing traffic networks can accommodate the increase in road traffic caused by the Project. As discussed in Section 6.12.3.6, the City of Riverside and Riverside County existing hazardous waste emergency response teams and procedures would cover the project area. Similarly, the Project would be under the jurisdiction of the City of Riverside Fire Department, and the City of Riverside Police Department. Furthermore, procedures will be in place on-site to provide best management practices for health and safety, and can be considered effective mitigation measures. After completion of construction, project operations and maintenance activities would have essentially no socioeconomic effects on project area public service providers. Personnel requirements would be negligible, and would place no extra burden on public services.

6.12.4.7 Impacts on Fiscal Conditions

As a municipal power project within the Riverside City limits, the Project would not be subjected to property taxes. The primary fiscal impact would be sales taxes, which would be levied at a rate of 7.75 percent, for all local project equipment and material purchases. The estimated purchase price of the primary pieces of equipment is approximately $55,000,000. The sales taxes on the primary equipment would be approximately $4,263,000. Under California law, the City can apply to have these taxes directed back to the City of Riverside.

Minor increases in sales taxes would occur due to re-spending of wages on retail goods and services in the Study Area by workers whose wages are provided in part or in total by the Project. These increases would be so small as to be negligible. After completion of construction, project operations and maintenance activities would have essentially no socioeconomic effects on the project area. Tax payments to local entities would be negligible, comprised of only retail sales taxes on any spending of workers' wages and minimal capital and operating supply purchases from the Study Area.

6.12.5 Mitigation

No socioeconomic impacts have been identified which are considered significant. Thus, no mitigation measures are proposed.

6.12.6 References

California Department of Finance (DOF), Demographic Research Unit, 2001. "Interim County Population Projections, Estimated July 1, 2000 and Projections for 2005, 2010, 2015, and 2000" (June 2001).

California Department of Finance (DOF), Demographic Research Unit, 2007. “Table E-4 California County Population Estimates and Components of Change by Year, July 1, 2000–2007.” Website: http://www.dof.ca.gov/html/DEMOGRAP/ ReportsPapers/Estimates/E2/E-2_2000-07.php.

California Employment Development Department (CEDD), 2001. “Labor Market Information— Projections of Employment by Industry.”

California Employment Development Department (CEDD), 2007. “Labor Market Information— Historical Data for Unemployment Rate and Labor Force.”

California Energy Commission (CEC), 2006. California Energy Commission Staff Approach to Environmental Justice. Web site: http://www.energy.ca.gov/env-justice/staff_env_justice_approach.htmlach to Environmental Justice

City of Riverside Public Works Department, 2004. Sewerage Systems Services. Website: http://www.riversideca.gov/pworks/sewerage.html

City of Riverside, undated. “The History of Riverside,” Web site: http://www.ci.riverside.ca.us/empire/history.html

City of Riverside, undated-B. “City of Riverside Fire Department Profile.” Web site: http://www.riversideca.gov/fire/profile.html

City of Riverside, 2006. “FY 2006/2007 Strategic Budget.”

Riverside Public Utilities, 2006. “Water Utility Statistics,” web site: http://www.riversideca.gov/utilities/ar_wate.htm

Riverside Unified School District, 2005. “District Profile.” Web site: http://www.rusd.k12.ca.us/ourdistrict/profile.html.

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, 2003.

U.S Census Bureau (Census Bureau). 2000. American FactFinder. Web Site: <http://factfinder.census.gov>. Accessed January 11, 2008.

U.S Census Bureau (Census Bureau). 2006. American FactFinder. Available: <http://factfinder.census.gov>. Accessed January 11, 2008.

United States Environmental Protection Agency (U.S. EPA), 1996. Guidelines for Incorporation Environmental Justice Concerns in EPA’s Environmental Justice Analyses. July 12.

6.13 Water Resources

6.13.1 Introduction

Riverside Public Utilities (RPU) proposes to develop, build, own and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced project area (site) within the City of Riverside, California. The Riverside Energy Resource Center Units 3&4 (RERC Units 3&4) Project (Project) will be constructed inside the project area. RERC Units 3&4 will primarily supply the internal needs of the City of Riverside during summer peak electrical demands as well as supporting the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from Project will be exported outside of the city.

This section assesses the potential impacts of the Project on water resources in the project study area. Potential effects on water resources are evaluated specifically with respect to significance thresholds established in the California Environmental Quality Act (CEQA) Checklist.

6.13.1.1 Project Description

The project area is owned by the City of Riverside and is located adjacent to the City of Riverside's Riverside Regional Water Quality Control Plant (RRWQCP) in a light industrial/manufacturing area. RERC Units 1&2, their associated switchyard, and interconnections for natural gas, water, and electric transmission are already located at the site. RERC Units 3&4 will consist of two additional aero-derivative combustion turbine generators with ECMs, a two bay expansion of the on-site switchyard, plus two ancillary buildings. The Project will occupy approximately 2.2 of 16 acres. An additional 2 acres will be reserved for construction laydown. The entire project area perimeter is already fenced with a combination of chain-link fencing and architectural block walls.

6.13.2 Laws, Ordinances, Regulations and Standards

Laws, ordinances, regulations and standards (LORS) on federal, state, county, and local levels that are applicable to water resources (in the context of the Project) are discussed in this section and summarized in Table 6.13-1 Compliance with these LORS is discussed in the subsection.

6.13.2.1 Federal

The Clean Water Act of 1972 (CWA) authorized the U.S. Environmental Protection Agency (U.S. EPA) to regulate discharges of wastewater and storm water into surface waters by issuing National Pollutant Discharge Elimination System (NPDES) permits setting effluent standards. In the state of California, Regional Water Quality Control Boards (RWQCB) implement these permits. The CWA applies to the Project for storm water discharges and soil erosion control during construction, maintenance, and operation of the plant and the associated transmission line. Erosion control plans that identify applicable Best Management Practices (BMP) to be implemented during construction will be prepared

for the construction of each project element that physically disturbs or displaces surface soil or similar materials.

6.13.2.2 State

California State LORS applicable to the Project include elements of the CEQA checklist and storm water permits (issued by the Santa Ana RWQCB).

California Environmental Quality Act

The CEQA checklist, provided in Table 6.13-4, defines criteria for significance of water resources impacts.

Storm Water Permits

The State Water Resources Control Board (SWRCB), pursuant to Water Quality Order No. 99-08-DWQ, requires an NPDES storm water permit for construction activities that disturb one acre or more of surface area. A Notice of Intent (NOI) shall be filed with the Santa Ana RWQCB prior to the start of construction activities. Comprehensive Storm Water Pollution Prevention Plan (SWPPP) must be prepared prior to filing the Notice of Intent (NOI). Upon completion of construction activities, a Notice of Termination (NOT) shall be filed with the same RWQCB.

6.13.2.3 Local

General Plan Policies

Applicable LORS identified in the City of Riverside 2025 General Plan (2007) address water supply, wastewater discharges, and storm water discharges. These policies are presented in Table 6.13-1.

Table 6.13-1 Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance and Timing
Federal		
CWA	Regulates storm water discharge and erosion control	NPDES permits required for construction would have to be obtained at least 60 days prior to discharge. A SWPPP would be developed prior to submitting the NOI.
State		
Porter-Cologne Water Quality Control Act	Specifies the responsibilities of the state with respect to protection of surface waters. Delegates authority to implement surface water and storm water permitting.	No action required.
City of Riverside 2025 General Plan: Open Space and Conservation Element		
Objective OS-10: Preserve the quantity and quality of all water resources throughout Riverside.	Policy 10.6: Continue to enforce RWQCB regulations regarding urban runoff.	Project will consult with City regarding RWQCB urban runoff regulations
	Policy 10.9: Evaluate development projects for compliance with NPDES requirements, and require the new development to landscape a percentage of the site to filter pollutant loads in stormwater runoff and provide groundwater percolation zones.	Project will comply with NPDES standards and provide landscaping to reduce pollutant loads in stormwater runoff, including the provision of groundwater percolation zones.
	Policy 10.11: Monitor the quantity and quality of groundwater and surface water resource, and consider revisions to the General Plan's policies if monitoring identifies significant reductions in water quality.	The Project recycles process waste water assuring protection of the groundwater resources in the area. All sanitary wastes are discharged to the City's sanitary sewer system.

6.13.3 LORS Compliance Strategy

RERC Units 3&4 will comply with all applicable and appropriate federal, state and local LORS by acquiring the permits described in Section 6.13.2.

The Project will utilize reclaimed and potable water that are already delivered to the site to support RERC Units 1&2. Potable water for sanitary use would come directly from the City's general water supply. The adjacent RRWQCP would supply reclaimed water for

cooling and plant process water. The Project will recycle process waste water eliminating the need to discharge process wastewater to the RRWQCP. Therefore, the Project would be consistent with local policies.

The storm water permitting process and acquisition of the NPDES Construction Permit, including submittal of the NOI and preparation of the SWPPP, would be completed a minimum of 60 days prior to start of construction of the Project. All on-site storm water runoff would be routed to a below-grade retention/infiltration basin on-site; therefore, an Industrial NPDES permit is not required.

6.13.4 Hydrologic Setting

This section describes the water resources features in the immediate vicinity (within a one mile radius) of the project area inside the project study area (PSA). The project area is situated at an elevation of approximately 725 feet above mean sea level, with a slight slope downward towards the northwest. Existing elevations in the proposed plant area range from approximately 715 feet to 740 feet above mean sea level. Geographical boundaries include the Santa Ana Mountains to the south and west, and San Gabriel and San Bernardino Mountains to the north and, and the Box Springs Mountains to the east. The Santa Ana River runs approximately ¼ mile north of the site.

6.13.4.1 Regional Climate and Precipitation

The climate in the Riverside area is characterized by mild winters, hot and dry summers, and low average annual rainfall. Precipitation and temperature data for the project area was obtained from the Western Region Climate Center's online database. The weather station closest to the project site is the Riverside Experiment Station Number 047473. Table 6.13-2 summarizes historic precipitation and temperature characteristics as well as the storm duration/recurrence intervals in the project area.

Table 6.13-2 Precipitation and Temperature Statistics *

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Maximum Temperature (°F)	66.5	68.0	70.1	75.0	79.5	86.6	93.9	94.4	90.5	82.3	73.3	67.6	79.0
Average Minimum Temperature (°F)	41.6	43.2	44.9	47.8	52.6	56.2	60.6	61.1	58.4	52.4	45.3	41.3	50.4
Average Total Precipitation (inches)	2.15	2.17	1.70	0.81	0.23	0.07	0.04	0.12	0.26	0.33	0.90	1.20	9.98

*Riverside Citrus Experimental Station #047473 (for period of record 7/1/48 to 6/30/07)

6.13.4.2 Regional Water Supply and Use

The City of Riverside gets 98.6 percent of its water supply from groundwater wells located in the Bunker Hill Basin in San Bernardino County, and the Riverside North and Riverside South Basins in San Bernardino and Riverside Counties. Groundwater is pumped from these wells and distributed for municipal use (industrial and residential) through a system of underground pipelines. These groundwater wells are recharged by rain and by snowmelt draining into the Bunker Hill and Riverside Basins. In 2006, total water use in the City was 66,300 acre-feet.

6.13.4.3 Flooding Potential

The Project is located outside the floodplain zone boundary of the Santa Ana River, as mapped by the Federal Emergency Management Agency (FEMA). The flood zone in this area is bounded by the Project's northern property boundary. The Project is outside the existing floodplain and thus would not be affected by potential flooding. The Project would convert a relatively small area to impermeable surface and therefore cause no additional flooding hazard to areas that are not currently at risk.

6.13.5 Project Water Supply

Potable water for sanitary use comes directly from the City's general water supply and is currently available at the proposed project site. A separate connection to the City potable water system, with an approved backflow preventer, supplies fire suppression water to the plant. Layout of the fire water suppression loop and piping, size of piping, spacing of hydrants, and equipment or buildings protected by sprinkler systems will be designed according to NFPA standards and local requirements of the City of Riverside Fire Department.

The adjacent RRWQCP supplies reclaimed water for RERC 1&2 process needs. This reclaimed water is also currently available for RERC 3&4 process water needs. Reclaimed water is used to slowly fill the raw water storage tank on an as needed basis. Raw water is then drawn from the tank to produce demineralized water on a "batch" basis for storage in the demineralized water tanks. This configuration avoids placing an acute demand on the raw water system when the RERC Units 3&4 operate.

Two additional 300,000 gallon demineralized water tanks will be added to the existing demineralized water storage tank. The capacity of all three tanks ensures adequate water storage for all four units.

Landscaping will also be irrigated with reclaimed water from the RRWQCP.

Water requirements under various operating ambient temperatures are shown in the process flow diagram (Drawing No. RIGOM0201-01) located in Section 2. The expected maximum annual water use is based on water use at 100% power operation for a mix of ambient operating temperatures as illustrated below.

Table 6.13-3 Plant Water Usage

Operating Basis	Ambient Temperature, deg. F	Daily Run Time, hrs	Annual Run Time*, hrs	Total Daily Usage for Each Operating Condition, Mgal	Total Annual Usage, Mgal**
Summer Max	115	16	123 (5%)	0.207	1.589
Summer Design	100	16	1,230 (50%)	0.178	13.680
Annual Average	72.2	8	984 (40%	0.068	8.341
Winter Low	18	4	123 (5%)	0.026	0.785
Totals			**2,460 (100%)**	**N/A**	**24.394**

Note 1: Run time is based on a total of 2460 hours at 100% load for a single unit or 1,230 hours each for two units at 100% load.

6.13.6 Process Wastewater

All of the RERC process waste water, excepting that which becomes contaminated and must be treated as a hazardous waste, will be recycled for use as raw water. The RERC facility will generate process waste water primarily resulting from cooling tower blowdown and condensate from the inlet air chiller. Other relatively minor contributions will be clean process water from the Oily Water Separator and water system tank overflows.

6.13.6.1 Treatment of Power Plant Process Waste Water

Wastewater from the equipment area (i.e., CTG, fuel gas compressor and ammonia vaporizer) wash downs with the potential to contain floatable oil and settleable solids, will be piped below grade by gravity to a coalescing oil-water separator. After removal of floatable oils and settleable solids, the clean waste water from the oil-water separator will be pumped to the raw water storage tank where it will combine with incoming reclaimed water, cooling tower blowdown, and condensate from the inlet air chiller to serve as raw water for the power plant.

6.13.6.2 Domestic Sewage

Domestic water uses (e.g., toilets, showers, sinks) will be discharged to the City's domestic wastewater system.

6.13.6.3 Storm Water System

Construction

The goal of the erosion and sediment control strategy is to retain sediment inside of the project area to the extent practicable. Erosion and sediment controls for construction activities have been selected from California's Construction BMP Handbook and will be properly installed and maintained in accordance with the manufacturers' specifications and good engineering practices. Soil and sediment control measures where necessary will be in

place at the onset of soil disturbing activities. Construction-phase (temporary) BMPs were selected to control runoff from a ten-year storm event and post-construction (permanent) control strategy is based on a 50-year storm event.

Grading and construction will be sequenced to minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking. Construction is expected to occur from September 2008 to June 2009. Although it is planned to sequence RERC Unit 3 & 4 construction to allow Unit 3 to be available for operation as early as possible, grading and foundation preparation work for both units will occur at the same time.

Geosynthetic and/or matting materials may be used around the site to temporarily or permanently stabilize soil, roads, and drains during construction activity for flow line erosion protection.

Dust control measures will be used to stabilize soil from wind erosion and reduce dust generated from the following construction activities: clearing and grading activities, construction vehicle traffic on unpaved roads, sediment tracking onto paved roads, and areas of unstabilized soil stockpiles. Water trucks will be utilized for dust control. Preventative measures such as limiting the areas of disturbance will be utilized in addition to wet suppression methods.

Roads used for construction access to the site currently exist. Stabilization practices may include applying gravel surfacing to roadways, or applying magnesium chloride or other product to graded surfaces to provide a more durable and less dusty surface. Stabilized roads shall be frequently maintained and re-stabilized as necessary.

During grading activities, several areas may be used to stockpile soil. The soil will be stockpiled in a generally uncompacted condition prior to placement, and is, therefore, subject to erosion. In addressing stockpiling, BMPs will include diversion of drainage from the stockpile areas, placement of additional sandbag de-silting facilities and silt fencing on the down gradient toe of the stockpile slope, and dust control. In addition, large stockpiles will be sloped to encourage sheet flow and reduce infiltration of rainwater.

Additional BMPs to be implemented during construction would be identified in the final Storm Water Pollution Prevention Plan prepared for the Project.

Post Construction

Existing site drainage patterns will be preserved. The finished plant site will be covered with either concrete roadways or 3/4-inch minus compacted gravel surfacing. The non-contact plant site drainage will be directed by surface flow to the existing storm water retention/infiltration basin at the low side of the site. Storm water that could potentially come in contact with hydrocarbons will be conveyed by underground piping to an oil/water separator prior to treatment. Containment of spills and source control will be incorporated into the final design. The storm water detention/infiltration basin was sized to contain more than the difference in runoff volume between pre and post development of the site for a 100-year storm event and has an open bottom for infiltration. Overflow from the

detention/infiltration basin, when it occurs, will overflow on the surface to a storm water catch basin on the RRWQCP site just to the east of the retention/infiltration basin.

Facilities that do not discharge to Waters of the United States are not subject to the requirements of the General Permit for Discharges of Storm Water Associated with Industrial Activity. Because non-contact plant site drainage will be directed by surface flow to a storm water retention/infiltration basin, the General Permit does not apply.

6.13.7 Impacts

This section evaluates the potential impacts of RERC Units 3&4 with respect to the potential effect on various water resources including ground and surface water quality and quantity. Consistency with LORS is also examined. The CEQA Checklist is provided in Table 6.13-4.

Table 6.13-4 CEQA Environmental Checklist – Water Resources

HYDROLOGY AND WATER QUALITY **Would the project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation**	**Less than Significant**	**No Impact**
a) Violate any water quality standards or waste discharge requirements?				X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
k) Substantially deplete or degrade local or regional surface water supplies, particularly fresh water, or fail to implement reasonable alternatives for water conservation?				X

6.13.7.1 Project Effect on Surface or Groundwater Supplies

Because the Project would utilize reclaimed water from the adjacent RRWQCP for cooling and process water, the potential impact to surface or groundwater supplies will be insignificant. Small amounts of City water would be used for domestic purposes by the staff at the facility. The use of wastewater would be consistent with the SWRCB policy regarding power plant cooling water.

6.13.7.2 Project Effect on Wind or Water Erosion and Sedimentation

Storm water runoff will be controlled during construction and operation of RERC Units 3&4 through adherence to the Santa Ana RWQCB Construction Activity Storm Water Permit. The permit requires preparation of a SWPPP that identifies methods to control and reduce erosion and sedimentation. Adherence to conditions of the permit and implementation of BMPs outlined in the SWPPP will reduce potential impacts to a level of insignificance.

6.13.7.3 Project Effect on Water Quality Degradation

Recycling of the process waste water will eliminate the need for process water discharge into the sewer. Concerns about plant contribution to TDS levels in the City's wastewater effluent and subsequent ground water degradation thus are not an issue.

Small amounts of wastewater from conventional sources (e.g., toilets, showers, sinks) are proposed to be discharged into the City's domestic system. No significant impacts are anticipated from this low volume source.

6.13.7.4 Flooding Potential

RERC Units 3&4 are not located in an identified flood zone. Storm water would be retained inside the project area (on-site) in a retention/infiltration basin designed to handle storm water flows from a 100-year event. Overflow from the retention/infiltration basin, when it occurs, will overflow on the surface to a storm water catch basin on the RRWQCP site just to the east of the detention/infiltration basin. RRWQCP staff has indicated it has adequate capacity to accommodate overflow if it occurs.

6.13.7.5 Project Consistency with Applicable LORS

RERC Units 3&4 will be constructed in compliance with all applicable LORS including the permits listed in Table 6.13-1. Because the Project will utilize reclaimed water for cooling and process water it is consistent with the SWRCB and CEC staff policy to use alternative water supplies whenever possible.

6.13.8 Cumulative Impacts

No additional industrial facilities that would consume substantial water supplies have been identified in the project vicinity. Any new facilities proposed would be subject to environmental review and any water use or quality impacts would be evaluated and mitigated. The Project is not anticipated to contribute to cumulative water resource impacts.

6.13.9 Mitigation and Monitoring

Because the Project will comply with applicable LORS, there will be no significant impact on water resources and additional mitigation measures beyond the stipulations outlined in project related permits would not be required.

6.13.10 Agency Contacts and Permits

Permit	Agency
Construction Activity NPDES Stormwater Permit	Milasol Gaslan NPDES Coordinator Santa Ana Regional Water Quality Control Board 3737 Main Street, Suite 500 Riverside, CA 92501-3348 (951) 782-4419

6.13.11 References

City of Riverside. 2007. The 2025 General Plan.

Mayer Hoffman McCann, P.C. 2006. Independent Auditors Report. Available at http://www.riversideca.gov/utilities/pdf/water/Water-Financials-2005-06.pdf.

Modesto Irrigation District Electric Generation Station Project. 2003. MID Application for Certification for Small Power Plant Exemption.

GWF Energy, LLC. 2001. Tracy Peaker Project Application for Certification for Small Power Plan Exemption.

6.14 Hazardous Materials

6.14.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own, and operate a nominal 95-megawatt (MW) simple-cycle power plant on 2.2 acres of a 16-acre fenced site within the City of Riverside, California. This proposed facility is referred to as the Riverside Energy Resource Center Units 3&4 (RERC 3&4 or Project). RERC 3&4 will supply the needs of the City of Riverside primarily during summer peak electrical demands as well as supporting the City's minimum emergency loads in the event RPU is islanded from the external transmission system. No power from the Project will be exported outside of the City.

This section describes the hazardous materials and waste generation management program that would be used during construction and operation of the project. The discussion includes information on the relevant laws, ordinances, regulations, and standards (LORS) that would be applicable given the nature of substances that will be used and wastes that may be generated at the proposed facility. Finally, an analysis of potential environmental and health impacts associated with hazardous materials and wastes is provided.

6.14.1.1 Project Description

The proposed site is owned by the City of Riverside and is located adjacent to the Riverside Energy Resource Center Units 1&2 (RERC 1&2) site, on the north side of Jurupa Avenue, fronting on Payton Avenue. The Project is located in a light industrial/manufacturing area, east of the RRWQCP and immediately north of RERC Units 1&2. The Project will consist of two additional aero-derivative combustion turbine generators with Emission Control Modules (ECM) and a common mechanical chiller for inlet air cooling, an on-site switchyard (two new bays), and on-site ancillary buildings.

RERC Units 3&4 will occupy approximately 2.2 acres, with an additional area of 2 acres set aside for construction laydown. The entire 16 acre plant perimeter (project area) is fenced with a combination of chain-link fencing and architectural block walls, with landscaping installed per City of Riverside standards. Notable features within 1 mile of the proposed Project site include residential areas, an elementary school, and the Riverside Municipal Airport. A complete description of area land uses is provided in Section 6.2.

Various chemicals will be stored and used during the construction and operation of the proposed Project. All chemicals will be stored in appropriate storage facilities. Bulk materials will be stored in tanks or containers made of materials compatible with the intended contents. Quantities generally less than 55 gallons will be stored in delivery containers. All hazardous material storage and use areas will be designed to contain leaks and spills. Containment structures will be provided with sufficient volume to contain the spill of a full tank without overflow. All chemicals on-site will be stored, handled, and used in accordance with applicable laws, ordinances, regulations, and standards (LORS).

All equipment containing significant quantities of oil (transformers, CTGs) will be provided with their own secondary containments. Containments will be sized to contain 110 percent of the nominal capacity plus an allowance for precipitation from a 25-year, 24-hour event and fire water. The secondary containments will be provided with drains with normally closed valves that allow for removal of clean rainwater.

Aqueous ammonia is the hazardous material that will be present in the greatest quantity and presents the largest degree of risk of spills or releases. The existing 12,000-gallon aqueous ammonia storage tank installed as part of RERC 1&2 will also be used for RERC 3&4. Thus with RERC 3&4 there is no increase in the amount of aqueous ammonia stored on site.

To mitigate the risk associated with storing large quantities of aqueous ammonia, the storage tank facility includes a secondary containment capable of holding 110 percent of the nominal 12,000-gallon tank capacity. Additional capacity was provided to hold precipitation from a 25-year, 24-hour event. The ammonia tank is equipped with a pressure relief valve, a vapor equalization, vent, and vacuum breaker. The ammonia delivery truck unloading station includes a curbed area that can contain the truck volume and prevent storm water runoff from entering the unloading area. The curbed truck drainage pad slopes toward a collection sump. The catch basin is drained periodically to remove any accumulation of spills and rain water.

Small-quantity chemicals will be stored in their original delivery containers to minimize risk of upset. All hazardous materials storage vessels will be designed in conformance with the applicable local, state, and federal LORS. All electric equipment will be specified to be free of polychlorinated biphenyls (PCBs).

Safety showers and eyewash stations will be provided in all chemical storage areas. Service water hose connections will be provided near the chemical storage areas to facilitate flushing of leaks and spills of non-water reactive materials. Appropriate safety gear will be provided for plant personnel for use during the handling, use, and cleanup of hazardous materials. Plant personnel will be properly trained in the handling, use and cleanup of hazardous materials used at the plant, and in procedures to follow in the event of a leak or spill. Adequate supplies of appropriate cleanup materials will be stored on-site. The RERC Hazardous Materials Business Plan that was prepared in compliance with the California Hazardous Materials Release Response Plans and Inventory Act for RERC 1&2 will be updated to reflect RERC 3&4 and submitted to the City of Riverside Fire Department for approval.

Process waste water streams that are subject to oil contamination will be contained and processed through an Oily Water Separator (OWS). Oil that accumulates in the OWS will be transported off-site for disposal.

Personal protective equipment (PPE) will be provided for plant personnel use. Personnel working with chemicals will be trained in proper handling techniques and in emergency response procedures to chemical spills or accidental releases.

Appropriate safety programs will be updated and will address hazardous materials storage locations, emergency response procedures, employee training requirements, hazard recognition, fire safety, first-aid/emergency medical procedures, and hazardous materials release containment/control procedures, hazard communications training, PPE training, and release reporting requirements. These programs include a chemical Risk Management Plan (RMP) for aqueous ammonia, sulfuric acid, and sodium hydroxide in accordance with the California Accidental Release Prevention Program (CalARP) emergency regulations, Hazardous Materials Business Plan, workers safety program, fire response program, a plant safety program, and the facility's standard operating procedures.

Spent SCR and oxidation catalyst will be recycled by the catalyst supplier. Used oil filters will be recycled or disposed of at an offsite disposal facility. Used oil will be recovered and recycled by a waste oil-recycling contractor.

Chemical cleaning wastes consist of acid and alkaline cleaning solutions used for pre-operational chemical cleaning of piping. These wastes, which may have elevated concentrations of metals, will be tested. If hazardous, these and all other hazardous solid and liquid wastes will be disposed of in accordance with applicable LORS.

Workers will be trained to handle waste generated at the site in accordance with federal and state worker safety and health regulations.

6.14.2 Setting

6.14.2.1 Laws, Ordinances, Regulations and Standards

The use and storage of hazardous materials and the generation of hazardous wastes are regulated by federal, state, and local laws, ordinances, regulations and standards (LORS).

Table 6.14-1 provides a summary of the LORS that are applicable to the proposed project.

Table 6.14-1 Laws, Ordinances, Regulations and Standards

FEDERAL	APPLICABILITY
Clean Water Act Oil Pollution Prevention Act (OPPA) 40 CFR Part 112	Requires implementation of a Spill Prevention Control & Countermeasures (SPCC) Plan for fuel storage facilities (including temporary facilities) if the quantity stored is greater than 1,320 gallons and if a spill could reasonably be expected to enter navigable waters of the United States or affect natural resources under the jurisdiction and management of the United States.
Clean Air Act (CAA) Chemical Accident Prevention Provisions 40 CFR Part 68	Requires a Risk Management Plan (RMP) if listed hazardous materials are stored at or above the designated Threshold Quantity (TQ).
Comprehensive Environmental Response, Compensation, and Liability Act (CERLA)/Superfund Amendment and Reauthorization Act - Emergency Planning and Community Right-to-Know Act (EPCRA) Section 302 40 CFR Part 300/355	Requires certain planning activities when Extremely Hazardous Substances (EHS) are present in excess of their Threshold Planning Quantity (TPQ). Facilities must comply within 60 days of becoming subject to these regulations. (Note: Requirement met by complying with State of California Hazardous Materials Release Response Plans and Inventory Act).
CERCLA/SARA EPCRA Section 304 40 CFR Part 300/355	Requires notification when there is a release of a hazardous material in excess of its reportable quantity (RQ).
CERCLA/SARA EPCRA Section 311/312 40 CFR Part 300/355	Requires a Material Safety Data Sheet (MSDS) for every hazardous material to be kept on-site and submitted to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC), and the local fire department. Requires annual inventory reporting. (Note: Requirement met by utilizing forms also required under the State of California Hazardous Materials Release Response Plans and Inventory Act).
CERCLA/SARA EPCRA Section 313 Toxic Release Inventory (TRI) 40 CFR Part 300/355	Requires annual reporting of releases of hazardous materials.
Resource Conservation and Recovery Act (RCRA) Subtitle C	Regulates storage, treatment, and disposal of hazardous waste.
Hazardous Materials Transportation Act 49 CFR Part 100 – 185	Regulates the transportation of hazardous materials. Requires employee training and proper transportation methods for hazardous materials as defined in 40 CFR Part 172.

STATE	APPLICABILITY
Hazardous Materials Release Response Plans and Requires preparation of a Hazardous Materials Inventory Act (Health and Safety Code, Chapter Business Plan (HMBP) including a hazardous 6.95 Section 25500 - 25545)	Requires preparation of a Hazardous Materials Business Plan (HMBP) including a hazardous materials inventory if hazardous materials are handled and stored in excess of 55 gallons, 500 pounds, or 200 cubic feet of gas at standard temperature and pressure or equal to or greater than the federal TPQ for federally-listed Extremely Hazardous Substances. Inventory report forms also meet federal EPCRA Section 312 requirements.
California Accidental Release Prevention (CalARP) Program (Health and Safety Code, Chapter 6.95, Section 25531 – 25543.4	Requires registration with local Certified Unified Program Agency (CUPA) or lead agency and preparation of a Release Management Plan (RMP) if acutely hazardous materials are handled or stored in excess of TPQs. This program is the adopted federal CAA Chemical Accident Prevention program (40 CFR part 68) with some amendments specific to the state.
Aboveground Petroleum Storage Act (Health and Safety Code, Chapter 6.67, Sections 25270 – 25270.13)	Requires entities that store petroleum in aboveground storage tanks (AST) in excess of certain quantities to prepare an SPCC plan.
California Hazardous Waste Control Law (Health and Safety Code, Chapter 6.5, Section 25100-25249; regulations found at 22 CCR Section 66261.126 et.seq.)	Controls Storage, treatment, and disposal of hazardous waste.
California Hazardous Waste Control Law, Management of Used Oil (Health and Safety Code, Chapter 6.5, Section 25250 – 25250.28	Regulates the disposition of used oil transported offsite for recycling. Does not apply to oil removed from electrical equipment.
Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et.seq.; waste discharge regulations found in CWC Sections 13260 – 13274)	Controls discharge of wastewater to the surface and groundwaters of California. Applies only if the facility discharges wastewater to surface or groundwater.
LOCAL	**APPLICABILITY**
Ordinance No. 615.3 Relating to establishments where hazardous waste is generated, stored, handled, disposed, treated, or recycled.	Requires initial notification reporting to the County of Riverside Health Services Agency Department of Health and a permit for facilities that generate hazardous waste.
Ordinance No. 651.3 Disclosure of hazardous materials and the formulation of Business Emergency Plans	Permit required for handling hazardous materials from the Department of Health. Applicants must develop a Business Emergency Plan. Businesses that the DEH determines present a significant risk under the state or federal regulations shall prepare a Risk Management Plan.
Ordinance No. 617.4 Regulation of underground tank systems containing systems for hazardous substances.	Requires a permit for underground storage tank systems for hazardous substances

Other Federal and State Regulations

Toxic Release Inventory

The EPA has established the Toxics Release Inventory (TRI), a publicly available database that contains information on toxic chemical releases and other waste management activities of chemicals reported annually by certain industry groups, including federal facilities.

California Environmental Protection Agency

The California EPA (Cal/EPA) has broad jurisdiction over hazardous materials management in the State. Within Cal/EPA, the Department of Toxic Substances Control (DTSC) has primary regulatory responsibility for hazardous waste management and cleanup. Enforcement of regulations has been delegated to local jurisdictions that enter into agreements with DSTC for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law.

Department of Toxic Substance Control

Resource Conservation and Recovery Act (RCRA) of 1976 is the principal Federal Law that regulates the generation, management, and transportation of hazardous materials and other wastes.

The DTSC regulates hazardous waste in California primarily under the authority of the Federal RCRA, and the California Health and Safety Code. Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reductions, cleanup, and emergency planning. From these laws, DTSC's major program areas develop regulations and consistent program policies and procedures. The regulations spell out what those who handle hazardous waste must do to comply with the laws. Under RCRA, DTSC has the authority to implement permitting, inspection, compliance, and corrective action programs to ensure that people who manage hazardous waste follow state and federal requirements.

California law provides the general framework for regulations of hazardous wastes by the Hazardous Waste Control Law (HWCL) passed in 1972. DTSC is the State's lead agency in implementing the HWCL provides for State regulation of existing hazardous waste facilities, which include "any structure, other appurtenances, and improvements on the land, used for treatment, transfer, storage, resource, recovery, disposal, or recycling of hazardous waste," and requires permits for, and inspections of facilities involved in generation and/or treatment, storage and disposal of hazardous wastes.

Tanner Act

Although there are numerous State policies dealing with hazardous waste materials, the most comprehensive is the Tanner Act (AB 2948) that was adopted in 1986. The Tanner Act governs the preparation of hazardous waste management plans and the siting of hazardous waste facilities in the State of California. The act also mandates that each county adopt a Hazardous Waste Management Plan.

Hazardous Materials Management Plans

In January 1996, Cal EPA adopted regulations implementing a "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program The program is implemented at the local level by a local agency-the Certified Unified Program Agency (CUPA). The CUPA is responsible for consolidating the administration of the six program elements within its jurisdiction.

California Accidental Release Prevention Program (CalARP)

The CalARP program (CCR Title 19, Division 2, Chapter 4.5) covers certain businesses that score or handle more than a certain volume of specific regulated substances at their facilities. The CalARP program regulations became effective on January 1, 1997, and include the provisions of the Federal Accidental Release Prevention program (Title 40, CRF Part 68) with certain additions specific to the State pursuant to Article 2, Chapter 6.95, of the Health and Safety Code.

Worker and Workplace Hazardous Materials Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The California Division of Occupational Safety and Health (Cal/OSHA) is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. The Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle.

Hazardous Materials Transportation

The California Highway Patrol (CHP) and California Department of Transportation (Caltrans) are the enforcement agencies for hazardous materials transportation regulations. Transporters of hazardous materials and waste are responsible for complying with all applicable packaging, labeling, and shipping regulations. The Office of Emergency Services (OES) also provides emergency response services involving hazardous material incidents.

Riverside County Hazardous Waste Management Plan

The Riverside County Hazardous Waste Management Plan (HWMP) identifies current and projected future hazardous waste generation and management needs throughout the County. The HWMP provides a framework for the development of facilities to manage hazardous wastes, i.e. facility siting criteria. The HWMP also includes a Households Hazardous Waste Element that is designed to divert household hazardous wastes from the County's landfills.

Riverside City 2025 Public Safety Element

According to the City of Riverside 2025 General Plan, hazardous material is any material that because of its quality, concentration or physical or chemical characteristics, poses a significant potential hazard to human health or safety or to the environment. Hazardous materials are used in the City of Riverside for a variety of purposes. The most common large

users include manufacturers, medical clinics, agriculture, dry cleaners, pest controllers, film processors and automotive related business.

Large users and transporters of hazardous materials are monitored and regulated by the Federal Environmental Protection Agency (EPA) and other Federal, State and County regulatory agencies, such as the State Department of Toxic Substance Control and the Riverside Fire Department.

The current regulatory environment provides a high level of protection from the hazardous materials manufactured within, transported to and stored in Riverside's industrial and educational facilities. By recognizing these hazards and ensuring that an educated public can work with City officials to minimize risks associated with hazardous materials in the urban environment, Riverside can maintain safe conditions citywide. The following objectives and policies were established in the Public Safety Element in order to minimize hazardous materials exposures.

Objective PS-3:	Minimize risks associated with the storage transport and disposal of Hazardous materials.
Policy PS-3.1:	Ensure that hazardous materials used in business and industries are handled properly.
Policy PS-3.2:	Provide the Fire Department with resources to ensure that hazardous materials are used and generated by businesses handled properly.
Policy PS-3.3:	Work with responsible Federal, State and County agencies to identify and regulate the disposal of toxic materials.
Policy PS-3.4:	Reduce the risks associated with ground transportation hazards, where feasible.
Policy PS-3.5:	Encourage sewer service to minimize groundwater contamination.

The Project is being designed to comply with the above policies and objectives set forth in the 2025 General Plan's Public Safety Element.

6.14.3 Hazardous Materials Management

Hazardous materials that will be used and stored during construction and operation of the Project are shown on Table 6.14-2. Only aqueous ammonia and sodium hypochlorite will be present in amounts greater than the federal and state regulated reportable quantities.

Table 6.14-2 Hazardous Materials – RERC Units 3&4

Material Name	Chemical Composition	Use	Quantity	Federal Reportable Quantity	Storage Location
Aqueous ammonia (19 percent solution)	Ammonium hydroxide	Control nitrous oxide (NOx) emissions through selective catalytic reduction (SCR)	12,000 gal. (approx. 90,000 lbs.)	1,000 pounds (ammonium hydroxide)	South of the gas Compressors and central to the plant
Cleaning chemicals/ detergents	Various	Periodic cleaning	10 gal.	*	Administration/ Control Building and Warehouse
Laboratory reagents (liquid)	Various	Water/wastewater laboratory analysis	10 gal.	*	Warehouse
Laboratory reagents (solid)	Various	Laboratory analysis	50 lb.	*	Warehouse
Mineral Oil lubrication oil	Oil	Lubricate gas compressor and bearings	15 gal.	None	Contained within equipment and extra oil stored in waste oil storage enclosure.
Synthetic lubrication oil	Oil	Lubricate rotating equipment (e.g., combustion turbine bearings)	200 gal.	None	Contained within equipment and extra oil stored in the waste oil storage enclosure.
Mineral lubrication Oil	Oil	Lubricate rotating equipment (e.g., generator bearings)	782 gal.	None	Contained within equipment, extra stored in waste oil storage enclosure.
Mineral insulating Oil	Oil	Transformers	10,600 gal.	None	Contained within GSU and auxiliary transformers
Scale/corrosion inhibitor (NALCO 2833)	Acrylate Polymer 14% Sodium Molybdate 5% Sodium Nitrate 30% Sodium Hydroxide 1% Water 50%	Cooling tower closed loop scale/corrosion Inhibitor	75 gal.	None	Near cooling tower
Starbrex ST 70Hypochlorite	Sodium Hypochlorite 6.36% Sodium Bromine 9.23% Inert 84.41%	cooling tower	100 gallons, 800+ lbs	100 lbs.	Near cooling tower
3D Trasar (3DT194)	Sulphuric Acid 4% Aromatic Amine 16% Inert 80%	Cooling tower water pH control	75 Gallons, 600+ lbs	1,000 lbs.	Near cooling tower
3D Trasar (3DT186)	Phosphoric Acid LMI 40% Phosphate (inert) 60%	Corrosion & Scale Control pH Adjustment	55 gallons, 450+ lbs	5,000 lbs.	Near cooling tower
Miscellaneous flammable liquids	Gasoline, paint, solvents, etc.	Fuel for on site landscaping equipment, paint and solvents for equipment painting	20 gal.	*	Flammable Storage enclosure

RQ depends on chemical constituents, which will be determined as needed.

6.14.4 Waste Generation

6.14.4.1 Solid Non-Hazardous Waste

The construction, operation, and maintenance of the Project will generate non-hazardous solid wastes typical of power generation facilities. Wastes generated during construction generally include soil, scrap wood, excess concrete, empty containers, scrap metal, and insulation. Typical wastes generated during operation and maintenance includes scrap metal and plastic, insulation material, paper, glass, empty containers and other miscellaneous solid wastes, and waste turbine wash water. These materials will be collected for recycling or transfer to landfills in accordance with applicable regulatory requirements.

A list of non-hazardous wastes, estimated waste quantities, and disposal methods is provided in Table 6.14-3.

Table 6.14-3 Non-hazardous Waste Management Methods

Source of Waste	Waste Composition	Quantity	Disposal Method
Construction waste	Wood, metal, concrete, etc.	0.5 cubic yards per month	Recycled or transported to offsite landfill as appropriate.
Closed Cooling (chilled Water) Systems	Propylene glycol	55 gal/year	Pumped from closed loop cooling system to 55-gal drums and sent offsite for recycling
Municipal Solid Waste	Paper, food, plastic, etc.	20 cubic yards per month	Recycled or transported to offsite landfill as appropriate.
Wastewater System	Process drains, miscellaneous floor drains	50 gpm [peak flow]	Waste water is directed to the Oily Water Separator. Clean water from the Oily Water Separator is recycled back to the Raw Water Storage Tank. Oils and other material trapped in the Oily Water Separator are shipped off site for proper disposal.

* Potential waste management facility; actual one will be selected pending project approval.

6.14.4.2 Hazardous Waste

Hazardous wastes will be generated as a result of Project construction, operation, and maintenance. The majority of hazardous wastes generated during construction will be liquid wastes such as waste oil and other lubricants from machinery operations, solvents used for cleaning and materials preparation, waste paints, and other material coatings.

Table 6.14-4 provides a list of the expected hazardous wastes that may be generated at RERC and the disposal methods that will be utilized.

Table 6.14-4 Hazardous Waste Management Methods

Source of Waste	Waste Composition	Quantity	Disposal Method
Chemical Feed and Sampling Systems	No waste routinely generated; occasional spills only	No waste routinely generated	Spills pumped from secondary containment into container and reclaimed or disposed of offsite at appropriately permitted facility (RCRA Part B)
Emissions Control Module	Spent SCR and Oxidation Catalyst	One SCR and one CO catalyst assembly per unit	Recycled by supplier
Electrical Transformers	Waste oil	No waste routinelygenerated	Pumped from transformer to 55-gallon drum, stored in Waste Oil Storage enclosure until sent offsite for recycling.
Lubricating Oils	Waste oil	No waste routinely generated	Pumped from equipment to 55-gallon drum, stored in Waste Oil Storage enclosure until sent offsite for recycling
Combustion Turbine Generator	Turbine Water Wash	Approximately 1,000 gallons per year	Transported off-site for disposal as a hazardous waste
Fuel Gas System	Blowdown oils	30 gal/month	Blowdown from filters flows to drain tanks and the contents from the drain tanks will be pumped into 55-gal drums and sent for recycling

Potential waste management facility; actual one will be selected pending project approval.

The methods used to properly collect and dispose or recycle hazardous wastes generated by the plant depend on the nature of the waste.

Hazardous wastes generated by the plant during operation will include spent SCR and oxidation catalyst, used oil filters, used oil, and chemical cleaning wastes.

6.14.4.3 General Plant Drainage

General plant drainage consists of wastewater collected by sample drains, equipment drains, equipment leakage, and area wash-downs. Waste water collected in the general plant drainage system will be routed to the Oily Water Separator. Clean water exiting the Oily Water Separator is recycled back to the Raw Water Storage Tank. Chemicals for treatment of the cooling tower water will be stored in a secondary containment with no direct drainage to the sewer system. Combustion turbine water wash effluent is routed to a holding tank for off-site disposal as a hazardous waste.

6.14.5 Impacts

6.14.5.1 CEQA Environmental Checklist

Table 6.14-5 shows the results of the CEQA Environmental Checklist.

Table 6.14-5 CEQA Environmental Checklist – Hazardous Materials

	Potentially Significant Impact	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
HAZARDS AND HAZARDOUS MATERIALS – ***Would the project:***				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS – *Would the project:*				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X	
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
i) Exceed an applicable LRDP or Program EIR standard of significance?				X

6.14.5.2 Discussion of Impacts

The proposed Project will have a less-than-significant impact on the public or the environment through the routine transport and use of hazardous materials. The proposed Project would be a peaking power plant that operates infrequently. Thus, the Project would not produce a continuous stream of hazardous or other waste materials. These wastes produced are common and are routinely transported in a safe manner. Transport of hazardous materials will comply with all applicable federal Department of Transportation laws and other applicable LORS to minimize the potential for a transportation-related release.

On-site Chemical Management Impacts

The principal regulated hazardous substance that will be present in a quantity exceeding state and federal threshold planning limits is 19 percent aqueous ammonia. This solution will be used in the ECM to control NO_X emissions. 19 percent aqueous ammonia (ammonium hydroxide) is a corrosive that can cause irritation to the respiratory tract, skin, and eyes.

The existing aqueous ammonia storage facility, which currently serves RERC 1&2 and will also serve RERC 3&4, is located at the north west end of the RERC site. It is ventilated to prevent accumulation of emissions from exceeding OSHA permissible exposure limits. This area is designed to hold the nominal capacity of the 12,000 gallon ammonia tank plus 10 percent freeboard capacity to accommodate precipitation from a 25-year 24-hour event. The associated piping systems are made of appropriate materials and contain safety features that reduce the potential for ammonia releases at the site. Because of safety shut-off systems associated with delivery of aqueous ammonia from the tank to the vaporizer and ammonia to the ECM, potential ammonia release quantities from these system components in the event of an upset condition are very small.

RERC 3&4 will use approximately 198 pounds per hour of 19 percent aqueous ammonia solution. It is anticipated that ammonia will be delivered approximately 10 times per year for all four units. This will not pose a substantial increase in risk of releases from use or transport of this substance.

Table 6.14-6 presents the anticipated frequency of hazardous materials deliveries to RERC.

Table 6.14-6 Anticipated Frequency of Hazardous Materials Deliveries to RERC

Hazardous Material	Frequency of Deliveries	Quantity per Load	Transport Method
19% Aqueous Ammonia	10 times/year	8,000 gal.	Tank truck
Sodium Hypochlorite	Quarterly	300 gal.	Tank truck
Anti-scalant Inhibitor (NALCO 73209)	Quarterly	75 gal.	Delivery vehicle
Biocide	Quarterly	50 gal.	Delivery vehicle
Anti-scalant (NALCO PT-191)	Quarterly	75 gal.	Delivery vehicle
Bisulfite (NALCO 7408)	Quarterly	75 gal.	Delivery vehicle
Sulfuric Acid	Quarterly	50 gallons	Tank truck
Laboratory Chemicals	Quarterly	2 gallons	US Mail/Courier

Sulfuric acid will be used at the facility for maintaining pH in the tower. The amount stored on-site (50 gallons) will not exceed state and federal threshold planning quantities. Sulfuric acid is a clear, oily liquid that is very corrosive. The primary exposure routes are either by direct contact in the event of spills or through inhalation of airborne vapors. The Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Safety and Health (NIOSH) limit the amount of sulfuric acid in workroom air to 1 milligram per cubic meter of air (1 mg/m3) [Agency for Toxic Substances and Disease Registry, 1998]. Sulfuric acid will be stored near the cooling towers of each unit. Extra inventory will be stored in the existing chemical storage enclosure area in containers compatible with strong acids.

The Project will use less than one gallon of 93 percent sulfuric acid solution per day. It is anticipated that sulfuric acid will be delivered four times per year. This will not pose a substantial increase in risk of releases from use or transport of this substance.

Sodium hypochlorite is synonymous with liquid bleach. It is prepared by reacting a dilute caustic soda solution with liquid or gaseous chlorine accompanied by cooling. This compound will be used for sanitization in the cooling tower and reverse osmosis system. Sodium hypochlorite is a powerful oxidizing agent that can produce burns when in contact with the skin and respiratory irritation or burns when inhaled.

The project will use approximately 5 gallons of sodium hypochlorite per day. It will be shipped to the site approximately four times a year and stored near the cooling tower and demin plant. With appropriate management, use of this chemical in low quantities will not pose a substantial risk of releases. The chemical storage enclosure, ammonia storage tanks, and other equipment that may contain hazardous substances will be designed to provide secondary containment and/or other means to control the spread of any spills or releases that may occur and to isolate such substances from incompatible materials or processes.

On-site Waste Management Impacts

Methods that will be used to handle waste generated by the proposed Project are summarized in Tables 6.14-3 and 6.14-4, above. In addition to those wastes generated during operation of the proposed Project, construction wastes that may be generated temporarily could also include small quantities of adhesives, solvents, and paints, and other solid construction debris. The construction contractors will save unused chemicals for reuse. Any chemical waste products generated by the contractors will be transported offsite by a licensed hazardous waste transporter to an approved disposal facility. Therefore, the impacts from waste management at the proposed Project site are expected to be minimal.

Sensitive Receptors

Sensitive receptors are usually thought of as vulnerable populations or ecosystems that could be impacted by the release of toxic materials or hazardous wastes. Such populations typically include daycare facilities, residential facilities such as schools, and parks, and other locations typically occupied by children. Hospitals and nursing homes are also considered sensitive receptors. Sensitive ecosystems may include wetlands, rivers, ponds, and natural landscapes that serve as feeding and brooding sites for animal populations. The Santa Ana River Corridor, north of the proposed facility, is frequented by humans and wildlife and is considered a sensitive area. In addition, residentially zoned land is located approximately 0.5 miles to the south. However, the area immediately surrounding the proposed facility is dedicated for commercial and industrial use and does not encompass any sensitive receptors. The previously identified dog kennel is located approximately 500 feet southeast of the Project. Adjoining properties include storage yards, commercial businesses, and the City of Riverside RRWQCP. Access is by commercially traveled roads utilized by other industries to haul raw materials or component ingredients similar to those that would be used by the proposed project.

Given the infrequent deliveries of hazardous materials or removal of wastes, the small quantities associated with these deliveries, and the routes that would be used by commercial haulers (which is away from the river's open space corridor), the risk to this area is considered minimal. Detailed discussion of the health and safety considerations for this project is found in Section 6.8.

Cumulative Impacts

As proposed, the Project will not result in significant cumulative impacts that could adversely affect public health and safety or the environment. The primary potential cumulative effect would require consideration of the possibility any one chemical release from the site would create an additive risk to humans or the environment when combined with other releases or emissions emanating from surrounding chemical-use facilities. An even less likely scenario would be that two or more hazardous substances would be released at the same time and therefore have the potential to combine, thereby posing a greater threat to offsite receptors. The hazardous material with the greatest potential for offsite migration would be the 19 percent aqueous ammonia solution. A health risk analysis for exposure to aqueous ammonia is included in Section 6.8. Spills or leaks of aqueous ammonia would gradually evaporate as a gas to the atmosphere. At high concentrations (greater than 2,500

parts per million [ppm]), ammonia gas causes severe health impacts. However, the odor threshold is approximately 5 ppm and irritation of the upper airways occurs at concentrations between 30 and 50 ppm. Therefore, any releases would be readily detectable at concentrations well below severe hazard levels. Safety precautions designed to quickly mitigate potential releases and safeguard worker health will include equipping workers with appropriate personal protective equipment, conducting appropriate hazardous materials and emergency response training, appropriate storage and signage practices, and worker right-to know/chemical awareness training.

6.14.6 Involved Agencies and Agency Contacts

Local agencies involved in hazardous materials management at the Proposed facility and a contact person at each agency. The Riverside County Community Health Agency, Department of Environmental Health is the CUPA and administers the Hazardous Waste Generator Program and the Hazardous Materials Handler Program. The County of Riverside and the City of Riverside oversee compliance with the California Accidental Release Prevention Program (CalARP) and the Hazardous Materials Release Response Plan and Inventory Act (i.e., the Hazardous Materials Business Plan program). The HMBP needs to be submitted to the City of Riverside Fire Department's HAZMAT Section.

Agency	Name/Title	Address	Phone Number
Riverside County Community Health Agency, Dept. of Environmental Health	Sandy Bunchek, Riverside Area Supervisor	4080 Lemon Street Riverside, CA 92501	(951) 955-8980
City of Riverside Fire Department	Tedd Laycock, Fire Chief	3900 Main Street Riverside, CA 925322	(951) 826-5321

6.14.7 References

Agency for Toxic Substances and Disease Registry (ATSDR), 2004. Medical management guidelines for ammonia. http://www.atsdr.cdc.gov.

Agency for Toxic Substances and Disease Registry (ATSDR), 2004. ToxFAQs for sulfur trioxide and sulfuric acid. http://www.atsdr.cdc.gov/tfacts117.html.

California Department of Toxic Substance Control, 2004. Laws, regulations and policies website: http://www.dtsc.ca.gov/LawsRegulationsPolicies/hs_code.html.

Section 7
Alternatives Considered

7.1 Introduction

Riverside Public Utilities (RPU) proposes to build, own and operate a nominal 95-megawatt (MW) simple-cycle power plant at its 16-acre Riverside Energy Resource Center (RERC) within the City of Riverside, California. The proposed facility is referred to as RERC Units 3&4 (Project). RERC Units 3&4 will supply the internal needs of the City of Riverside primarily during summer peak electrical demands and to support the City's minimum emergency loads in the event RPU is islanded form the external transmission system. No power from RERC Units 3&4 will be exported outside of the City.

As part of the Project development process, the City assessed a number of alternatives. Alternative sizes and configurations of facilities were investigated in the context of the City's power requirements, the limitations on the ability to import power through Southern California Edison's (SCE) Vista substation[1], and the availability of additional purchased power in the market. The plant size of 95 MW and configuration of two simple cycle gas turbines (net output) were selected based on consideration of load growth, and the City's experience with the size and type of gas turbine generators selected for the application.

7.2 Alternative Resources

Several alternatives were considered in developing additional units at RERC. These alternatives considered not only the need for added generation, but also RPU's Riverside Transmission Reliability Project (RTRP) which, in addition to reinforcing the internal RPU transmission system, will add a second point of interconnection between RPU and SCE. The following prime alternatives were considered:

a) Two new units adjacent to the planned Wilderness Substation. This substation project, part of RTRP and composed of the planned Southern California Edison Wildlife Substation and Riverside Public Utilities Wilderness Switchyard, is being developed as the second major substation interconnection to the SCE system. The site is in a light industrial area with appropriate zoning, immediate access to reclaimed water and high pressure natural gas, and easy access to the RPU transmission system. The alternative of building new generation adjacent to the Wilderness Substation was not fully developed due to the complexities of having two projects – the power plant and RTRP - under separate licensing review under two different agencies dealing with contiguous land parcels. As a result, while this project would have met the resource needs of RPU, this option was dropped from

[1] Riverside Public Utilities has only one point of interconnection to California's transmission system through Southern California Edison's Vista Substation. The Vista Substation is at maximum capacity, is approximately 45 years old, and is located close to the San Andreas Fault. RPU receives all base load, intermediate, and some peaking power electricity through this connection from power plants in which it owns a share, such as the San Onofre Nuclear Generating Station and Intermountain Power Project, as well as power purchase contracts.

consideration because the project could not have been built in time to support the growing resource needs of RPU.

b) Other RPU substation sites, and also properties not currently owned by RPU, within the City of Riverside system that could host one or two peaking combustion turbines were also considered. All of these sites were less desirable than RERC due to closer proximity to residential areas, lack of reclaimed water supply, greater distance to interconnect to the high pressure natural gas system, and increased transmission system upgrades that would be required until the RTRP is completed. While it is possible to develop these sites, they would require greater infrastructure and development work than the two additional units at RERC or two new units adjacent to the Wilderness Substation, and could not have been developed in time to meet RPU's resource needs.

c) Constructing peaking resources at sites outside of the RPU system was not considered as they would be dependent upon delivering their power through the SCE Vista substation until the RTRP completed in the 2012-2013 timeframe. As Vista is RPU's only point of delivery and is limited to 557 MW, significantly less than RPU's peak load, new peaking resources outside of the City would be stranded either due to Vista being fully loaded or operating at reduced capacity. For that reason, RPU cannot pursue development of peaking resources outside of the City until RTRP is implemented.

d) For the same reasons cited above for item c, contracting for peaking resources via a power purchase agreement is also not considered a viable alternative.

e) Consideration was also given to the amount of generation and the number of generators to add. Adding three combustion turbine generators (RERC Units 3, 4, & 5, ~144 MW in total) to fully utilize the space at RERC was considered as an alternative if more than 95 MW of generation was required. This option was not selected for several reasons:
    1. Until the RTRP is completed there is inadequate transmission capability to export the power from RERC as it was determined that the two existing transmission circuits emanating from the RERC switchyard would be overloaded with five units in operation.
    2. Adding three units at this time would necessitate permitting under an AFC. Given RPU's need for power in 2009, it was considered that a project large enough to warrant treatment as an AFC could not be relied upon to deliver power in 2009 even if the transmission capacity was available.
    3. The RERC natural gas interconnection was not originally sized to support five combustion turbines. While it may be possible to serve this load, additional study would have been required and expansion of the natural gas supply pipeline and interconnection may have been a resulting requirement.

f) Consideration was also given to adding a 2x1 LM6000 combined cycle power plant (RERC Units 3, 4, & 5, ~135 MW in total), again to fully utilize the available space at RERC. This option is not being pursued for several reasons:
    1. RPU's need at this time is for peaking power and it was not expected that RPU would need the amounts of energy that would justify the added cost/complexity of a combined cycle power plant of this size.
    2. As with alternative e), until the RTRP is completed there is inadequate transmission capability to export the power from RERC as it was determined that the two existing transmission circuits emanating from the RERC switchyard would be overloaded with more than four units in operation.
    3. Adding a 2x1 plant at this time would necessitate permitting under an AFC. Given RPU's need for power in 2009, it was considered that a project large enough to warrant treatment as an AFC could not be relied upon to deliver power in 2009 even if the transmission capacity was available.

One consequence of looking at options e) and f) and running sensitivity cases for the RTRP with an ultimate build out at RERC[2] was to understand that the fault duty for the 69kV breakers at the RERC Switchyard would further increase beyond what would be needed for the addition of RERC Units 3&4 alone. As discussed in Section 5, Transmission System Engineering, the higher rated fault duty breakers that would be needed if and when the remaining space at RERC is fully developed will be installed as part of RERC 3&4. The incremental cost to do so is small and avoids having to replace the breakers in the future if or when that expansion occurs. The existing RERC Units 1&2 breakers are adequate for the addition of RERC Units 3&4.

7.3 Alternative Fuels and Technologies

The alternatives included plants based on alternative fuels, such as coal, biomass, waste, and oil, but these selections would generally not meet the environmental benefits of natural gas or are not allowed.

Alternative generation technologies, such as solar, nuclear, wind-generation, fuel cells or water based electric generation were determined to be cost prohibitive and infeasible for this project. Combined cycle plants are best suited for base load operation, and would not meet RPU's need for additional peaking power at this time. Biodiesel would not meet air quality limits. Only gas fired simple-cycle operation of the CTGs was considered to meet the peaking load of the City.

Alternative turbine models and technologies such as dry low NOx are available. However given the availability of reclaimed water at the RERC site, coupled with the smaller range

[2] For the RTRP RERC ultimate build out sensitivity case a pair of 2x1 combined cycle plants was considered with ach having a 25 MW steam turbine. As this was a sensitivity study only, the two 25 MW steam turbines were lumped into one 50 MW turbine. The sensitivity study looked only at fault duties and did not evaluate load flows as a means of quickly understanding where overloads might occur.

of permitted operation, e.g., 60-100% load versus 50-100% load, continuing to utilize a water injected turbine is the appropriate choice. In addition, given that RPU already uses LM6000 combustion turbines at the RERC site, mixing turbine models on the same site would have complicated operations, maintenance, spare parts management, and training.

7.4 Turbine Inlet Air Cooling

Combustion turbines are constant volume machines. At higher ambient temperature, the density of air will be lower, and for the same volume of intake air, the mass of air flowing in the turbine will reduce, hence the turbine output decreases.

The LM6000 combustion turbines selected for the Project have the capability for evaporative cooling or inlet air chilling for enhancing the output of the unit at higher ambient temperatures. Evaporative coolers lower the gas turbine intake air temperature by means of water flowing over a wetted media over which the inlet air passes. The best achievable inlet air temperature will be 2 or 3^0F higher than the prevailing wet bulb temperature. On the hottest day, at an ambient of 115^0F (DBT) and 72^0F (WBT), the evaporative cooler can achieve an inlet air temperature of 75^0F (DBT).

Inlet air chilling utilizes a mechanical chiller (refrigeration) to maintain an inlet air temperature of 42^0 to 46^0F at all times. Thus, inlet air chilling through its lower inlet air temperature and consequent increased air density provides an extra power boost over evaporative coolers of approximately 10 MW for RERC. Further, the chiller performance is not dependent upon the ambient conditions and ensures a constant and reliable output. Chillers give higher power output than evaporative coolers, but require a separate mechanical refrigeration system with compressors, wet cooling tower and an air heat exchanger that consume electric power thus slightly reducing overall net power output.

For RERC Units 1&2 the candidate combustion turbine bidders were invited to bid with both evaporative cooling and mechanical chilling. The cost and the performance evaluation bids received showed that it would be cost effective for chillers to be installed on the proposed RERC in lieu of evaporative coolers. Because the difference in efficiency between the two options was minimal, the selected LM6000 PC SPRINT combustion turbines were equipped with an inlet air chiller package. To maintain consistency between RERC Units 3&4 and RERC Units 1&2, the same inlet air cooling technology will be used for all four turbines.

7.5 Alternative Water Supply and Discharge

Reclaimed water from the City's Water Quality Control Plant will be used for RERC Units 3&4 as is the case for RERC Units 1&2. Potable water will be used as an emergency backup should reclaimed water not be available.

As is the case for RERC Units 1&2, all process waste water will be recycled eliminating any process liquid discharge into the City wastewater system.

7.6 "No Project" Alternative

A "No Project" alternative was considered and rejected as inconsistent with the City's objectives to provide electrical power reliably and efficiently to its electric utility customers.

7.7 Transmission Line Alternatives

Any alternatives to connect RERC Units 3&4 other than to the RERC Switchyard would have had greater environmental impacts and were thus not considered.

7.8 Alternative Emission Controls

RPU's objective in selecting equipment and vendors is to ensure continuous compliance with air quality regulations and ongoing operation efficiency though a history of demonstrated performance at similar generation facilities.

One emissions control strategy has been repeatedly used and demonstrated to meet BACT requirements for simple-cycle combustion turbines. This strategy includes the use of selective catalytic reduction to reduce NO_x emissions to 2.5[3] ppmv, combined with an oxidization catalyst to reduce co emissions to 6.0 ppmv. The SCR system uses aqueous ammonia instead of anhydrous ammonia as a reactant to minimize the risk of accidental release and associated impacts. The SCR/CO oxidization strategy has been utilized in numerous gas turbine projects and has been demonstrated to be safe, reliable and cost-effective through significant accumulated hours of operation. SCR/CO oxidization is understandably recognized by gas turbine manufacturers and by environmental regulators as the standard for BACT determinations.

SCONOx™ is another technology that warrants discussion as an alternative emission control strategy. This technology has not been as widely used as has the proposed SCR/CO oxidization system. SCONOx™ is a NO_x reduction system for natural gas turbine applications within an exhaust temperature range between 280°F and 650°F that is significantly below the design operating parameters of the simple-cycle LM6000 proposed for RERC Units 3&4 (820°F to 870°F). This system uses a coated catalyst to oxidize both NO_x and CO and thereby reduce plant emissions. $SCONO_x$ also requires steam in the reformer section.

As steam will not be available at the RERC site due to the simple cycle plant design, this technology would not be feasible for the RERC. This conclusion is also reinforced by none of the bidders for RERC Units 1&2 having proposed SCONOx for a simple cycle application.

[3] For RERC Units 3&4 it will be necessary to reduce NOx emissions to 2.3 ppmvd to meet SCAQMD Rule 1309.1 efficiency standard. To our knowledge, RERC Units 3&4 and the City of Anaheim's Canyon project also currently before the California Energy Commission, are the first simple cycle peaking combustion turbines to propose operating at this low an emissions level.

Section 8
List of Preparers

Section	Title	Preparer	Company
	Project Manager	Robert Gill	RPU
	Environmental Project Manager	Michael Tatterson	POWER Engineers
	Document Production	Laurie Kaufman	POWER Engineers
1.0	Executive Summary	Michael Tatterson Dave Tateosian	POWER Engineers
2.0	Project Description	Michael Tatterson Harry Hall Dave Tateosian Prasad Raju	POWER Engineers
3.0	Energy Resources and Efficiency	Harry Hall	POWER Engineers
4.0	Transmission Line Safety and Nuisance	Michael Tatterson	POWER Engineers
5.0	Transmission System Engineering	John Squire	POWER Engineers
6.0	Environmental Considerations		
6.1	Air Quality	Karl Lany John Furlong Gregory Darvin	SCEC, Atmospheric Dynamics
6.2	Land Use	Kevin Everett	POWER Engineers
6.3	Biological Resources	Michael Tuma Taya Cummins	SWCA
6.4	Cultural Resources	Caprice Harper James Steely Edward Knoll	SWCA

Section	Title	Preparer	Company
6.5	Geologic Resources and Hazards	Michael Tatterson	POWER Engineers
6.6	Paleontological Resources	Lauren Seckel Jessica DeBusk Cara Corsetti	SWCA
6.7	Noise	Jonathan Higginson	Wieland Acoustics
6.8	Public Health and Safety	Karl Lany John Furlong	SCEC
6.9	Traffic and Transportation	Roger Pelayo	KOA
6.10	Agriculture and Soils	Michael Tatterson	POWER Engineers
6.11	Visual Resources	John Paez	POWER Engineers
6.12	Socioeconomics	Kevin Everett Cara Bellavia	POWER Engineers SWCA
6.13	Water Resources	Allison Carver Prasad Raju	POWER Engineers
6.14	Hazardous Waste	Kevin Everett Harry Hall	POWER Engineers
7.0	Alternatives	Dave Tateosian	POWER Engineers
8.0	List of Preparers	Michael Tatterson	POWER Engineers
9.0	Acronyms	Michael Tatterson	POWER Engineers

Section 9
Acronyms

ACRONYM	DEFINITION
µPa	microPascals
AC	Alternating Current
ACHP	Advisory Council on Historic Preservation
ADA	American with Disabilities Act
AFC	Application for Certification
AIRFA	American Indian Religious Freedom Act
ALUC	Airport Land Use Commission (Riverside)
ALUCP	Airport Land Use Compatibility Plan
APCD	Air Pollution Control Districts
APCO	Air Pollution Control Office
AQIA	Air quality impact analysis
AQMD	Air quality management districts
BACT	Best available control technology
BEP	Business Emergency Plan
BMP	Best Management Practices
BPIP	Building Profile Input Program
CAFEP	Corona and Field Effects Program
CalARP	Clean Air Act and the California Accidental Release Program
Cal-OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
Caltrans	California Department of Transportation

ACRONYM	DEFINITION
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CATEF	California Air Toxics Emission Factors
CBC	California Building Codes
CCD	Census County Division
CDP	Census Designated place
CEC	California Energy Commission
CEMS	Continuous Emissions Monitoring System
CEQA	California Environmental Quality Act
CETAP	Community Environmental Transportation Corridor Acceptability Process
CIP	Comprehensive Interpretive Plan
City	City of Riverside
CNEL	Community Noise Equivalent Level
CO	Carbon monoxide
County	County of Riverside
CO_2	Carbon dioxide
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CSC	California Species of Concern
CTG	Combustion Turbine Generator
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
DAS	Data Acquisition System

ACRONYM	DEFINITION
dB	Decibels
DC	Direct Current
DPR	California Department of Parks and Recreation
ECM	Emissions Control Module
EPRI	Electric Power Research Institute
ESA	Expanded Study Area
ETZ	Emergency Touchdown Zone
FAA	Federal Aviation Administration
FAR	Floor Area Ration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FM	Fire Marshal
GIS	Geographic Information System
GSU	Generator Step up
HAP	Hazardous Air Pollutants
HARP	Hot Spots Analysis and Reporting Program
HCM	Highway Capacity Manual
HIA	Acute Hazard Index
HIC	Chronic Hazard Index
HMI	Human Machine Interface
HPS	High Pressure Sodium
Hz	Hertz
IES	Illuminating Engineering Society (of North America)

ACRONYM	DEFINITION
ISCST3	The Industrial Source Complex- Short Term 3
ITE	Institute of Transportation Engineers
Kv	Kilovolt
LORS	Laws, ordinances, regulations and standards
LRIP	Long Range Interpretive Plan
Ma	Milli-Amp: 1/1000 of an ampere
MACT	Maximum achievable control technology
MAOP	Maximum Allowable Operating Pressure
MCC	Motor Control Center
MEI	Maximally Exposed Individual
MICR	Maximum Individual Cancer Risk
MLD	Most Likely Descended
MP	Manufacturing Park
MSDS	Material Safety Data Sheet
MSHCP	Multiple Species Habitat Conservation Plan
msl	Mean sea level
MW	Megawatt
N_2	Nitrogen dioxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NESC	National Electrical Safety Code
NESHAPS	National Emission Standards for Hazardous Air Pollutants

ACRONYM	DEFINITION
NFPA	National Fire Protection Association
NH_3	Ammonia
NHPA	National Historic Preservation Act
NIEHS	National Institution of Environmental Health Science
NOI	Notice of Intent
NOT	Notice of Termination
NO_x	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Historic Preservation Act
NSA	Northern Study Area
NSPS	New Source Performance Standards
NSR	New Source Review
O_2	Oxygen
OEHHA	California Office of Environmental Health Hazard Assessment
OSZ	Outer Safety Zone
OWS	Oil Water Separator
PCBs	Polychlorinated biphenyls
PCS	Plant control system
PDC	Power Distribution Center
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
PPE	Personal Protective Equipment
Project	RERC Units 3 & 4

ACRONYM	DEFINITION
PA	Project Area
PSA	Project Study Area
PSD	Prevention of Significant Deterioration
PWL	Sound Power Level
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Incentives Market
RERC	Riverside Energy Resource Center
RMP	Risk Management Plan
RMS	Root Mean Squared
RO	Reverse Osmosis
ROG	Reactive organic gases
RPU	Riverside Public Utilities
RTA	Riverside Transit Agency
RTC	RECLAIM Trading Credits
RV	Recreational Vehicle
RWQCB	Regional Water Quality Control Boards
SCAQMD	California's South Coast Air Quality Management District
SCFM	California Fire Marshal
SCR	Selective catalytic reduction
SCSN	Southern California Seismic Network
SEL	Sweitzer Engineering Laboratory
SERC	State Emergency Response Commission
SIP	State Implementation Plan

ACRONYM	DEFINITION
SMSA	Standard Metropolitan Statistical Area
SO_2	Sulfur dioxide
SO_X	Sulfate
SO_{x2}	Oxides of sulfur
SPL	Sound pressure level
SPPE	Small Power Plant Exemption
SSA	Southern Study Area
SVP	Society weapons and tactics
SWAT	Special weapons and tactics
SWCA	SWCA Environmental Consultants, Inc.
SWPPP	Storm Water Pollution Control Board
SWRCB	State Water Resources Control Board
TCP	Traditional Cultural Properties
TDS	Total Dissolved Solids
TSP	Total Suspended Particulate
U.S. EPA	U.S Environmental Protection Agency
UL	Underwriters Laboratory
UOC	Utilities Operations Center
V/m	Volts per meter
VDC	Volts Direct Current
VOC	Volatile Organic Compounds
WMWD	Western Municipal Water District
WQCP	Riverside Regional Water Quality Control Plant

ACRONYM	DEFINITION
WWTP	City of Riverside Wastewater Treatment Plant
ZLD	Zero Liquid Discharge

APPENDIX 2.6-A

GAS WILL SERVE LETTER

Oliver Harris
Account Manager
Energy Markets
UEG / Wholesale Markets

Southern California Gas Company

A Sempra Energy utility™

March 17, 2008

Robert Gill
Principle Engineer
The City of Riverside
5901 Payton Avenue
Riverside, CA 92504

Southern California Gas Company
555 West Fifth Street
ML 22A1
Los Angele, CA 90013
Mailing Address:
Box 513249
Los Angeles, CA
90051-1249
213-244-3695 office
213-244-8222 fax

SUBJECT: Service Evaluation for 100 MW Power Plant

Robert,

After evaluating Riverside Public Utility's proposed 100 MW Power Plant project that will be located at 5901 Payton Avenue in the city of Riverside, CA, The Gas Company is pleased to announce that there is available capacity on our pipeline to meet your submitted requirements.

Currently your project can be served the required volumes from Distribution Supply Line 41-08, but not at the requested pressure. The Gas Company does not guarantee pressure but you can expect a pressure range of 275-325 psig at this site.

If served from the distribution line, Regulator Station ID 824IE would have to be rebuilt in order to provide the required capacity. The preliminary cost estimate to rebuild ID 824IE is $750,000, which does not include the cost for a service line or meter set assembly.

This preliminary cost estimate is for the construction cost of the facilities and is provided at your request. SoCalGas/SDG&E have not performed a detailed specific site or route evaluation for your project in the development of this estimate. Additionally, costs associated with permitting, paving, right-of-way, environmental, gas quality, measurement, regulatory, and land acquisition/development issues; and any unusual construction costs or facility requirements (e.g. freeway, river, or channel crossings) are explicitly excluded from this preliminary cost estimate. These costs are the developer's responsibility and can be significant.

SoCalGas/SDG&E's construction costs also continue to rise with increasing costs of labor and materials. Since this preliminary cost estimate is developed using average historical project cost data, it is highly likely that the actual construction costs for your particular project could vary significantly from this preliminary estimate based on the actual design, permitting and construction variables associated with this specific project. SoCalGas/SDG&E urge you to retain the services of a third-party engineering construction firm, or enter into a design and engineering contract with SoCalGas/SDG&E to develop a more accurate construction cost estimate for your specific project. SoCalGas/SDG&E do not recommend any use of this preliminary cost estimate. Any use by you is at your own risk and should factor in the above risks and limitations.

If you have any questions or need more information, please call me at (213) 244-3695.

Sincerely,

Oliver Harris
Account Manager

APPENDIX 2.7-A

WATER WILL SERVE LETTER

CITY OF RIVERSIDE

Public Utilities Department
Water Production & Operations

March 14, 2008

Robert B. Gill
Principal Electrical Engineer
Riverside Public Utilities
5901 Payton Avenue
Riverside, CA 92504

Dear Mr. Gill

As you are aware the City of Riverside, through its Water Utility, currently provides reclaimed water to the Riverside Public Utilities (RPU), Riverside Energy Resources Center Units 1&2 (RERC 1&2) from the Riverside Regional Wastewater Quality Control Plant (RRWQCP).

We understand that RPU Electric is proposing to construct and operate two additional units at the RERC site, known as RERC Units 3&4. These units could be operational by the summer of 2009. The maximum anticipated reclaimed water requirements for these new facilities could be up to an additional 25 million gallons per year and up to 210 gallons per minute.

The RRWQCP currently has the capability to serve the needs of RERC 3&4 and this letter is intended to indicate the intention of the Water Utility to provide reclaimed water in the amounts required for the life of the proposed units

Sincerely,

Kevin S. Milligan
Utilities Assistant General Manager/Water

KSM:ega

APPENDIX 6.1-A

EQUIPMENT DESCRIPTION

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Larry Salguero**
Project Info: **RPU Phase 2 (CMS 701736)**

Engine: **LM6000 PC-SPRINT w/ VIGV**
Deck Info: **G0125O - 8f2.scp**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-736, 20644 Btu/lb,LHV**

Date: **05/21/2007**
Time: **4:23:30 PM**
Version: **3.5.10**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**
Ambient Conditions									
Dry Bulb, °F	18.0	18.0	18.0	59.0	59.0	59.0	59.0	100.0	100.0
Wet Bulb, °F	15.4	15.4	15.4	51.4	51.4	51.4	51.4	68.3	68.3
RH, %	60.0	60.0	60.0	60.0	60.0	60.0	60.0	19.0	19.0
Altitude, ft	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0
Ambient Pressure, psia	14.313	14.312	14.312	14.312	14.312	14.312	14.312	14.313	14.312
Engine Inlet									
Comp Inlet Temp, °F	18.0	18.0	18.0	46.0	59.0	59.0	59.0	46.0	100.0
RH, %	60.0	60.0	60.0	96.8	60.0	60.0	60.0	95.0	19.0
Conditioning	NONE	NONE	NONE	CHILL	NONE	NONE	NONE	CHILL	NONE
Tons or kBtu/hr	0	0	0	275	0	0	0	1290	0
Pressure Losses									
Inlet Loss, inH20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volute Loss, inH20	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	**100**	**75**	**50**	**100 w/evap**	**100**	**75**	**50**	**100 w/evap**	**100**
kW, Gen Terms	**48957**	**36725**	**24490**	**49455**	**47432**	**35582**	**23728**	**49460**	**36990**
Est. Btu/kW-hr, LHV	**8431**	**8769**	**9591**	**8543**	**8605**	**9017**	**9846**	**8543**	**9041**
Fuel Flow									
MMBtu/hr, LHV	412.8	322.1	234.9	422.5	408.1	320.9	233.6	422.6	334.4
lb/hr	19994	15600	11378	20468	19771	15542	11317	20469	16200
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection									
lb/hr	22100	14496	8211	19418	18312	11427	8744	19460	14576
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SPRINT	**OFF**	**OFF**	**OFF**	**LPC**	**LPC**	**LPC**	**OFF**	**LPC**	**LPC**
lb/hr	0	0	0	8192	9349	9349	0	8192	8016
Control Parameters									
HP Speed, RPM	10179	9825	9474	10431	10475	10046	9784	10431	10493
LP Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	458.1	389.7	307.9	450.3	437.0	380.2	293.5	450.3	373.1
T3CRF - CDT, °F	953	887	804	968	976	890	884	968	999
T48IN, °R	1977	1849	1720	2038	2038	1885	1825	2038	2016
T48IN, °F	1517	1389	1260	1578	1578	1425	1366	1578	1557
Exhaust Parameters									
Temperature, °F	791.4	741.0	708.8	841.8	849.3	775.2	794.9	841.8	875.3
lb/sec	303.9	267.8	219.0	292.4	283.7	257.7	202.7	292.5	243.8
lb/hr	1093928	964257	788447	1052771	1021219	927662	729878	1052898	877778
Energy, Btu/s- Ref 0 °R	97280	81446	64272	98730	96416	81608	64621	98732	84509
Energy, Btu/s- Ref T2 °F	61090	49765	38523	61462	59305	48145	38547	61462	50103
Cp, Btu/lb-R	0.2722	0.2679	0.2647	0.2774	0.2779	0.2724	0.2699	0.2774	0.2783
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)									
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	41	32	24	42	41	32	23	42	34
CO ppmvd Ref 15% O2	54	52	50	17	13	14	21	17	8
CO, lb/hr	54.19	40.79	28.86	17.18	13.36	10.76	12.16	17.37	6.24
CO2, lb/hr	53835.03	42062.50	30720.99	55119.64	53249.03	41918.57	30559.10	55127.34	43659.46
HC ppmvd Ref 15% O2	8	8	7	2	2	2	2	2	2
HC, lb/hr	4.80	3.51	2.42	1.23	1.19	0.93	0.74	1.23	0.97
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

109	110	111	112	113	114
100.0	100.0	115.0	115.0	115.0	115.0
68.3	68.3	72.4	72.4	72.4	72.4
19.0	19.0	12.0	12.0	12.0	12.0
730.0	730.0	730.0	730.0	730.0	730.0
14.312	14.312	14.313	14.312	14.312	14.312
100.0	100.0	46.0	115.0	115.0	115.0
19.0	19.0	95.0	12.0	12.0	12.0
NONE	NONE	CHILL	NONE	NONE	NONE
0	0	1591	0	0	0
5.00	5.00	5.00	5.00	5.00	5.00
4.00	4.00	4.00	4.00	4.00	4.00
12.00	12.00	12.00	12.00	12.00	12.00
75	50	100 w/evap	100	75	50
27753	18510	49460	33010	24769	16521
9489	10778	8543	9203	9828	11401
263.4	199.5	422.6	303.8	243.4	188.4
12757	9664	20469	14715	11792	9125
Water	Water	Water	Water	Water	Water
8823	7587	19460	13244	8368	7220
100.0	100.0	100.0	100.0	100.0	100.0
LPC	OFF	LPC	LPC	LPC	OFF
8016	0	8192	6538	6538	0
10117	9871	10431	10459	10128	9903
3600	3600	3600	3600	3600	3600
316.9	257.1	450.3	344.5	287.7	243.0
922	927	968	999	929	938
1894	1842	2038	2005	1927	1855
1434	1383	1578	1545	1467	1395
826.9	843.7	841.8	886.6	876.0	872.3
214.0	177.0	292.5	226.0	192.5	166.8
770556	637349	1052898	813465	693004	600519
70846	58797	98732	78874	66328	56699
40617	34198	61462	46182	38588	32893
0.2744	0.2718	0.2774	0.2781	0.2763	0.2729
25	25	25	25	25	25
26	20	42	31	24	19
8	12	17	7	7	10
4.82	5.79	17.37	5.35	4.19	4.70
34415.73	26109.75	55127.34	39667.66	31807.48	24652.32
2	2	2	2	2	2
0.77	0.58	1.23	0.88	0.71	0.55
0.00	0.00	0.00	0.00	0.00	0.00

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: Larry Salguero
Project Info: RPU Phase 2 (CMS 701736)

Engine: LM6000 PC-SPRINT w/ VIGV
Deck Info: G0125O - 8f2.scp
Generator: BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)
Fuel: Site Gas Fuel#900-736, 20644 Btu/lb,LHV

Date: 05/21/2007
Time: 4:23:30 PM
Version: 3.5.10

Case #	100	101	102	103	104	105	106	107	108
Engine Exhaust									
Exhaust MW	28.2	28.3	28.5	28.0	28.0	28.1	28.3	28.0	28.0
Exhaust Flow, ACFM	588079	495197	392460	593172	578989	493783	391920	593195	507215
Exhaust Flow, SCFM	231003	202453	163824	224080	217603	196991	152742	224098	187286
Exhaust Flow, Btu/lb	320	304	293	338	340	317	319	338	347
Exhaust Flow, Calories/s	24514593	20524473	16196587	24880064	24296946	20565139	16284461	24880545	21296177
Inlet Flow Wet, pps	296.0	263.1	233.1	282.7	274.0	260.1	219.6	282.8	236.1
Inlet Flow Dry, pps	295.7	262.8	232.8	280.9	272.3	258.4	218.2	281.0	234.2
Shaft HP	66802	50213	33666	67479	64732	48665	32637	67486	50572
Generator Information									
Capacity kW	73721	73721	73721	64115	67440	64115	64115	52019	67440
Efficiency	0.983	0.981	0.975	0.983	0.980	0.980	0.975	0.983	0.977
Inlet Temp, °F	18.0	18.0	18.0	59.0	59.0	59.0	59.0	100.0	100.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TRQ48, Torque Limit Cold End	121364	93878	64244	120417	115683	91807	62220	120429	92612
Correct Control Parameters									
PS3JQA, psia	463.956	394.682	311.836	456.056	442.586	385.060	297.252	456.056	377.869
XN25R3, rpm	6174	6112	6083	6304	6320	6237	6103	6303	6277
8th Stage Bleed									
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0	0	0	0
CDP Bleed									
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Est. Gas Pressure at Baseplate, psig	**591.1**	**490.6**	**381.3**	**590.4**	**572.6**	**482.6**	**369.1**	**590.5**	**484.3**
CardPack	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**
Exhaust CardPack	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**
NSI	**315**	**0**	**0**	**304**	**304**	**0**	**439**	**304**	**305**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
XNENG	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

109	110	111	112	113	114
25	25	25	25	25	25
26.4	20.0	42.5	30.5	24.5	18.9
17	30	42	15	17	30
11.1	14.6	42.9	11.1	10.3	13.8
10	10	10	10	10	10
3.68	2.78	5.91	4.24	3.40	2.63
2.00	2.00	2.00	2.00	2.00	2.00
0.74	0.56	1.18	0.85	0.68	0.53
2.70	2.70	2.70	2.70	2.70	2.70
0.15	0.11	0.24	0.17	0.14	0.11
0.02	0.02	0.03	0.02	0.02	0.01
1.2284	1.2433	1.2209	1.2234	1.2289	1.2433
72.0422	72.9118	71.6023	71.7498	72.0708	72.9128
15.7453	16.5414	14.5067	15.0683	15.5773	16.5297
4.4684	4.0966	5.2358	4.8764	4.5898	4.1052
6.5147	5.2038	7.4297	7.0788	6.5300	5.2060
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0009	0.0016	0.0007	0.0006	0.0008
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.0024	0.0022	0.0028	0.0026	0.0024	0.0022
0.9622	0.9594	0.9675	0.9650	0.9630	0.9595
80.4631	80.2320	80.9101	80.7020	80.5305	80.2366
15.3961	15.9358	14.3515	14.8381	15.2387	15.9252
3.1754	2.8695	3.7661	3.4914	3.2646	2.8756
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0010	0.0019	0.0007	0.0007	0.0009
0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.0023	0.0021	0.0028	0.0026	0.0024	0.0021
0.8644	0.8810	0.8557	0.8587	0.8648	0.8810
72.2844	73.6719	71.5668	71.8109	72.3243	73.6733
13.8312	14.6328	12.6942	13.2034	13.6858	14.6225
2.8526	2.6349	3.3312	3.1067	2.9319	2.6404
10.1646	8.1765	11.5478	11.0172	10.1902	8.1799
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0009	0.0016	0.0007	0.0006	0.0008
0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.0021	0.0019	0.0025	0.0023	0.0022	0.0019

Riverside Emissions Summary R2

GIVEN / CALCULATED DATA CASE		100	101	102	103	104	105	106
Inlet Conditioning		None	None	None	*Chill	None	None	None
TURBINE LOAD	%	100	75	50	100*	100	75	50
Site Elevation		730	730	730	730	730	730	730
AMBIENT	°F	18	18	18	59	59	59	59
TURBINE EXHAUST FLOW	lb/hr	1,093,928	964,257	788,447	1,052,771	1,021,219	927,662	729,878
GAS TEMP. FROM TURBINE	°F	791.4	741.0	708.8	841.8	849.3	775.2	794.9
TURBINE EXHAUST GAS ANAL., % VOL.	Ar	0.87	0.88	0.89	0.86	0.85	0.87	0.88
	N2	73.04	73.93	74.72	71.56	71.46	72.37	73.78
	O2	13.43	14.36	15.14	12.69	12.70	13.79	14.54
	CO2	3.15	2.81	2.52	3.33	3.32	2.89	2.69
	H2O	9.49	8.01	6.73	11.56	11.67	10.08	8.09
HUMIDITY	%	60.0	60.0	60.0	60.0	60.0	60.0	60.0
GIVEN: TURBINE CO	ppmvd @ 15% O2	60	69	119	42	33	38	66
CALC.: TURBINE CO, lb/hr	lb/hr	60.2	53.9	68.3	42.9	33.0	29.8	37.7
GIVEN: TURBINE NOx	ppmvd @ 15% O2	25	25	25	25	25	25	25
CALC.: TURBINE NOx, lb/hr	lb/hr	41.4	32.3	23.5	42.4	41.0	32.2	23.4
CALC. GAS MOL. WT.		28.21	28.34	28.46	28.00	27.99	28.12	28.32
SOx from Turbine	lb/hr							
SO2 from Turbine	lb/hr	0.23	0.18	0.13	0.24	0.23	0.18	0.13
SO3 from Turbine	lb/hr	0.03	0.03	0.02	0.03	0.03	0.03	0.02
Particulate	lb/hr	2.70	2.70	2.70	2.70	2.70	2.70	2.70
VOC -NMNEHC	ppmvdc	5.00	4.70	4.50	2.00	2.00	2.00	2.00
AMBIENT AIR FLOW(Tempering)	lb/hr	13,500	13,500	13,500	13,500	13,500	13,500	13,500
	ACFM	**2,799**	**2,799**	**2,799**	**3,068**	**3,068**	**3,068**	**3,068**
	SCFM	**3,023**	**3,023**	**3,023**	**3,052**	**3,052**	**3,052**	**3,052**
AIR + GAS MIXTURE TEMP.	°F	**783**	**732**	**698**	**833**	**840**	**766**	**783**
TOTAL AIR + GAS FLOW	lb/hr	1,107,428	977,757	801,947	1,066,271	1,034,719	941,162	743,378
AIR + GAS COMPOSITION, % VOL.	N2	73.09	73.98	74.76	71.61	71.52	72.42	73.82
	O2	13.52	14.44	15.23	12.79	12.79	13.88	14.65
	CO2	3.12	2.77	2.48	3.29	3.27	2.85	2.65
	H2O	9.40	7.93	6.65	11.44	11.55	9.97	7.98
	AR	0.87	0.88	0.89	0.87	0.87	0.88	0.90
AIR + GAS MOL WT		28.22	28.35	28.46	28.01	28.00	28.13	28.33
CO AT CATALYST FACE -	ppmvd @ 15% O2	60	69	119	41	33	38	66
NOx AT CATALYST FACE -	ppmvd @ 15% O2	25.0	25.0	25.0	25.0	25.0	25.0	25.0
DESIGN REQUIREMENTS								
CO CATALYST CO OUT	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0
REQUIRED NOx OUT	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PM10	lb/hr	7.0	7.0	7.0	7.0	7.0	7.0	7.0
GUARANTEED PERFORMANCE DATA								
CO OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0
NOx OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total PM10 (see NOTE below)	lb/hr	2.9	2.9	2.8	3.0	3.0	2.9	2.9
VOC Conversion	%	60.0%	57.4%	55.6%	0.0%	0.0%	0.0%	0.0%
CO CATALYST CO CONVERSION, Min.	%	90.0%	91.3%	95.0%	85.5%	81.9%	84.2%	90.9%
CO OUT, lb/hr - Max.	lb/hr	**6.1**	**4.7**	**3.4**	**6.2**	**6.0**	**4.7**	**3.4**
SCR CATALYST NOx CONVERSION, Min.	%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
NOx OUT, lb/hr - Max.	lb/hr	**4.1**	**3.2**	**2.4**	**4.2**	**4.1**	**3.2**	**2.3**
DESIGN INLET ALPHA - NH3:NOx		1.10	1.10	1.10	1.10	1.10	1.10	1.10
EXPECTED AQ. NH3 (19% SOL.) FLOW	lb/hr	110.8	86.4	62.9	113.5	109.6	86.1	62.7
NH3 SLIP, ppmv	ppmv	4.6	4.1	3.6	4.8	4.8	4.2	3.9
NH3 SLIP, lb/hr	lb/hr	3.1	2.4	1.7	3.1	3.0	2.4	1.7
CO Catalyst Conversion of SO2 to SO3	%	40%	29%	23%	54%	56%	40%	52%
SCR Catalyst Conversion of SO2 to SO3	%	2%	2%	2%	2%	2%	2%	2%
Total Conversion	%	42%	31%	25%	56%	58%	42%	54%
SO2 from Turbine	Moles	0.0036	0.0028	0.0020	0.0038	0.0036	0.0028	0.0020
SO3 from Turbine	Moles	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003
Converted to SO3 by CO Catalyst	Moles	0.00151	0.00087	0.00051	0.00210	0.00208	0.00118	0.00110
Total SO3	Moles	0.00188	0.00125	0.00076	0.00248	0.00246	0.00156	0.00135
Total PM10 taken as Ammonia Sulfate	lb/hr	0.2	0.2	0.1	0.3	0.3	0.2	0.2
PM10 From Turbine	lb/hr	2.7	2.7	2.7	2.7	2.7	2.7	2.7
VOC as CH4	lb/hr	1.26	1.10	0.90	1.22	1.18	1.07	0.84

NOTE: Calculations for pm10 based on GE Data for Natural Gas Fuel with a maximum of 0.2 grains of Sulfur per 100 SCF.

Riverside Emissions Summary R2

GIVEN / CALCULATED DATA CASE		107	108	109	110	111	112	113	114
Inlet Conditioning		*Chill	None	None	None	*Chill	None	None	None
TURBINE LOAD	%	100*	100	75	50	100*	100	75	50
Site Elevation		730	730	730	730	730	730	730	730
AMBIENT	°F	100	100	100	100	115	115	115	115
TURBINE EXHAUST FLOW	lb/hr	1,052,898	877,778	770,556	637,349	1,052,898	813,465	693,004	600,519
GAS TEMP. FROM TURBINE	°F	841.8	875.3	826.9	843.7	841.8	886.6	876.0	872.3
TURBINE EXHAUST GAS ANAL., % VOL.	Ar	0.86	0.86	0.86	0.88	0.86	0.86	0.86	0.88
	N2	71.57	71.57	72.28	73.67	71.57	71.81	72.32	73.67
	O2	12.69	13.02	13.83	14.63	12.69	13.20	13.69	14.62
	CO2	3.33	3.16	2.85	2.63	3.33	3.11	2.93	2.64
	H2O	11.55	11.38	10.16	8.18	11.55	11.02	10.19	8.18
HUMIDITY	%	19.0	19.0	19.0	19.0	12.0	12.0	12.0	12.0
GIVEN: TURBINE CO	ppmvd @ 15% O2	42	15	17	30	42	15	17	30
CALC.: TURBINE CO, lb/hr	lb/hr	42.9	12.3	11.1	14.6	42.9	11.1	10.3	13.8
GIVEN: TURBINE NOx	ppmvd @ 15% O2	25	25	25	25	25	25	25	25
CALC.: TURBINE NOx, lb/hr	lb/hr	42.4	33.6	26.4	20.0	42.4	30.5	24.4	18.9
CALC. GAS MOL. WT.		28.00	28.01	28.11	28.31	28.00	28.04	28.12	28.31
SOx from Turbine	lb/hr								
SO2 from Turbine	lb/hr	0.24	0.19	0.15	0.11	0.24	0.17	0.14	0.11
SO3 from Turbine	lb/hr	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.01
Particulate	lb/hr	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
VOC -NMNEHC	ppmvdc	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
AMBIENT AIR FLOW(Tempering)	lb/hr	13,500	46,000	13,500	13,500	13,500	57,000	37,000	29,000
	ACFM	**3,280**	**11,177**	**3,280**	**3,280**	**3,361**	**14,189**	**9,210**	**7,219**
	SCFM	**3,025**	**10,306**	**3,025**	**3,025**	**3,018**	**12,742**	**8,271**	**6,483**
AIR + GAS MIXTURE TEMP.	°F	**833**	**840**	**815**	**829**	**833**	**840**	**840**	**840**
TOTAL AIR + GAS FLOW	lb/hr	1,066,398	923,778	784,056	650,849	1,066,398	870,465	730,004	629,519
AIR + GAS COMPOSITION, % VOL.	N2	71.63	71.82	72.36	73.74	71.64	72.14	72.55	73.82
	O2	12.79	13.39	13.95	14.75	12.79	13.68	14.03	14.90
	CO2	3.29	3.01	2.81	2.58	3.29	2.91	2.79	2.52
	H2O	11.43	10.92	10.03	8.05	11.43	10.44	9.79	7.90
	AR	0.85	0.85	0.86	0.88	0.85	0.83	0.84	0.86
AIR + GAS MOL WT		28.01	28.04	28.12	28.32	28.01	28.08	28.15	28.33
CO AT CATALYST FACE -	ppmvd @ 15% O2	42	15	17	30	42	15	17	30
NOx AT CATALYST FACE -	ppmvd @ 15% O2	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
DESIGN REQUIREMENTS									
CO CATALYST CO OUT	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
REQUIRED NOx OUT	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PM10	lb/hr	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
GUARANTEED PERFORMANCE DATA									
CO OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
NOx OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total PM10 (see NOTE below)	lb/hr	3.0	3.0	2.9	2.9	3.0	3.0	2.9	2.9
VOC Conversion	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CO CATALYST CO CONVERSION, Min.	%	85.5%	60.0%	65.3%	80.0%	85.5%	60.1%	65.4%	80.0%
CO OUT, lb/hr - Max.	lb/hr	**6.2**	**4.9**	**3.9**	**2.9**	**6.2**	**4.4**	**3.6**	**2.8**
SCR CATALYST NOx CONVERSION, Min.	%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
NOx OUT, lb/hr - Max.	lb/hr	**4.2**	**3.4**	**2.6**	**2.0**	**4.2**	**3.0**	**2.4**	**1.9**
DESIGN INLET ALPHA - NH3:NOx		1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
EXPECTED AQ. NH3 (19% SOL.) FLOW	lb/hr	113.5	89.8	70.7	53.5	113.5	81.6	65.3	50.5
NH3 SLIP, ppmv	ppmv	4.8	4.4	4.1	3.8	4.8	4.3	4.1	3.7
NH3 SLIP, lb/hr	lb/hr	3.1	2.5	2.0	1.5	3.1	2.2	1.8	1.4
CO Catalyst Conversion of SO2 to SO3	%	54%	60%	59%	68%	54%	61%	67%	72%
SCR Catalyst Conversion of SO2 to SO3	%	2%	2%	2%	2%	2%	2%	2%	2%
Total Conversion	%	56%	62%	61%	70%	56%	63%	69%	74%
SO2 from Turbine	Moles	0.0038	0.0030	0.0023	0.0017	0.0038	0.0027	0.0022	0.0017
SO3 from Turbine	Moles	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0001
Converted to SO3 by CO Catalyst	Moles	0.00210	0.00184	0.00143	0.00120	0.00210	0.00167	0.00151	0.00127
Total SO3	Moles	0.00248	0.00222	0.00168	0.00145	0.00248	0.00192	0.00176	0.00140
Total PM10 taken as Ammonia Sulfate	lb/hr	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2
PM10 From Turbine	lb/hr	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
VOC as CH4	lb/hr	1.22	1.05	0.89	0.74	1.22	0.99	0.83	0.71

NOTE: Calculations for pm10 based on GE Data for Natural Gas Fuel v

@ 115°F

Cooling Tower Data Sheet

GE AEP

Project: 00195-Riverside Project
Location: California
Product Type: AT Cooling Tower

Evapco, Incorporated
P.O. Box 1300
Westminster, MD, 21158, U.S.A.
410-756-2600 Fax: 410-756-6450

Selection Criteria Date: 03/31/04 Page: 1

Capacity (Tons):	3,460.00
Capacity (MBH):	51,900.000
Fluid:	Water
✓Flow (GPM):	5190.0 (Total)
Entering Fluid Temp (F):	98.6
✓Leaving Fluid Temp (F):	78.6
Wet Bulb (F):	72.0

Selection

Qty	AT Model	Capacity (Tons)	Percent Capacity
1	314-0972	3,463	100.1

All Weights, Dimensions and Technical Data are Shown per Unit

# Fans:	3		
# Fan Motors @ HP:	(3) @ 50.00		
✓Air Flow (CFM):	602,700 (Total)		
Inlet Pressure Drop (psi):	0.6		
Evaporated Water Rate (gpm):	83.0		

Overall Length :	71'	8.00"
Overall Width :	13'	11.25"
Overall Height :	19'	3.50"
Operating Weight (lbs):	108,840	
Shipping Weight (lbs):	61,290	
Heaviest Section (lbs):	13,250	

Options Selected

Layout Criteria

Recommended Clearances Around Units (Feet)

From Unit Ends to Wall:	4	Between Unit Ends:	5
From Sides to Wall:	7	Between Unit Sides:	12

Refer to the Equipment Layout Manual or contact your Sales Representative for more details on layout criteria.

Shipping Data

Description Section		***Domestic Skidded Dimensions (in)*** Length	Width	Height	Cubic Feet	Total Cubic Feet	Gross Wt (lbs)	Total Gross Wt (lbs)
Basin:	3	294	167	102	2898	8694	7,180	21,540
Casing:	3	303	167	135	3953	11860	13,250	39,750
Totals:	6				6851	20554	20,430	61,290

Shipping Notes: Ships with fan screen loose; Escorted extra wide truck

TDS: < 50 ppm

Drift: 0.001 %

Release Diameter: 13.9'

Release Height: 45.5'

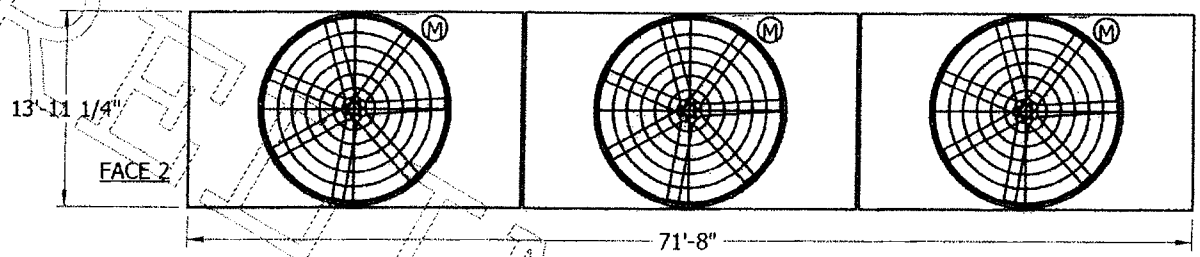
Base Elev: 724.5'

CONFIDENTIAL
This document is the property of Evapco, Inc. It should not be copied or disclosed without prior written authorization.

EVAPCO, INC.

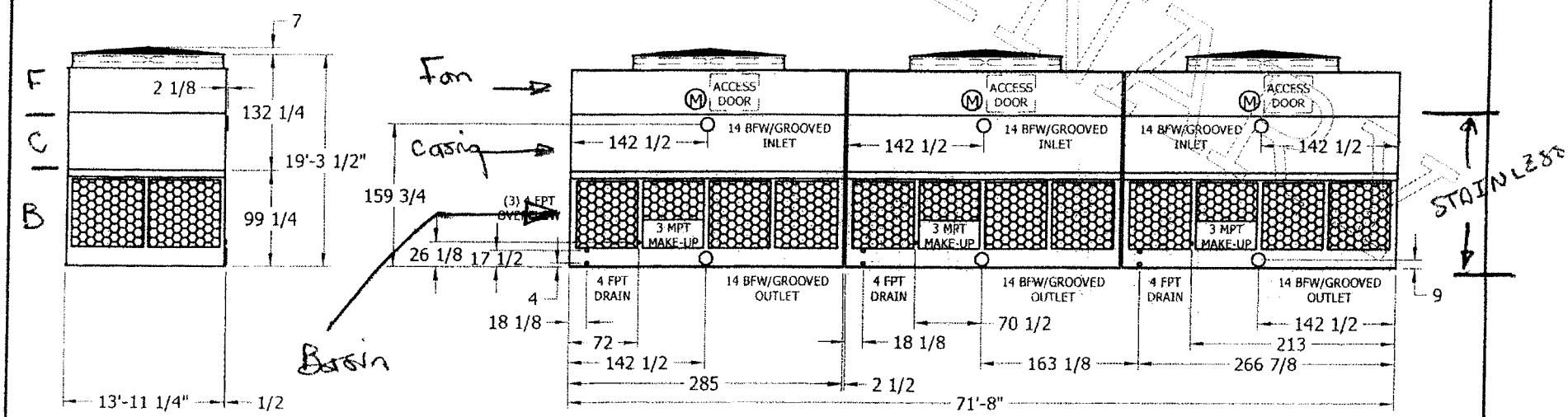
UNIT	MODEL #	SCALE	DWG. #	REV.	DATE	SERIAL #
COOLING TOWER	AT 314-0872	NTS	T2147248-ERC-ST			

NOTES:
1. (M)- FAN MOTOR LOCATION
2. HEAVIEST SECTION IS UPPER SECTION
3. MPT DENOTES MALE PIPE THREAD
   FPT DENOTES FEMALE PIPE THREAD
   BFW DENOTES BEVELED FOR WELDING
4. + UNIT WEIGHT DOES NOT INCLUDE ACCESSORIES (SEE SEPARATE DRAWINGS FOR ACCESSORIES)
5. 3/4" DIA. MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DRAWING
6. MAKE-UP WATER PRESSURE-20 psi MIN, 50 psi MAX



FACE 1

PLAN VIEW



SHIPPING WEIGHT	OPERATING WEIGHT	HEAVIEST SECTION WEIGHT	NO. OF SHIPPING SECTIONS
62520 lbs.+	110070 lbs.	13660 lbs.	6

GEN SET PACKAGE PERFORMANCE DATA [DM7714]

SEPTEMBER 21, 2005

Can't find what you're looking for? Click here

Performance Number: DM7714

Change Level: 00

Sales Model: C32 DITA
Combustion: DI
Aspr: TA
Engine Power:
1000 W/F EKW 1042 W/O F EKW
1,502 HP
Speed: 1,800 RPM
After Cooler: ATAAC
Manifold Type: DRY
Governor Type: ELEC
After Cooler Temp(F): 120
Turbo Quantity: 2
Engine App: GP
Turbo Arrangement:
Hertz: 60
Engine Rating: PGS
Strategy:
Rating Type: STANDBY
Certification: EPA TIER-1 2000 - 2005

General Performance Data

GEN W/F EKW	PERCENT LOAD	ENGINE POWER BHP	ENGINE BMEP PSI	FUEL RATE LB/BHP-HR	FUEL RATE GPH	INTAKE MFLD TEMP DEG F	INTAKE MFLD P IN-HG	INTAKE AIR FLOW CFM	EXH MFLD TEMP DEG F	EXH STACK TEMP DEG F	EXH GAS FLOW CFM
1,000.0	100	1502	337	0.338	72.5	110.1	77.7	3,245.4	1,165.8	833.5	8,207.1
900.0	90	1358	305	0.336	65.2	103.1	71.9	3,097.1	1,101.9	791.6	7,560.9
800.0	80	1215	273	0.344	59.7	108.7	68.1	2,980.6	1,075.3	775.6	7,186.5
750.0	75	1145	257	0.349	57.0	111.4	66.2	2,924.1	1,062.0	768.9	6,995.8
700.0	70	1074	241	0.349	53.6	109.9	61.5	2,786.3	1,046.3	763.5	6,642.7
600.0	60	933	210	0.348	46.4	104.7	50.3	2,461.4	1,007.4	753.3	5,823.4
500.0	50	793	178	0.346	39.2	99.5	39.3	2,140.1	959.7	743.0	5,007.6
400.0	40	658	148	0.346	32.5	96.3	29.2	1,836.4	905.7	723.2	4,230.7
300.0	30	519	117	0.351	26.0	93.7	20.1	1,557.4	835.7	683.2	3,467.9
250.0	25	449	101	0.357	22.9	92.5	15.9	1,423.2	793.6	656.1	3,090.0
200.0	20	378	85	0.365	19.7	91.2	11.9	1,296.0	746.6	623.8	2,719.2
100.0	10	233	52	0.405	13.5	84.9	6.6	1,140.7	605.7	510.6	2,133.0

Heat Rejection Data

GEN W/F EKW	PERCENT LOAD	REJ TO JW BTU/MN	REJ TO ATMOS BTU/MN	REJ TO EXHAUST BTU/MN	EXH RCOV TO 350F BTU/MN	FROM OIL CLR BTU/MN	FROM AFT CLR BTU/MN	WORK ENERGY BTU/MN	LHV ENERGY BTU/MN	HHV ENERGY BTU/MN
1,000.0	100	19,904	2,895	62,671	33,894	8,303	17,402	63,694	156,392	166,572
900.0	90	18,141	2,423	56,074	29,288	7,507	15,469	57,609	140,582	149,738
800.0	80	16,606	2,263	52,889	27,411	6,881	13,819	51,524	128,753	137,113
750.0	75	15,924	2,235	51,126	26,444	6,540	13,023	48,510	122,839	130,858
700.0	70	15,071	2,167	48,567	25,023	6,142	11,772	45,553	115,503	123,066
600.0	60	13,421	1,945	42,482	21,667	5,346	8,985	39,581	99,920	106,460
500.0	50	11,943	1,803	35,942	18,198	4,493	6,597	33,610	84,452	89,911
400.0	40	10,692	1,678	29,800	14,729	3,753	4,550	27,866	70,007	74,613
300.0	30	9,668	1,496	23,715	11,146	3,014	2,900	22,009	56,074	59,770
250.0	25	8,985	1,479	20,758	9,384	2,616	2,161	19,051	49,192	52,434
200.0	20	9,440	1,501	16,663	7,052	2,275	1,535	16,037	42,425	45,155

California Environmental Protection Agency AIR RESOURCES BOARD	CATERPILLAR INC.	EXECUTIVE ORDER U-R-001-0331 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the December 15, 1998 Settlement Agreement between the Air Resources Board and the manufacturer, and any modifications thereof to the Settlement Agreement;

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engine and emission control system produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2008	8CPXL32.0ESW	32.0	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Direct Diesel Injection, Turbocharger, Charge Air Cooler and Engine Control Module	Generator

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
KW > 560	Tier 2	STD	N/A	N/A	6.4	3.5	0.20	N/A	N/A	N/A
		CERT	--	--	5.4	1.6	0.13	--	--	--

4.03 1.19 0.097 g/bhp-hr
(1 kw = 0.746 hp)

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 20 day of December 2007.

Annette Hebert

Annette Hebert, Chief
Mobile Source Operations Division

ATTACHMENT 1 OF 2

Engine Model Summary Template

U-R-001-0331

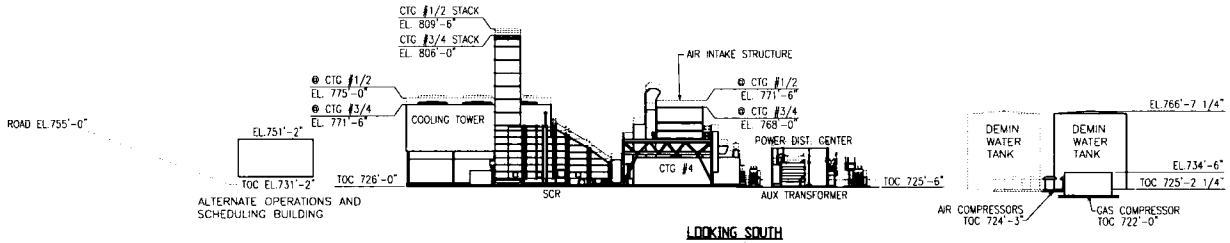
Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
8CPXL32.0ESW	1	C32	1505@2100	376	530.8	4422@1400	418	393.4	EM, DI, TC, ~~CAC~~ ECM
8CPXL32.0ESW	2	C32	1500@2100	376	530.8	4422@1400	418	393.4	EM, DI, TC,
8CPXL32.0ESW	3 Cert Engine	C32	1330@1500	469	473	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	5	C32	1502@1800	418	506.3	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	6	C32	1357@1800	374	453.1	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	8	C32	1357@1800	374	453.1	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	9	C32	1502@1800	418	506.3	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	10	C32	1016@1750	294	345.9	3635@1300	349	305.4	EM, DI, TC,
8CPXL32.0ESW	11	C32	1257@1800	356	431.2	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	12	C32	1126@1800	324	392.1	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	13	C32	970@1750	277	325.8	3461@1300	335	292.9	EM, DI, TC,
[illegible]	14	C32	951@1800	266	322.7	3205@1400	298	280.3	EM, DI, TC,
8CPXL32.0ESW	15	C32	951@2100	238	336.9	3205@1400	298	280.3	EM, DI, TC,
8CPXL32.0ESW	16	C32	1124@1800	319	386.1	3792@1400	365	344.1	EM, DI, TC,
8CPXL32.0ESW	17	C32	1124@2100	279	393.6	3792@1400	365	344.1	EM, DI, TC,
8CPXL32.0ESW	18	C32	1200@1800	336	407.3	4045@1400	390	367.2	EM, DI, TC,
8CPXL32.0ESW	19	C32	1200@2100	301	425.9	4045@1400	390	367.2	EM, DI, TC,
8CPXL32.0ESW	20	C32	1350@1800	384	464.7	4552@1400	438	412.4	EM, DI, TC,
8CPXL32.0ESW	21	C32	1350@2100	340	480.6	4552@1400	438	412.4	EM, DI, TC,
8CPXL32.0ESW	22	C32	1016@1750	294	345.9	3635@1300	349	305.4	EM, DI, TC,
8CPXL32.0ESW	24	C32	1502@1800	418	506.3	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	25	C32	1330@1500	469	473	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	26	C32	1502@1800	418	506.3	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	27	C32	1330@1500	469	473	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	28	C32	1257@1800	356	431.2	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	29	C32	1110@1500	408	412.2	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	30	C32	923@1800	257	311.4	3554@1300	345	302	EM, DI, TC,
8CPXL32.0ESW	31	C32	800@2100	207	292.9	2447@1350	239	217.1	EM, DI, TC,

Engine Model Summary Template

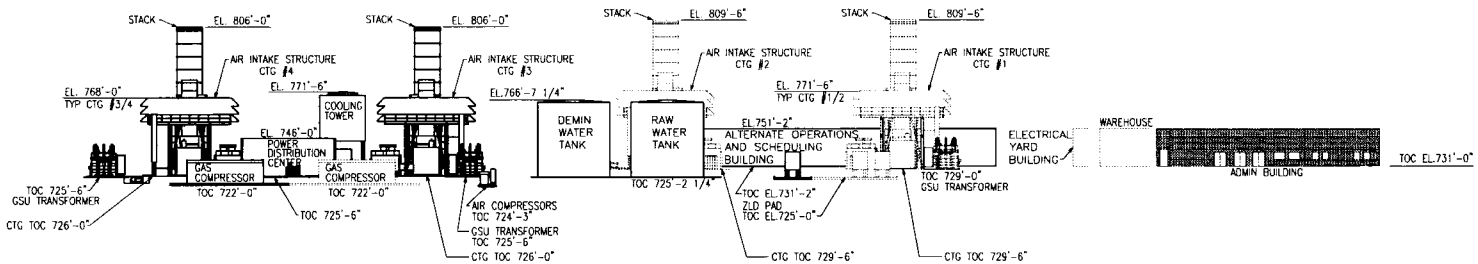
ATTACHMENT 2 OF 2

U-R-001-0331

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930 CAC ECM
8CPXL32.0ESW	32	C32	1000@2100	262	370	3047@1400	310	292	EM, DI, TC,
8CPXL32.0ESW	33	C32	800@2100	209	296	2447@1350	249	227	EM, DI, TC,
8CPXL32.0ESW	34	C32	861@2100	216	306	2607@1400	264	249	EM, DI, TC,
8CPXL32.0ESW	35	C32	920@2100	244	345	3023@1400	312	294	EM, DI, TC,
8CPXL32.0ESW	36	C32	1110@2100	296	419	3743@1400	386	364	EM, DI, TC,
8CPXL32.0ESW	37	C32	1225@2100	327	462	4129@1400	425	400	EM, DI, TC,
8CPXL32.0ESW	38	C32	950@1600	295	317	3627@1200	350	282	EM, DI, TC,
8CPXL32.0ESW	39	C32	1110@2100	296	419	3743@1400	386	364	EM, DI, TC,
8CPXL32.0ESW	40	C32	800@2100	209	295	2473@1350	249	227	EM, DI, TC,
8CPXL32.0ESW	41	C32	920@2100	239	338	3023@1400	312	294	EM, DI, TC,
8CPXL32.0ESW	42	C32	1225@2100	327	462	4129@1400	425	400	EM, DI, TC,
8CPXL32.0ESW	43	C32	860@2100	221	313	2599@1400	263	248	EM, DI, TC,
8CPXL32.0ESW	44	C32	1000@2100	262	370	3047@1400	310	292	EM, DI, TC,
8CPXL32.0ESW	45	C32	1357@1800	385	466	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	46	C32	1357@1800	385	466	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	47	C32	1502@1800	429	519	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	48	C32	1502@1800	429	519	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	49	C32	1257@1800	363	440	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	50	C32	1126@1800	333	403	NA	NA	NA	EM, DI, TC,
8CPXL32.0ESW	51	C32	1050@1900	280	359	3686@1350	360	327	EM, DI, TC,



LOOKING SOUTH
1/32"=1'-0"



LOOKING EAST
1/32"=1'-0"

PRELIMINARY
NOT FOR PROCUREMENT
OR CONSTRUCTION

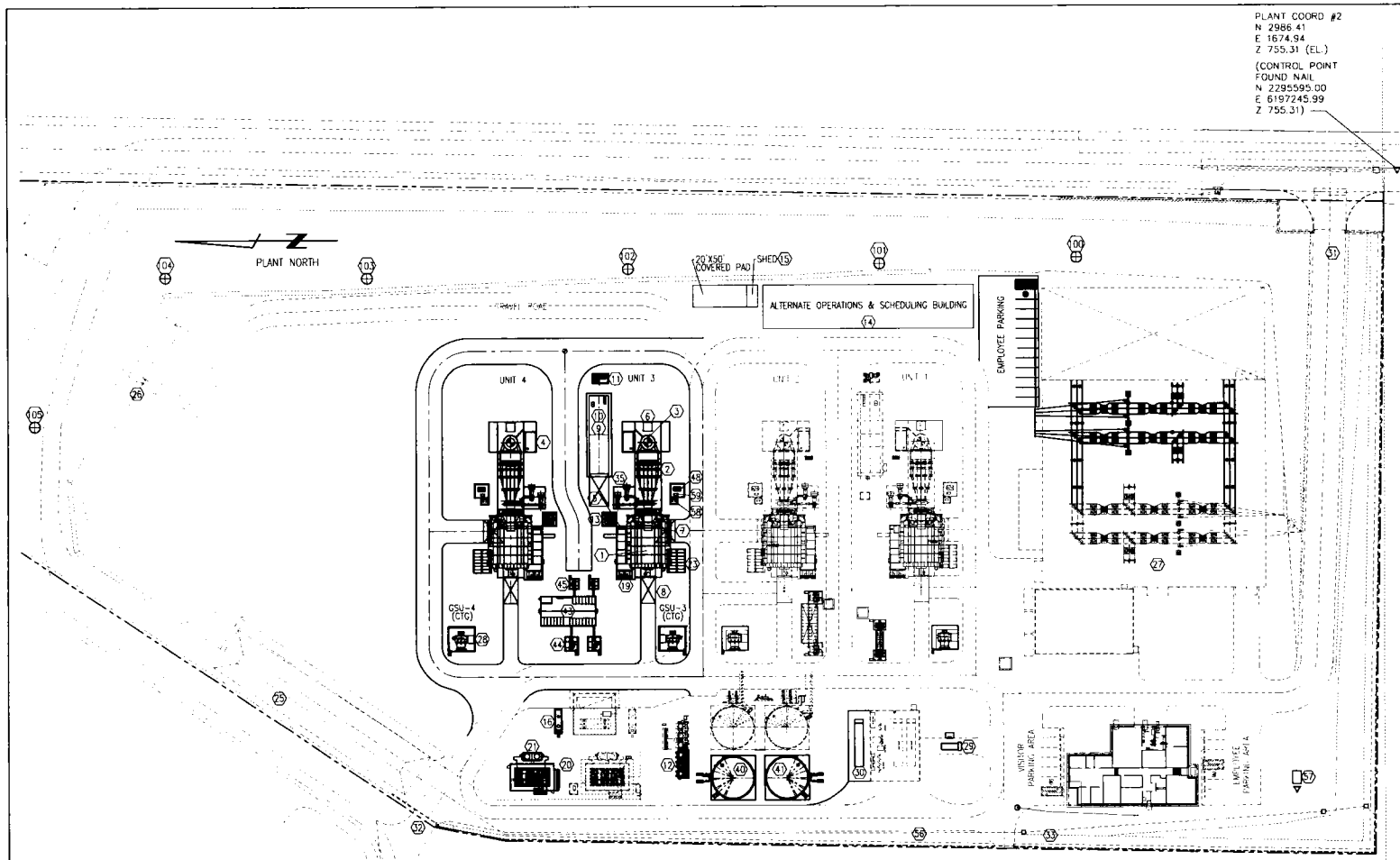
REV	DESCRIPTION	DR	CHK	APP	DATE
A	ISSUE FOR PERMITTING SUPPORT				

POWER ENGINEERS

RIVERSIDE UNITS 3 & 4
GENERAL ARRANGEMENT
ELEVATION VIEWS

SCALE 1/16"=1'-0"
DATE 12/10/07
W.O. NO. 113560
DRAWN J.SMITH
CHECKED
APPROVED
DRAWING NO. RIGOM2001-01
SHEET 1 OF 1
FILE NAME RIGOM2001-01_RC

CITY OF RIVERSIDE
PUBLIC UTILITIES



ITEM	DESCRIPTION	NOTES
1	COMBUSTION TURBINE GENERATOR	
2	SELECTIVE CATYLST REDUCTION UNIT	
3	EXHAUST STACK	80' HIGH
4	AMMONIA EVAPORATION SKID	
5	CTG AUXILIARY SKID	
6	CEMS SHELTER	
7	TURBINE REMOVAL AREA	
8	GENERATOR REMOVAL AREA	
9	CHILLER PACKAGE	
10	AUXILIARY COOLING TOWER	
11	AUX COOLING TOWER CHEM FEED SKID	
12	AIR COMPRESSOR/DRYER SKID & RECEIVER	
13	CTG LUBE OIL FIN FAN COOLER	
14	ALTERNATE OPERATIONS & SCHEDULING BLDG	
15	STORAGE SHED	
16	OIL/WATER SEPERATOR	
17	NOT USED	
18	NOT USED	
19	CTG CONTROL HOUSE	
20	FUEL GAS COMPRESSOR SKID	INCLUDES SOUND ENCLOSURE
21	FUEL GAS COMPRESSOR BYPASS COOLER	
22	NOT USED	
23	CTG SWITCHGEAR	
24	NOT USED	
25	STORM WATER RETENTION/INFILTRATION BASIN	
26	GAS METERING STATION	
27	SWITCHYARD	
28	GSU TRANSFORMER (2)	
29	BLACK START GENERATOR	
30	ZLD	
31	MAIN PLANT ENTRANCE	SLIDING GATE
32	EMERGENCY PLANT ENTRANCE	SLIDING GATE
33	PLANT PERIMETER FENCE (10'-0" HIGH)	
34	NOT USED	
35	TEMPERING AIR FANS	
36	NOT USED	
37	NOT USED	
38	NOT USED	
39	NOT USED	
40	DEMINERALIZED WATER TANK & PUMPS (2)	(300,000 gal)
41	RAW WATER TANK & PUMPS (2)	(300,000 gal)
42	NOT USED	
43	POL	
44	4160V AUXILIARY TRANSFORMER	
45	480V AUXILIARY TRANSFORMER	
46	NOT USED	
47	NOT USED	
48	WATER WASH DRAIN TANK	
49	NOT USED	
50	NOT USED	
51	NOT USED	
52	NOT USED	
53	NOT USED	
54	NOT USED	
55	NOT USED	
56	EQUIPMENT/PERSONNEL ACCESS GATE	SLIDING GATE WITH MAN GATE
57	COMMUNICATION TOWER AND SHED	BY RPU
58	CTG FINAL FUEL FILTER SKID	
59	CTG FINAL FUEL FILTER DRAINS TANK	
100	OWL HABITAT	
101	OWL HABITAT	
102	OWL HABITAT	
103	OWL HABITAT	
104	OWL HABITAT	
105	OWL HABITAT	

PRELIMINARY
NOT FOR PROCUREMENT
OR CONSTRUCTION

0 25 50 100 150 FEET
1" = 50'

POWER ENGINEERS

REV	DESCRIPTION	DR	CHK	APP	DATE
B	ISSUE FOR PERMITTING SUPPORT	JTS			
A	ISSUE FOR CONCEPTUAL ARRANGEMENT	JTS			

RIVERSIDE ENERGY RESOURCE CENTER
UNITS 3 & 4
SITE ARRANGEMENT

SCALE 1"=50'	DRAWN J.Smith	DRAWING NO RIGOM1001-01_RB	CITY OF RIVERSIDE PUBLIC UTILITIES
DATE 11/26/07	CHECKED		
SO. NO 112596	APPROVED	SHEET 1 OF 1	
		FILE NAME RIGOM1001-01_RB.dwg	

1 cm = 62.5'

APPENDIX 6.1-B

CRITERIA POLLUTANT EMISSIONS INVENTORY
FOR
OPERATIONS

Riverside Energy Resource Center
Project Total Potential to Emit - Normal Year

ROG	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations 920 hours/turbine	2.55	2.55	40.80	40.80	2,228.54	1.17	8.50
Startup 150 hours/turbine	2.33	2.33	9.33	9.33	349.74	0.17	1.55
Shutdown 150 hours/turbine	2.55	2.55	10.20	10.20	382.47	0.19	1.70
Maintenance 10 hours/turbine	2.55	2.55	12.75	12.75	17.85	0.01	0.85
Total Maximum from Turbines	2.55	2.55	61.20	60.32	2,978.61	1.55	12.60
Black Start Engine	0.36	0.36	1.09	1.09	4.37	0.01	0.11
Project Total	2.91	2.91	62.29	61.42	2,982.98	1.56	12.71

(daily = 16 hrs normal operation, plus 4 starts/stops)

SOx	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	0.56	0.56	8.94	8.94	488.57	0.3	1.9
Startup	0.51	0.51	2.04	2.04	76.68	0.0	0.3
Shutdown	0.56	0.56	2.24	2.24	83.85	0.0	0.4
Maintenance	0.56	0.56	2.79	2.79	3.91	0.0	0.2
Total Maximum from Turbines	0.56	0.56	13.42	13.22	653.01	0.34	2.8
Black Start Engine	0.01	0.01	0.02	0.02	0.09	0.00	0.0
Project Total	0.57	0.57	13.44	13.25	653.10	0.34	2.77

(daily = 16 hrs normal operation, plus 4 starts/stops)

CO	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	92.38	13.24	1478.11	211.83	11,571.28	6.09	44.1
Startup	85.90	23.19	343.59	92.77	3,479.02	1.74	15.5
Shutdown	92.38	21.84	369.53	87.36	3,276.00	1.64	14.6
Maintenance	92.38	92.38	461.91	461.91	646.67	0.46	30.8
Total Maximum from Turbines	92.38	92.38	2217.17	391.97	18,972.97	9.93	104.9
Black Start Engine	3.94	3.94	11.82	11.82	47.29	0.11	1.2
Project Total	96.32	96.32	2228.99	403.79	19020.26	10.04	106.1

(daily = 16 hrs normal operation, plus 4 starts/stops)

PM10	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	6.00	6.00	96.00	96.00	5,244.00	2.76	20.00
Startup	5.49	5.49	21.95	21.95	823.02	0.41	3.66
Shutdown	6.00	6.00	24.00	24.00	900.00	0.45	4.00
Maintenance	6.00	6.00	30.00	30.00	42.00	0.03	2.00
Total Maximum from Turbines	6.00	6.00	144.0	141.95	7,009.02	3.65	29.7
Black Start Engine	0.32	0.32	0.96	0.96	3.85	0.01	0.1
Project Total	6.32	6.32	144.96	142.91	7,012.87	3.66	29.8

(daily = 16 hrs normal operation, plus 4 starts/stops)

NOx	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	90.32	8.34	1445.16	133.38	7,285.62	3.83	27.8
Startup	82.28	22.05	329.14	88.19	3,307.25	1.65	14.7
Shutdown	90.32	12.27	361.29	49.09	1,840.80	0.92	8.2
Maintenance	90.32	90.32	451.61	451.61	632.26	0.45	30.1
Total Maximum from Turbines	90.32	90.32	2167.74	270.66	13,065.93	6.86	80.8
Black Start Engine	12.98	12.98	38.94	38.94	155.76	0.35	3.9
Project Total	103.30	103.30	2,206.68	309.60	13,221.70	7.21	84.67

(daily = 16 hrs normal operation, plus 4 starts/stops)

Riverside Energy Resource Center
Project Total Potential to Emit - Commissioning Year

ROG	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 720 hours/turbine	2.55	2.55	40.80	40.80	1,744.08	0.92
Commission 200 hours/turbine	2.55	2.55	61.20	61.20	356.97	0.25
Startup 150 hours/turbine	2.33	2.33	9.33	9.33	349.74	0.17
Shutdown 150 hours/turbine	2.55	2.55	10.20	10.20	382.47	0.19
Maintenance 10 hours/turbine	2.55	2.55	12.75	12.75	17.85	0.01
Black Start Engine	0.36	0.36	1.09	1.09	4.37	0.01
Total					2,855	1.56

SOx	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 720 hours/turbine	0.56	0.56	8.94	8.94	382.36	0.20
Commission 200 hours/turbine	0.56	0.56	13.42	13.42	78.26	0.06
Startup 150 hours/turbine	0.51	0.51	2.04	2.04	76.68	0.04
Shutdown 150 hours/turbine	0.56	0.56	2.24	2.24	83.85	0.04
Maintenance 10 hours/turbine	0.56	0.56	2.79	2.79	3.91	0.003
Black Start Engine	0.01	0.01	0.02	0.02	0.09	0.0002
Total					625	0.34

CO	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 720 hours/turbine	92.38	13.24	1,478.11	211.83	9,055.78	4.77
Commission 200 hours/turbine	92.38	92.38	2,217.17	2,217.17	12,933.47	9.24
Startup 150 hours/turbine	85.90	23.19	343.59	92.77	3,479.02	1.74
Shutdown 150 hours/turbine	92.38	21.84	369.53	87.36	3,276.00	1.64
Maintenance 10 hours/turbine	92.38	92.38	461.91	461.91	646.67	0.46
Black Start Engine	3.94	3.94	11.82	11.82	47.29	0.11
Total					29,438	17.95

PM10	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 720 hours/turbine	6.00	6.00	96.00	96.00	4,104.00	2.16
Commission 200 hours/turbine	6.00	6.00	144.00	144.00	840.00	0.60
Startup 150 hours/turbine	5.49	5.49	21.95	21.95	823.02	0.41
Shutdown 150 hours/turbine	6.00	6.00	24.00	24.00	900.00	0.45
Maintenance 10 hours/turbine	6.00	6.00	30.00	30.00	42.00	0.03
Black Start Engine	0.32	0.32	0.96	0.96	3.85	0.01
Total					6,713	3.66

NOx	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 720 hours/turbine	90.32	8.34	1,445.16	133.38	5,701.79	3.00
Commission 200 hours/turbine	90.32	90.32	2,167.74	2,167.74	12,645.15	9.03
Startup 150 hours/turbine	82.28	22.05	329.14	88.19	3,307.25	1.65
Shutdown 150 hours/turbine	90.32	12.27	361.29	49.09	1,840.80	0.92
Maintenance 10 hours/turbine	90.32	90.32	451.61	451.61	632.26	0.45
Black Start Engine	12.98	12.98	38.94	38.94	155.76	0.35
Total					24,283	15.41

Prime Unit Gas Turbine Emissions

920 hours - 2 units - normal operations

Ratings		Legend	
Input Rating (MMBtu/hr):	980.70	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	16	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	95	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	16	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	100	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	920	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	2.42	2.42	2.55	2.55	40.80	40.80	2228.54	1.17	8.50
UNROG	0.0104	0.0104	9.69	9.69	10.20	10.20	163.19	163.19	8914.17	4.69	34.00
SOx	0.0006	0.0006	0.53	0.53	0.56	0.56	8.94	8.94	488.57	0.26	1.86
CO	0.0942	0.0135	87.76	12.58	92.38	13.24	1478.11	211.83	11571.28	6.09	44.13
PM10	0.0061	0.0061	5.70	5.70	6.00	6.00	96.00	96.00	5244.00	2.76	20.00
NOx	0.0921	0.0085	85.81	7.92	90.32	8.34	1445.16	133.38	7285.62	3.83	27.79

Emission Rate Source

ROG	Mfr Guarantee
SOx	SCAQMD AER Factor
CO	Mfr Guarantee
PM10	Mfr Guarantee
NOx	Mfr Guarantee

Heat input @ 1050 Btu/cf, 490.35 MMBtu/hr (consistent with RERC 1 & 2)

Prime Unit Gas Turbine Emissions

150 hours, 2 units - startup operations

Ratings		Legend	
Input Rating (MMBtu/hr):	880.68	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	1	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	100	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	20	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	150	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmbtu)	C-EF (lb/mmbtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	2.33	2.33	2.33	2.33	9.33	9.33	349.74	0.17	1.55
UNROG	0.0104	0.0104	9.16	9.16	9.16	9.16	36.64	36.64	1373.86	0.69	6.11
SOx	0.0006	0.0006	0.51	0.51	0.51	0.51	2.04	2.04	76.68	0.04	0.34
CO	0.0975	0.0263	85.90	23.19	85.90	23.19	343.59	92.77	3479.02	1.74	15.46
PM10	0.0062	0.0062	5.49	5.49	5.49	5.49	21.95	21.95	823.02	0.41	3.66
NOx	0.0934	0.0250	82.28	22.05	82.28	22.05	329.14	88.19	3307.25	1.65	14.70

Emission Rate Source

ROG	See Startup Worksheet
SOx	See Startup Worksheet
CO	See Startup Worksheet
PM10	See Startup Worksheet
NOx	See Startup Worksheet

Fuel throughput also from startup spreadsheet (0.11285 mmcf x 1048 Btu/cf)

Prime Unit Gas Turbine Emissions

150 hours, 2 units - shutdown operations

Ratings		Legend	
Input Rating (MMBtu/hr):	836.27	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	1	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	100	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	20	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	150	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMBtu)	C-EF (lb/MMBtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0030	0.0030	2.55	2.55	2.55	2.55	10.20	10.20	382.47	0.19	1.70
UNROG	0.0104	0.0104	8.70	8.70	8.70	8.70	34.79	34.79	1304.58	0.65	5.80
SOx	0.0007	0.0007	0.56	0.56	0.56	0.56	2.24	2.24	83.85	0.04	0.37
CO	0.1105	0.0261	92.38	21.84	92.38	21.84	369.53	87.36	3276.00	1.64	14.56
PM10	0.0072	0.0072	6.00	6.00	6.00	6.00	24.00	24.00	900.00	0.45	4.00
NOx	0.1080	0.0147	90.32	12.27	90.32	12.27	361.29	49.09	1840.80	0.92	8.18

Emission Rate Source

ROG	See startup rate
SOx	Normal Operation rate
CO	See Shutdown Worksheet - GE specification rates
PM10	Normal Operation rate
NOx	See Shutdown Worksheet - GE specification rates

Prime Unit Gas Turbine Maintenance Emissions

10 hours - 2 units

Ratings	
Input Rating (MMBtu/hr):	980.70
Average hours of operation per day:	4
Average days of operation per week:	1
Average weeks of operation per year:	1
Average Loading (%):	70
Maximum hours of operation per day:	5
Maximum hours of operation per month:	10
Maximum weeks of operation per year:	2
Maximum days per week:	1
Maximum Annual Hours	10

Legend

U-EF	Emission Factor for uncontrolled emissions
C-EF	Net emission factor for controlled emissions
AHU	Average hourly uncontrolled emissions
AHC	Average hourly controlled emissions
MHU	Maximum hourly uncontrolled emissions
MHC	Maximum hourly controlled emissions
MDU	Maximum daily uncontrolled emissions
MDC	Maximum daily controlled emissions
AA	Annual average controlled emissions
APTE	Annual potential to emit
30DA	Thirty day average daily emissions

	U-EF (lb/mmbtu)	C-EF (lb/mmbtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	1.78	1.78	2.55	2.55	12.75	12.75	17.85	0.01	0.85
UNROG	0.0104	0.0104	7.14	7.14	10.20	10.20	51.00	51.00	71.39	0.05	3.40
SOx	0.0006	0.0006	0.39	0.39	0.56	0.56	2.79	2.79	3.91	0.00	0.19
CO	0.0942	0.0942	64.67	64.67	92.38	92.38	461.91	461.91	646.67	0.46	30.79
PM10	0.0061	0.0061	4.20	4.20	6.00	6.00	30.00	30.00	42.00	0.03	2.00
NOx	0.0921	0.0921	63.23	63.23	90.32	90.32	451.61	451.61	632.26	0.45	30.11

Emission Rate Source

ROG	Mfr. Guarantee
SOx	SCAQMD AER Factor
CO	Mfr. Guarantee
PM10	Mfr. Guarantee
NOx	Mfr. Guarantee

Heat input @ 1050 Btu/cf, 490.35 MMBtu/hr (consistent with RERC 1 & 2)

Prime Unit Gas Turbine Emissions

920 hours - 1 unit - normal operations

Ratings	
Input Rating (MMBtu/hr):	490.35
Average hours of operation per day:	16
Average days of operation per week:	5
Average weeks of operation per year:	26
Average Loading (%):	95
Maximum hours of operation per day:	16
Maximum hours of operation per month:	100
Maximum weeks of operation per year:	52
Maximum days per week:	7
Maximum Annual Hours	920

Legend	
U-EF	Emission Factor for uncontrolled emissions
C-EF	Net emission factor for controlled emissions
AHU	Average hourly uncontrolled emissions
AHC	Average hourly controlled emissions
MHU	Maximum hourly uncontrolled emissions
MHC	Maximum hourly controlled emissions
MDU	Maximum daily uncontrolled emissions
MDC	Maximum daily controlled emissions
AA	Annual average controlled emissions
APTE	Annual potential to emit
30DA	Thirty day average daily emissions

	U-EF (lb/mmbtu)	C-EF (lb/mmbtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	1.21	1.21	1.27	1.27	20.40	20.40	1114.27	0.59	4.25
UNROG	0.0104	0.0104	4.84	4.84	5.10	5.10	81.59	81.59	4457.09	2.35	17.00
SOx	0.0006	0.0006	0.27	0.27	0.28	0.28	4.47	4.47	244.28	0.13	0.93
CO	0.0942	0.0135	43.88	6.29	46.19	6.62	739.06	105.92	5785.64	3.05	22.07
PM10	0.00612	0.00612	2.85	2.85	3.00	3.00	48.00	48.00	2622.00	1.38	10.00
NOx	0.0921	0.0085	42.90	3.96	45.16	4.17	722.58	66.69	3642.81	1.92	13.89

Emission Rate Source

ROG	Manufacturer guarantee
SOx	SCAQMD AER Factor
CO	Manufacturer guarantee
PM10	Manufacturer guarantee
NOx	Manufacturer guarantee

Heat input @ 1050 Btu/cf, 490.35 MMBtu/hr (consistent with RERC 1 & 2)

Prime Unit Gas Turbine Emissions

150 hours, 1 unit - startup operations

Ratings		Legend	
Input Rating (MMBtu/hr):	440.34	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	1	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	100	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	20	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	150	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmbtu)	C-EF (lb/mmbtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	1.17	1.17	1.17	1.17	4.66	4.66	174.87	0.09	0.78
UNROG	0.0104	0.0104	4.58	4.58	4.58	4.58	18.32	18.32	686.93	0.34	3.05
SOx	0.0006	0.0006	0.26	0.26	0.26	0.26	1.02	1.02	38.34	0.02	0.17
CO	0.0975	0.0263	42.95	11.60	42.95	11.60	171.79	46.39	1739.51	0.87	7.73
PM10	0.0062	0.0062	2.74	2.74	2.74	2.74	10.97	10.97	411.51	0.21	1.83
NOx	0.0934	0.0250	41.14	11.02	41.14	11.02	164.57	44.10	1653.63	0.83	7.35

Emission Rate Source

ROG	See Startup Worksheet
SOx	See Startup Worksheet
CO	See Startup Worksheet
PM10	See Startup Worksheet
NOx	See Startup Worksheet

Prime Unit Gas Turbine Emissions

150 hours, 1 unit - shutdown operations

Ratings	
Input Rating (MMBtu/hr):	418.13
Average hours of operation per day:	1
Average days of operation per week:	5
Average weeks of operation per year:	26
Average Loading (%):	100
Maximum hours of operation per day:	4
Maximum hours of operation per month:	20
Maximum weeks of operation per year:	52
Maximum days per week:	7
Maximum Annual Hours	150

Legend	
U-EF	Emission Factor for uncontrolled emissions
C-EF	Net emission factor for controlled emissions
AHU	Average hourly uncontrolled emissions
AHC	Average hourly controlled emissions
MHU	Maximum hourly uncontrolled emissions
MHC	Maximum hourly controlled emissions
MDU	Maximum daily uncontrolled emissions
MDC	Maximum daily controlled emissions
AA	Annual average controlled emissions
APTE	Annual potential to emit
30DA	Thirty day average daily emissions

	U-EF (lb/MMBtu)	C-EF (lb/MMBtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0030	0.0030	1.27	1.27	1.27	1.27	5.10	5.10	191.24	0.10	0.85
UNROG	0.0104	0.0104	4.35	4.35	4.35	4.35	17.39	17.39	652.29	0.33	2.90
SOx	0.0007	0.0007	0.28	0.28	0.28	0.28	1.12	1.12	41.92	0.02	0.19
CO	0.1105	0.0261	46.19	10.92	46.19	10.92	184.76	43.68	1638.00	0.82	7.28
PM10	0.0072	0.0072	3.00	3.00	3.00	3.00	12.00	12.00	450.00	0.23	2.00
NOx	0.1080	0.0147	45.16	6.14	45.16	6.14	180.64	24.54	920.40	0.46	4.09

Emission Rate Source

ROG	Normal Operation rate
SOx	Normal Operation rate
CO	See Shutdown Worksheet - GE specification rates
PM10	Normal Operation rate
NOx	See Shutdown Worksheet - GE specification rates

Prime Unit Gas Turbine Maintenance Emissions

10 hours - 1 unit

Ratings		Legend	
Input Rating (MMBtu/hr):	490.350	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	1	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	1	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	5	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	10	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	2	MDC	Maximum daily controlled emissions
Maximum days per week:	1	AA	Annual average controlled emissions
Maximum Annual Hours	10	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmbtu)	C-EF (lb/mmbtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	0.89	0.89	1.27	1.27	6.37	6.37	8.92	0.01	0.42
UNROG	0.0104	0.0104	3.57	3.57	5.10	5.10	25.50	25.50	35.70	0.03	1.70
SOx	0.0006	0.0006	0.20	0.20	0.28	0.28	1.40	1.40	1.96	0.00	0.09
CO	0.0942	0.0942	32.33	32.33	46.19	46.19	230.95	230.95	323.34	0.23	15.40
PM10	0.0061	0.0061	2.10	2.10	3.00	3.00	15.00	15.00	21.00	0.02	1.00
NOx	0.0921	0.0921	31.61	31.61	45.16	45.16	225.81	225.81	316.13	0.23	15.05

Emission Rate Source

ROG	Mfr Guarantee
SOx	SCAQMD AER Factor
CO	Mfr Guarantee
PM10	Mfr Guarantee
NOx	Mfr Guarantee

Heat input @ 1050 Btu/cf, 490.35 MMBtu/hr (consistent with RERC 1 & 2)

Prime Unit Gas Turbine Emissions

1500 hours - 1 unit - normal operations

Ratings		Legend	
Input Rating (MMBtu/hr):	150.6	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	13	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	1	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	17	AHC	Average hourly controlled emissions
Average Loading (%):	100	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum hours of operation per month:	20	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	150	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMBtu)	C-EF (lb/MMBtu)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	0.0026	0.0026	0.40	0.40	0.40	0.40	1.6	1.6	60	0.03	0.27
UNROG	0.0104	0.0104	1.57	1.57	1.57	1.57	6.3	6.3	235	0.12	1.04
SOx	0.0006	0.0006	0.09	0.09	0.09	0.09	0.3	0.3	13	0.01	0.06
CO	0.0975	0.0263	14.69	3.97	14.69	3.97	58.8	15.9	595	0.30	2.64
PM10	0.0062	0.0062	0.94	0.94	0.94	0.94	3.8	3.8	141	0.07	0.63
NOx	0.0934	0.0250	14.07	3.77	14.07	3.77	56.3	15.1	566	0.28	2.51

Emission Rate Source

ROG	CARB 1999 BACT guidance - Table I (.0027 lb/mmBTUhhv)
SOx	AP42, converted from hhv of 1020 to hhv of 1048
CO	40 ppmv and 6 ppmv (controlled) guarantee
PM10	AP42, converted from hhv of 1020 to hhv of 1048
NOx	25 ppmv and 2.5 ppmv (controlled) guarantee

Fuel flow reference: CE spec 3.5.18, curve 102

Startup Emissions Worksheet
(per turbine)

Emission Rates (lb/hr) @ Various Loads

Stage	Uncontrolled NOx (Lb/hr)	Control Efficiency	Controlled NOx Rate (Lb/hr)	Uncontrolled CO Rate (Lb/hr)	Control Efficiency	Controlled CO Rate (Lb/hr)	Uncontrolled ROG Rate (Lb/hr)	Control Efficiency	Controlled ROG Rate (Lb/hr)	PM10 Rate (Lb/hr)	SOx Rate (Lb/hr)	Fuel Flow Factor	Fuel (MMBtu/min)
35 min	45.16	91.0%	4.06	46.19	85%	6.93	1.27	0.00%	1.27	3.00	0.28	1.00	8.17
10 min	45.16	0%	45.16	46.19	54%	21.25	1.27	0%	1.27	3.00	0.28	1.00	8.17
4 min	15.00	0%	15.00	25.76	45%	14.17	0.48	0%	0.48	1.12	0.10	0.31	2.50
0 min	0.000	0%	0.00	0.00	0%	0.00	0.00	0%	0.00	0.00	0.00	0.00	0.00

Hourly Emissions During Startup

Load	Uncontrolled Accumulated NOx (Lb)		Controlled Accumulated NOx (Lb)	Uncontrolled Accumulated CO (Lb)	Controlled Accumulated CO (Lb)	Uncontrolled Accumulated ROG (Lb)	Controlled Accumulated ROG (Lb)	Accumulated PM10 (Lb/hr)	Accumulated SOx (Lb/hr)	Fuel (MMBtu for period)	Fuel (MMBtu accumulated)
4min (0-20%)	0.50		0.50	0.86	0.47	0.02	0.02	0.04	0.00	0.08	
6min (20-100%)	3.01	Startup Profile	2.00	3.60	1.77	0.09	0.09	0.21	0.02	32.01	32.01
15 min(100%)	22.58		6.15	23.10	7.04	0.64	0.64	1.50	0.14	245.00	277.01
35 min (100%)	15.05		2.37	15.40	2.31	0.42	0.42	1.00	0.09	163.33	**440.34**
Total per startup	**41.14**		**11.02**	**42.95**	**11.60**	**1.17**	**1.17**	**2.74**	**0.26**		

Note: Emission rates based upon simple average of initial and achieved load per time period

20% load fuel rate = 150.1 MMBtu/hr HHV (Based on GE 3.5.18, 102)
0% ROG control assumed, because no reduction taken in normal operation calculations.

Shutdown Emissions Worksheet
(per turbine)

Shutdown rates taken from Agua Mansa application -

Emission Rates (lb/hr) @ Various Loads

Operating Factor	Fuel (MMBtu/min)
1	8.1667
0.37	3.0217
0.0002	0.000

10% load from RERC 1&2 analysis

Hourly Emissions During Shutdown

Load	Uncontrolled NOx (Lb/hr)	Controlled NOx (Lb/hr)	Uncontrolled CO (Lb/hr)	Controlled CO (Lb/hr)	Uncontrolled ROG (Lb/hr)	Controlled ROG (Lb/hr)	PM10 (Lb/hr)	SOx (Lb/hr)	Fuel (MMBtu for period)	Fuel (MMBtu accumulated)
5min (0-10%)									7.554	
15 min(10-100%)									83.913	91.467
40min (100%)									326.667	418.133
Total per shutdown	45.16	6.14	46.19	10.92	1.27	1.27	3.00	0.28		

Note: Emission rates based upon simple average of initial and achieved load per time period
Controlled NOx and CO = GE 8-min. shut down estimate, plus 52 minutes normal operation rate
All other pollutant rates = normal operations.

Per turbine emissions Units 3 and 4

	Normal Hour (lb/hour)	Startup Hour (lb/hour)	Shutdown Hour (lb/hour)	Commission / Maintenance Hour (lb/hour)	20% Load (lb/hour)	Commission Year* (lb/yr)	Normal Year** (lb/yr)	Daily Max - Normal Year*** (lb/day)	Daily Max - First Year **** (lb/day)
ROG	1.27	1.17	1.27	1.27	0.40	1,552	1,552	30.16	30.60
UNROG	5.10	4.58	4.35	5.10	1.57				
SOx	0.28	0.26	0.28	0.28	0.09	340	340	6.61	6.71
CO	6.62	11.60	10.92	46.19	3.97	17,844	9,930	195.98	1108.58
PM10	3.00	2.74	3.00	3.00	0.94	3,652	3,652	70.97	72.00
NOx	4.17	11.02	6.14	45.16	3.77	15,059	6,860	135.33	1083.87

* Commission Year - 200 hrs commissioning, 720 hrs normal, 150 hrs start, 150 hrs stop, 10 hrs maintenance
** Normal Year - 920 hrs normal, 150 hrs start, 150 hrs stop, 10 hrs maintenance
*** Daily Max Normal Year - 16 normal hours, 4 starts, 4 stops
**** Daily Max Firsst year - 24 hrs uncontrolled

Black Start Engine PM emissions

lb/hr	0.3212
lb/yr	17.34
ACFM	8207
Temp	834 deg. F

Potential Emissions
Caterpillar C32, 1000kW, 1502 HP

Rating

Bhp	Generator Kw
1502	1000

Operating Schedule:

	Avg	Max
Daily Hours	0.5	3
Annual Hours	12	54
Days/Month	1	3

Emission Summary:

Pollutant	g/hp-hr	lb/hr	MHU (Lbs./Hr.)	MHC (Lbs./Hr.)	ADU (Lbs./Day)	ADC (Lbs./day)	MDU (Lbs./day)	MDC (Lbs./day)	Ann. Avg. (Lbs./Yr.)	Ann. Max. (Lbs./Yr.)	30 Day Avg (Lbs./day)
NOx	3.92	12.980	12.980	12.980	6.49	6.49	38.94	38.94	156	701	3.89
CO	1.19	3.940	3.940	3.940	1.97	1.97	11.82	11.82	47	213	1.18
HC	0.11	0.364	0.364	0.364	0.18	0.18	1.09	1.09	4	20	0.11
SOx	0.0023	0.008	0.008	0.008	0.00	0.00	0.02	0.02	0.1	0.41	0.002
PM10	0.097	0.321	0.321	0.321	0.16	0.16	0.96	0.96	4	17	0.10

Source of Factors:

CARB Executive Order U-R-001-0331 (Family 8CPXL32.0ESW)
SOx factors reflect 15 ppmw and diesel weight of 7.05 lb/gal
HC Factor from CAT TMI 7714-00

SCEC
CALIFORNIA: ph. (714) 282-8240 • fax (714) 282-8247
HAWAII: ph. (808) 488-8113 • fax (808) 488-6859

Project: RERC UNITS 3 & 4 Turbine Emission Rates
Project #: 2248.2206 Date: 12/31/07
By: KAL Checked By: _____

Reference: GE spec sheet 3.5.10, CASE 107-100%, 100°F w/ chill

Fuel consumption (EST) - 8543 BTU/Kw-hr - LHV

LHV - 910 BTU/cf - spec sheet

HHV - 1050 BTU/cf - SCAQMD DESIGN VALUE

POWER generation (Gross) - 49460 KW

Hourly Fuel Consumption

Estimated MMBtu/hr (HHV) = 8543 BTU/Kw-hr (LHV) • 49,460 KW • $\frac{1050 \text{ (HHV)}}{910 \text{ (LHV)}}$ • $\frac{1}{10^6}$

= 487.54 MMBtu/hr @ 1050 Btu/cf

→ Assume consistency w/ SCAQMD analysis units 1 & 2 = 490.8 MMBTU/hr @ 1050 BTU/cf

Controlled Emission Rates

NOx	2.3 ppmv @ 15% O_2	-	GE guarantee
VOC	2.0 ppmv @ 15% O_2	-	GE guarantee
CO	6.0 ppmv @ 15% O_2	-	GE guarantee
NH_3	5.0 ppmv @ 15% O_2	-	GE guarantee
PM_{10}	3.0 LB/hr	-	GE guarantee
SOx	0.6 LB/mmcf	-	SCAQMD AER factor
UNROG	8.0 ppmv @ 15% O_2	-	Express Data sheet

Emission Factors (LB/MMBtu)

$$EF(LB/MMBTU) = ppmv \cdot MW \cdot \frac{1}{(SMV)} \cdot Fd \cdot \left(\frac{20.9}{20.9-15}\right) \cdot \frac{1}{10^6}$$

ppmv = Concentration @ 15% O_2

MW = Molecular weight
- NOx = 46.01
- VOC = 16.0
- CO = 28.0
- NH_3 = 17.03

SMV = specific molar volume @ 68°F = 385.3 dscf/LB-mol

Fd = dry O_2 F-factor for Nat. Gas @ 68°F = 8710 dscf/MMBtu

SCEC
CALIFORNIA: ph. (714) 282-8240 • fax (714) 282-8247
HAWAII: ph. (808) 488-8113 • fax (808) 488-6859

Project: _____
Project #: _____ Date: _____
By: _____ Checked By: _____

Emission Rates - Controlled (cont)

$NOx = 2.3\ ppmv \cdot 46.01\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0085\ LB/MMBtu$

$CO = 6.0\ ppmv \cdot 28\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0135\ LB/MMBtu$

$VOC = 2.0\ ppmv \cdot 16\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0026\ LB/MMBtu$

$NH_3 = 8\ ppmv = 0.104\ LB/MMBtu$

$NH_3 = 5.0\ ppmv \cdot 17.03\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0068\ LB/MMBtu$

$SOx = 0.6\ LB/MMcf \cdot \frac{1\ cf}{1050\ Btu}$

$= 0.0057\ LB/MMBtu$

$PM_{10} = 3.0\ LB/hr \cdot \frac{1}{490.35\ MMBtu/hr}$ ✓

$= 0.0061\ LB/MMBtu$

Emission Rates - Uncontrolled

$NOx = 25\ ppmv \cdot 46.01\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0921\ LB/MMBtu$

$CO = 42\ ppmv \cdot 28\ LB\text{-}mol \cdot \frac{1}{385.3\ dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0942\ LB/MMBtu$

SCEC
CALIFORNIA: ph. (714) 282-8240 • fax (714) 282-8247
HAWAII: ph. (808) 488-8113 • fax (808) 488-6859

Project: _____
Project #: _____ Date: _____
By: _____ Checked By: _____

20% Load Data - 4 min after startup.

CO conc = 62 ppmv @ 15% O_2
NOx conc = 25 ppmv @ 15% O_2

Assume fuel flow rate @ 4 min = 183.9 MMBTU/hr (RERC)

Low Load NOx

$= 25\,ppmv \cdot 46.01\,\frac{LB\text{-}mol}{} \cdot \frac{1}{385.3\,dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.0921$ LB/MMBTU

0.0921 LB/MMBTU $\cdot$ 183.9 MMBTU/hr

NOx = 16.93 LB/hr - uncontrolled rate

Low Load CO

$= 62\,ppmv \cdot 28\,\frac{LB\text{-}mol}{} \cdot \frac{1}{385.3\,dscf/LB\text{-}mol} \cdot \frac{20.9}{5.9} \cdot 8710 \cdot \frac{1}{10^6}$

$= 0.1401$ LB/MMBTU

0.1401 LB/MMBTU $\cdot$ 183.9 MMBTU/hr

= 25.76 LB/hr - uncontrolled rate

SCEC
CALIFORNIA: ph. (714) 282-8240 • fax (714) 282-8247
HAWAII: ph. (808) 488-8113 • fax (808) 488-6859

Project: RERC 3 & 4 - Shutdown Emissions
Project #: Date:
By: KAL Checked By: Page 1 of 1

REFERENCE - GE El Colton (Agua Manza) Data

Given - shutdown = 8 min

8 min shutdown Nox = 2.7 LB = 0.338 LB min

8 min shutdown CO = 5.2 LB = 0.65 LB min

Normal Nox = 3.97 LB/hr = 0.066 LB/min

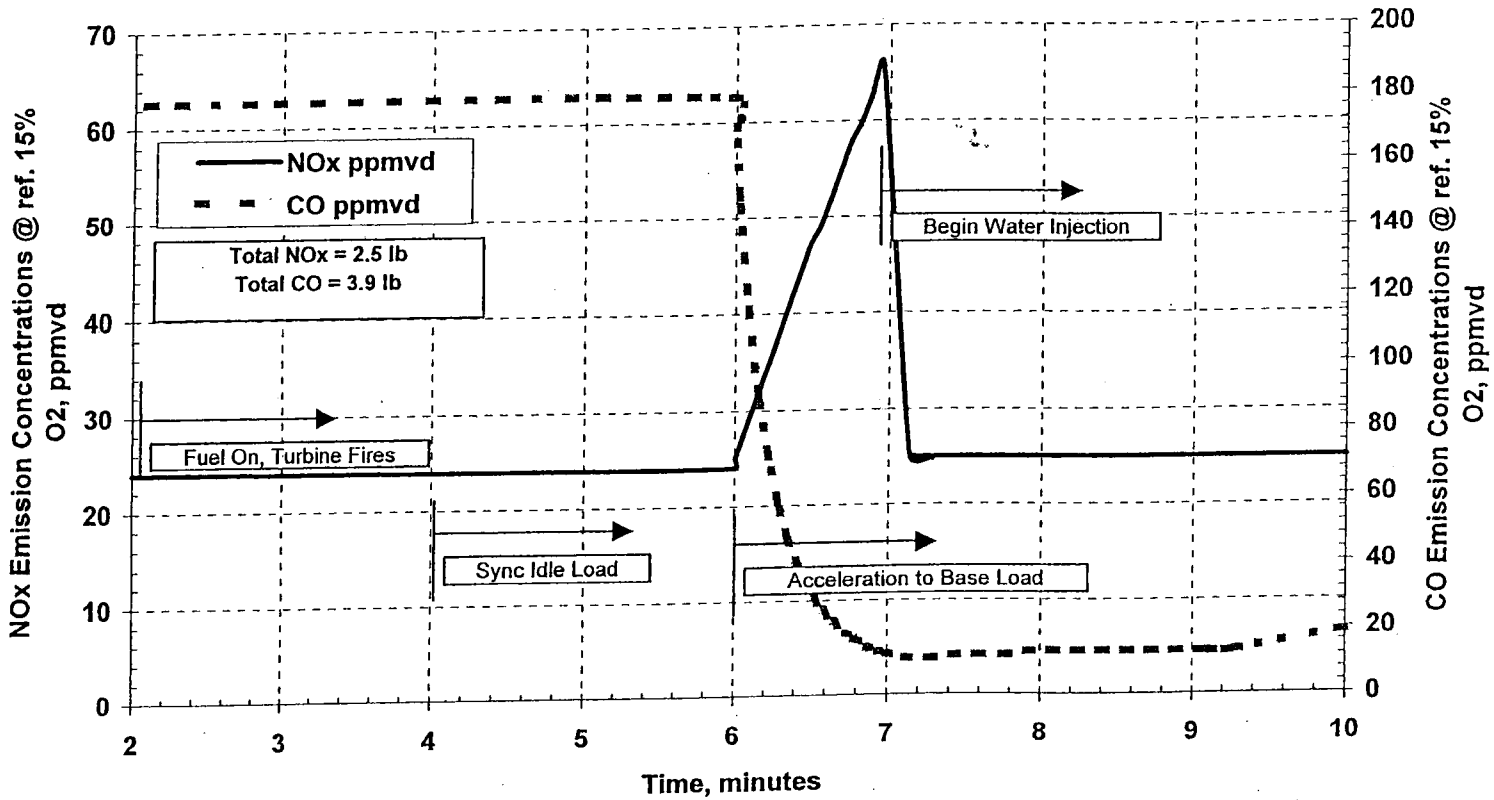
Normal CO = 6.62 LB/hr = 0.110 LB/min

shutdown LB/hr

Nox = (8 min × 0.338 LB min) + (52 min × 0.066 LB/min)
= 6.14 LB/hr

CO = (8 min × 0.65 LB/min) + (52 min × 0.11 LB/min)
= 10.92 LB/hr

Predicted NOx and CO Concentrations During10 minute Startup at 73°F Amb. Temperature. - LM6000 PC-SPRINT w/ VIGVs



Acceleration to base load is based on 10 minute startup, 72.8°F, RH of 60.0% with 5.0 inH2O, 12.0 inH2O at 730.0ft. MSL, Fuel: Site Gas Fuel#900-744, 21153 Btu/lb,LHV, Water NOx control to 25ppmvd. Water Injection starts at ~10000kW. 290ERT 60Hz, 13.8kV, 0.9PF (14839). **NOT FOR GUARANTEE**

Shutdown Emissions

Shutdowns are estimated to take 8 minutes to bring the turbine down. Upon initiation of the shutdown procedure, ammonia injection will be turned off. Approximately 7 minutes into the shutdown, water injection will be turned off.

Following is shutdown emission data from the turbine manufacturer:

NOx CO VOC SOx PM10

Emissions, lbs/shutdown*

NOx	CO	VOC	SOx	PM10
2.7	5.2	1.20	0.13	2.00

* Shutdown emissions for NOx and CO taken from turbine manufacturer data for 8 minute shutdown, based on ambient conditions of 33 deg. F, relative humidity = 80.0%. Shutdown emissions for VOC, SOx, and PM10 provided by applicant.

SOURCE: SCAQMD Engineering Report for similar LM6000 permitted in 2002-2003

Cooling Tower Emissions Summary - Commission Operations
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information:

Equipment Type: Cooling Tower	Capacity (tons): 3,460	Water Flow Per Cell (gpm): 1,730
Manufacturer: Evapco	Air Flow Per Cell (acfm) 200,900	Drift Rate (%): 0.001
Model: 314-0972	# of Cells: 3	TDS Level (ppm): 50
	Annual Operating Schedule: 1230	

Emission Rates:

Pollutant	Per Cell Emission Rate (lbs/hr)	Total Emission Rate (lbs/hr)	Total Emission Rate (g/s)		Comments
PM_{10}	0.00043	0.0013	0.00016	24-Hour	
PM_{10}	0.00006	0.0002	0.00002	Annual	Annual emissions averaged over 8760 hours.
$PM_{2.5}$	0.00043	0.0013	0.00016	24-Hour	
$PM_{2.5}$	0.00006	0.0002	0.00002	Annual	Annual emissions averaged over 8760 hours.

Emission Totals:

	Total Emission Rate (lbs/day)	Total Emission Rate (lbs/year)	Comments
PM_{10}	0.031	1.7	Daily emissions (24 hour day).
$PM_{2.5}$	0.031	1.7	Annual emissions (Equiv. 1330 hours 100% load, 25 concentration cycles).

Notes:
1. Total cooling tower flow rate: (602700 acfm).
2. Total cooling tower circulation rate: 5190 (gpm).
4. Cooling tower TDS = Make-up water TDS x concentration Cycles = 50 ppm x 25 cycles.
5. Default Drift Rate: 0.001
6. Default TDS Levels (ppm): 50

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Larry Salguero**
Project Info: **RPU Phase 2 (CMS 701736)**

Engine: **LM6000 PC-SPRINT w/ VIGV**
Deck Info: **G0125Q - 8f2.scp**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-736, 20644 Btu/lb,LHV**

Date: **05/21/2007**
Time: **4:23:30 PM**
Version: **3.5.10**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**
Ambient Conditions									
Dry Bulb, °F	18.0	18.0	18.0	59.0	59.0	59.0	59.0	100.0	100.0
Wet Bulb, °F	15.4	15.4	15.4	51.4	51.4	51.4	51.4	68.3	68.3
RH, %	60.0	60.0	60.0	60.0	60.0	60.0	60.0	19.0	19.0
Altitude, ft	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0
Ambient Pressure, psia	14.313	14.312	14.312	14.312	14.312	14.312	14.312	14.313	14.312
Engine Inlet									
Comp Inlet Temp, °F	18.0	18.0	18.0	46.0	59.0	59.0	59.0	46.0	100.0
RH, %	60.0	60.0	60.0	96.8	60.0	60.0	60.0	95.0	19.0
Conditioning	NONE	NONE	NONE	CHILL	NONE	NONE	NONE	CHILL	NONE
Tons or kBtu/hr	0	0	0	275	0	0	0	1290	0
Pressure Losses									
Inlet Loss, inH20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volute Loss, inH20	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	**100**	**75**	**50**	**100 w/evap**	**100**	**75**	**50**	**100 w/evap**	**100**
kW, Gen Terms	**48957**	**36725**	**24490**	**49455**	**47432**	**35582**	**23728**	**49460**	**36990**
Est. Btu/kW-hr, LHV	**8431**	**8769**	**9591**	**8543**	**8605**	**9017**	**9846**	**8543**	**9041**
Fuel Flow									
MMBtu/hr, LHV	412.8	322.1	234.9	422.5	408.1	320.9	233.6	422.6	334.4
lb/hr	19994	15600	11378	20466	19771	15542	11317	20469	16200
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection									
lb/hr	22100	14496	8211	19418	18312	11427	8744	19460	14576
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SPRINT	**OFF**	**OFF**	**OFF**	**LPC**	**LPC**	**LPC**	**OFF**	**LPC**	**LPC**
lb/hr	0	0	0	8192	9349	9349	0	8192	8016
Control Parameters									
HP Speed, RPM	10179	9825	9474	10431	10475	10046	9784	10431	10493
LP Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	458.1	389.7	307.9	450.3	437.0	380.2	293.5	450.3	373.1
T3CRF - CDT, °F	953	887	804	968	976	890	884	968	999
T48IN, °R	1977	1849	1720	2038	2038	1885	1825	2038	2016
T48IN, °F	1517	1389	1260	1578	1578	1425	1366	1578	1557
Exhaust Parameters									
Temperature, °F	791.4	741.0	708.8	841.8	849.3	775.2	794.9	841.8	875.3
lb/sec	303.9	267.8	219.0	292.4	283.7	257.7	202.7	292.5	243.8
lb/hr	1093928	964257	788447	1052771	1021219	927662	729878	1052898	877778
Energy, Btu/s- Ref 0 °R	97280	81446	64272	98730	96416	81608	64621	98732	84509
Energy, Btu/s- Ref T2 °F	61090	49765	38523	61462	59305	48145	38547	61462	50103
Cp, Btu/lb-R	0.2722	0.2679	0.2647	0.2774	0.2779	0.2724	0.2699	0.2774	0.2763
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)									
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	41	32	24	42	41	32	23	42	34
CO ppmvd Ref 15% O2	54	52	50	17	13	14	21	17	8
CO, lb/hr	54.19	40.79	28.86	17.18	13.36	10.76	12.16	17.37	6.24
CO2, lb/hr	53835.03	42062.50	30720.99	55119.64	53249.03	41918.57	30559.10	55127.34	43659.46
HC ppmvd Ref 15% O2	8	8	7	2	2	2	2	2	2
HC, lb/hr	4.80	3.51	2.42	1.23	1.19	0.93	0.74	1.23	0.97
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

109	110	111	112	113	114
100.0	100.0	115.0	115.0	115.0	115.0
68.3	68.3	72.4	72.4	72.4	72.4
19.0	19.0	12.0	12.0	12.0	12.0
730.0	730.0	730.0	730.0	730.0	730.0
14.312	14.312	14.313	14.312	14.312	14.312
100.0	100.0	46.0	115.0	115.0	115.0
19.0	19.0	95.0	12.0	12.0	12.0
NONE	NONE	CHILL	NONE	NONE	NONE
0	0	1591	0	0	0
5.00	5.00	5.00	5.00	5.00	5.00
4.00	4.00	4.00	4.00	4.00	4.00
12.00	12.00	12.00	12.00	12.00	12.00
75	50	100 w/evap	100	75	50
27753	**18510**	**49460**	**33010**	**24769**	**16521**
9489	**10778**	**8543**	**9203**	**9828**	**11401**
263.4	199.5	422.6	303.8	243.4	188.4
12757	9664	20469	14715	11792	9125
Water	**Water**	**Water**	**Water**	**Water**	**Water**
8823	7587	19460	13244	8368	7220
100.0	100.0	100.0	100.0	100.0	100.0
LPC	OFF	LPC	LPC	LPC	OFF
8016	0	8192	6538	6538	0
10117	9871	10431	10459	10128	9903
3600	3600	3600	3600	3600	3600
316.9	257.1	450.3	344.5	287.7	243.0
922	927	968	999	929	938
1894	1842	2038	2005	1927	1855
1434	1383	1578	1545	1467	1395
826.9	843.7	841.8	886.8	876.0	872.3
214.0	177.0	292.5	226.0	192.5	166.8
770556	637349	1052898	813465	693004	600519
70846	58797	98732	78874	66328	56699
40617	34198	61462	46182	38588	32893
0.2744	0.2718	0.2774	0.2781	0.2763	0.2729
25	25	25	25	25	25
26	20	42	31	24	19
8	12	17	7	7	10
4.82	5.79	17.37	5.35	4.19	4.70
34415.73	26109.75	55127.34	39667.66	31807.48	24652.32
2	2	2	2	2	2
0.77	0.58	1.23	0.88	0.71	0.55
0.00	0.00	0.00	0.00	0.00	0.00

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

Performance By: **Larry Salguero**
Project Info: **RPU Phase 2 (CMS 701736)**

Engine: **LM6000 PC-SPRINT w/ VIGV**
Deck Info: **G0125O - 8f2.scp**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.9PF (14839)**
Fuel: **Site Gas Fuel#900-736, 20644 Btu/lb,LHV**

Date: **05/21/2007**
Time: **4:23:30 PM**
Version: **3.5.10**

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**
Engine Exhaust									
Exhaust MW	28.2	28.3	28.5	28.0	28.0	28.1	28.3	28.0	28.0
Exhaust Flow, ACFM	588079	495197	392460	593172	578989	493783	391920	593195	507215
Exhaust Flow, SCFM	231003	202453	163824	224080	217603	196991	152742	224096	187286
Exhaust Flow, Btu/lb	320	304	293	338	340	317	319	338	347
Exhaust Flow, Calories/s	24514593	20524473	16196587	24880084	24296946	20565139	16284461	24880545	21296177
Inlet Flow Wet, pps	296.0	263.1	233.1	282.7	274.0	260.1	219.6	282.8	236.1
Inlet Flow Dry, pps	295.7	262.8	232.8	280.9	272.3	258.4	218.2	281.0	234.2
Shaft HP	66802	50213	33666	67479	64732	48665	32637	67486	50572
Generator Information									
Capacity kW	73721	73721	73721	64115	67440	64115	64115	52019	67440
Efficiency	0.983	0.981	0.975	0.983	0.980	0.980	0.975	0.983	0.977
Inlet Temp, °F	18.0	18.0	18.0	59.0	59.0	59.0	59.0	100.0	100.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TRQ48, Torque Limit Cold End	121364	93878	64244	120417	115683	91807	62220	120429	92612
Correct Control Parameters									
PS3JQA, psia	463.956	394.682	311.836	456.056	442.586	385.060	297.252	456.056	377.869
XN25R3, rpm	6174	6112	6083	6304	6320	6237	6103	6303	6277
8th Stage Bleed									
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0	0	0	0
CDP Bleed									
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Est. Gas Pressure at Baseplate, psig	**591.1**	**490.6**	**381.3**	**590.4**	**572.6**	**482.6**	**369.1**	**590.5**	**484.3**
CardPack	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**	**8f2**
Exhaust CardPack	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**	**7f5**
NSI	**315**	**0**	**0**	**304**	**304**	**0**	**439**	**304**	**305**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
XNENG	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

109	110	111	112	113	114
25	25	25	25	25	25
26.4	20.0	42.5	30.5	24.5	18.9
17	30	42	15	17	30
11.1	14.6	42.9	11.1	10.3	13.8
10	10	10	10	10	10
3.68	2.78	5.91	4.24	3.40	2.63
2.00	2.00	2.00	2.00	2.00	2.00
0.74	0.56	1.18	0.85	0.68	0.53
2.70	2.70	2.70	2.70	2.70	2.70
0.15	0.11	0.24	0.17	0.14	0.11
0.02	0.02	0.03	0.02	0.02	0.01
1.2284	1.2433	1.2209	1.2234	1.2289	1.2433
72.0422	72.9118	71.6023	71.7498	72.0708	72.9128
15.7453	16.5414	14.5067	15.0683	15.5773	16.5297
4.4664	4.0966	5.2358	4.8764	4.5898	4.1052
6.5147	5.2038	7.4297	7.0788	6.5300	5.2060
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0009	0.0016	0.0007	0.0006	0.0008
0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
0.0024	0.0022	0.0028	0.0026	0.0024	0.0022
0.9622	0.9594	0.9675	0.9650	0.9630	0.9595
80.4631	80.2320	80.9101	80.7020	80.5305	80.2366
15.3961	15.9358	14.3515	14.8381	15.2387	15.9252
3.1754	2.8695	3.7661	3.4914	3.2646	2.8756
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0007	0.0010	0.0019	0.0007	0.0007	0.0009
0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.0023	0.0021	0.0028	0.0026	0.0024	0.0021
0.8644	0.8810	0.8557	0.8587	0.8648	0.8810
72.2844	73.6719	71.5668	71.8109	72.3243	73.6733
13.8312	14.6328	12.6942	13.2034	13.6858	14.6225
2.8526	2.6349	3.3312	3.1067	2.9319	2.6404
10.1646	8.1765	11.5478	11.0172	10.1902	8.1799
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0006	0.0009	0.0016	0.0007	0.0006	0.0008
0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
0.0021	0.0019	0.0025	0.0023	0.0022	0.0019

Riverside Emissions Summary R2

GIVEN / CALCULATED DATA CASE		100	101	102	103	104	105	106
Inlet Conditioning		None	None	None	*Chill	None	None	None
TURBINE LOAD	%	100	75	50	100*	100	75	50
Site Elevation		730	730	730	730	730	730	730
AMBIENT	°F	18	18	18	59	59	59	59
TURBINE EXHAUST FLOW	lb/hr	1,093,928	964,257	788,447	1,052,771	1,021,219	927,662	729,878
GAS TEMP. FROM TURBINE	°F	791.4	741.0	708.8	841.8	849.3	775.2	794.9
TURBINE EXHAUST GAS ANAL., % VOL.	Ar	0.87	0.88	0.89	0.86	0.85	0.87	0.88
	N2	73.04	73.93	74.72	71.56	71.46	72.37	73.78
	O2	13.43	14.36	15.14	12.69	12.70	13.79	14.54
	CO2	3.15	2.81	2.52	3.33	3.32	2.89	2.69
	H2O	9.49	8.01	6.73	11.56	11.67	10.08	8.09
HUMIDITY	%	60.0	60.0	60.0	60.0	60.0	60.0	60.0
GIVEN: TURBINE CO	ppmvd @ 15% O2	60	69	119	42	33	38	66
CALC.: TURBINE CO, lb/hr	lb/hr	60.2	53.9	68.3	42.9	33.0	29.8	37.7
GIVEN: TURBINE NOx	ppmvd @ 15% O2	25	25	25	25	25	25	25
CALC.: TURBINE NOx, lb/hr	lb/hr	41.4	32.3	23.5	42.4	41.0	32.2	23.4
CALC. GAS MOL. WT.		28.21	28.34	28.46	28.00	27.99	28.12	28.32
SOx from Turbine	lb/hr							
SO2 from Turbine	lb/hr	0.23	0.18	0.13	0.24	0.23	0.18	0.13
SO3 from Turbine	lb/hr	0.03	0.03	0.02	0.03	0.03	0.03	0.02
Particulate	lb/hr	2.70	2.70	2.70	2.70	2.70	2.70	2.70
VOC -NMNEHC	ppmvdc	5.00	4.70	4.50	2.00	2.00	2.00	2.00
AMBIENT AIR FLOW(Tempering)	lb/hr	13,500	13,500	13,500	13,500	13,500	13,500	13,500
	ACFM	**2,799**	**2,799**	**2,799**	**3,068**	**3,068**	**3,068**	**3,068**
	SCFM	**3,023**	**3,023**	**3,023**	**3,052**	**3,052**	**3,052**	**3,052**
AIR + GAS MIXTURE TEMP.	°F	**783**	**732**	**698**	**833**	**840**	**766**	**783**
TOTAL AIR + GAS FLOW	lb/hr	1,107,428	977,757	801,947	1,066,271	1,034,719	941,162	743,378
AIR + GAS COMPOSITION, % VOL.	N2	73.09	73.98	74.76	71.61	71.52	72.42	73.82
	O2	13.52	14.44	15.23	12.79	12.79	13.88	14.65
	CO2	3.12	2.77	2.48	3.29	3.27	2.85	2.65
	H2O	9.40	7.93	6.65	11.44	11.55	9.97	7.98
	AR	0.87	0.88	0.89	0.87	0.87	0.88	0.90
AIR + GAS MOL WT		28.22	28.35	28.46	28.01	28.00	28.13	28.33
CO AT CATALYST FACE -	ppmvd @ 15% O2	60	69	119	41	33	38	66
NOx AT CATALYST FACE -	ppmvd @ 15% O2	25.0	25.0	25.0	25.0	25.0	25.0	25.0
DESIGN REQUIREMENTS								
CO CATALYST CO OUT	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0
REQUIRED NOx OUT	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PM10	lb/hr	7.0	7.0	7.0	7.0	7.0	7.0	7.0
GUARANTEED PERFORMANCE DATA								
CO OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0
NOx OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total PM10 (see NOTE below)	lb/hr	2.9	2.9	2.8	3.0	3.0	2.9	2.9
VOC Conversion	%	60.0%	57.4%	55.6%	0.0%	0.0%	0.0%	0.0%
CO CATALYST CO CONVERSION, Min.	%	90.0%	91.3%	95.0%	85.5%	81.9%	84.2%	90.9%
CO OUT, lb/hr - Max.	lb/hr	**6.1**	**4.7**	**3.4**	**6.2**	**6.0**	**4.7**	**3.4**
SCR CATALYST NOx CONVERSION, Min.	%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
NOx OUT, lb/hr - Max.	lb/hr	**4.1**	**3.2**	**2.4**	**4.2**	**4.1**	**3.2**	**2.3**
DESIGN INLET ALPHA - NH3:NOx		1.10	1.10	1.10	1.10	1.10	1.10	1.10
EXPECTED AQ. NH3 (19% SOL.) FLOW	lb/hr	110.8	86.4	62.9	113.5	109.6	86.1	62.7
NH3 SLIP, ppmv	ppmv	4.6	4.1	3.6	4.8	4.8	4.2	3.9
NH3 SLIP, lb/hr	lb/hr	3.1	2.4	1.7	3.1	3.0	2.4	1.7
CO Catalyst Conversion of SO2 to SO3	%	40%	29%	23%	54%	56%	40%	52%
SCR Catalyst Conversion of SO2 to SO3	%	2%	2%	2%	2%	2%	2%	2%
Total Conversion	%	42%	31%	25%	56%	58%	42%	54%
SO2 from Turbine	Moles	0.0036	0.0028	0.0020	0.0038	0.0036	0.0028	0.0020
SO3 from Turbine	Moles	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003
Converted to SO3 by CO Catalyst	Moles	0.00151	0.00087	0.00051	0.00210	0.00208	0.00118	0.00110
Total SO3	Moles	0.00188	0.00125	0.00076	0.00248	0.00246	0.00156	0.00135
Total PM10 taken as Ammonia Sulfate	lb/hr	0.2	0.2	0.1	0.3	0.3	0.2	0.2
PM10 From Turbine	lb/hr	2.7	2.7	2.7	2.7	2.7	2.7	2.7
VOC as CH4	lb/hr	1.26	1.10	0.90	1.22	1.18	1.07	0.84

NOTE: Calculations for pm10 based on GE Data for Natural Gas Fuel with a maximum of 0.2 grains of Sulfur per 100 SCF.

Riverside Emissions Summary R2

GIVEN / CALCULATED DATA CASE		107	108	109	110	111	112	113	114
Inlet Conditioning		*Chill	None	None	None	*Chill	None	None	None
TURBINE LOAD	%	100*	100	75	50	100*	100	75	50
Site Elevation		730	730	730	730	730	730	730	730
AMBIENT	°F	100	100	100	100	115	115	115	115
TURBINE EXHAUST FLOW	lb/hr	1,052,898	877,778	770,556	637,349	1,052,898	813,465	693,004	600,519
GAS TEMP. FROM TURBINE	°F	841.8	875.3	826.9	843.7	841.8	886.6	876.0	872.3
TURBINE EXHAUST GAS ANAL., % VOL.	Ar	0.86	0.86	0.86	0.88	0.86	0.86	0.86	0.88
	N2	71.57	71.57	72.28	73.67	71.57	71.81	72.32	73.67
	O2	12.69	13.02	13.83	14.63	12.69	13.20	13.69	14.62
	CO2	3.33	3.16	2.85	2.63	3.33	3.11	2.93	2.64
	H2O	11.55	11.38	10.16	8.18	11.55	11.02	10.19	8.18
HUMIDITY	%	19.0	19.0	19.0	19.0	12.0	12.0	12.0	12.0
GIVEN: TURBINE CO	ppmvd @ 15% O2	42	15	17	30	42	15	17	30
CALC.: TURBINE CO, lb/hr	lb/hr	42.9	12.3	11.1	14.6	42.9	11.1	10.3	13.8
GIVEN: TURBINE NOx	ppmvd @ 15% O2	25	25	25	25	25	25	25	25
CALC.: TURBINE NOx, lb/hr	lb/hr	42.4	33.6	26.4	20.0	42.4	30.5	24.4	18.9
CALC. GAS MOL. WT.		28.00	28.01	28.11	28.31	28.00	28.04	28.12	28.31
SOx from Turbine	lb/hr								
SO2 from Turbine	lb/hr	0.24	0.19	0.15	0.11	0.24	0.17	0.14	0.11
SO3 from Turbine	lb/hr	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.01
Particulate	lb/hr	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
VOC -NMNEHC	ppmvdc	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
AMBIENT AIR FLOW(Tempering)	lb/hr	13,500	46,000	13,500	13,500	13,500	57,000	37,000	29,000
	ACFM	**3,280**	**11,177**	**3,280**	**3,280**	**3,361**	**14,189**	**9,210**	**7,219**
	SCFM	**3,025**	**10,306**	**3,025**	**3,025**	**3,018**	**12,742**	**8,271**	**6,483**
AIR + GAS MIXTURE TEMP.	°F	**833**	**840**	**815**	**829**	**833**	**840**	**840**	**840**
TOTAL AIR + GAS FLOW	lb/hr	1,066,398	923,778	784,056	650,849	1,066,398	870,465	730,004	629,519
AIR + GAS COMPOSITION, % VOL.	N2	71.63	71.82	72.36	73.74	71.64	72.14	72.55	73.82
	O2	12.79	13.39	13.95	14.75	12.79	13.68	14.03	14.90
	CO2	3.29	3.01	2.81	2.58	3.29	2.91	2.79	2.52
	H2O	11.43	10.92	10.03	8.05	11.43	10.44	9.79	7.90
	AR	0.85	0.85	0.86	0.88	0.85	0.83	0.84	0.86
AIR + GAS MOL WT		28.01	28.04	28.12	28.32	28.01	28.08	28.15	28.33
CO AT CATALYST FACE -	ppmvd @ 15% O2	42	15	17	30	42	15	17	30
NOx AT CATALYST FACE -	ppmvd @ 15% O2	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
DESIGN REQUIREMENTS									
CO CATALYST CO OUT	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
REQUIRED NOx OUT	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PM10	lb/hr	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
GUARANTEED PERFORMANCE DATA									
CO OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
NOx OUT, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NH3 SLIP, ppmvd @ 15% O2 - Max.	ppmvd @ 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
VOC	ppmvdc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total PM10 (see NOTE below)	lb/hr	3.0	3.0	2.9	2.9	3.0	3.0	2.9	2.9
VOC Conversion	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CO CATALYST CO CONVERSION, Min.	%	85.5%	60.0%	65.3%	80.0%	85.5%	60.1%	65.4%	80.0%
CO OUT, lb/hr - Max.	lb/hr	**6.2**	**4.9**	**3.9**	**2.9**	**6.2**	**4.4**	**3.6**	**2.8**
SCR CATALYST NOx CONVERSION, Min.	%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
NOx OUT, lb/hr - Max.	lb/hr	**4.2**	**3.4**	**2.6**	**2.0**	**4.2**	**3.0**	**2.4**	**1.9**
DESIGN INLET ALPHA - NH3:NOx		1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
EXPECTED AQ. NH3 (19% SOL.) FLOW	lb/hr	113.5	89.8	70.7	53.5	113.5	81.6	65.3	50.5
NH3 SLIP, ppmv	ppmv	4.8	4.4	4.1	3.8	4.8	4.3	4.1	3.7
NH3 SLIP, lb/hr	lb/hr	3.1	2.5	2.0	1.5	3.1	2.2	1.8	1.4
CO Catalyst Conversion of SO2 to SO3	%	54%	60%	59%	68%	54%	61%	67%	72%
SCR Catalyst Conversion of SO2 to SO3	%	2%	2%	2%	2%	2%	2%	2%	2%
Total Conversion	%	56%	62%	61%	70%	56%	63%	69%	74%
SO2 from Turbine	Moles	0.0038	0.0030	0.0023	0.0017	0.0038	0.0027	0.0022	0.0017
SO3 from Turbine	Moles	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0001
Converted to SO3 by CO Catalyst	Moles	0.00210	0.00184	0.00143	0.00120	0.00210	0.00167	0.00151	0.00127
Total SO3	Moles	0.00248	0.00222	0.00168	0.00145	0.00248	0.00192	0.00176	0.00140
Total PM10 taken as Ammonia Sulfate	lb/hr	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2
PM10 From Turbine	lb/hr	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
VOC as CH4	lb/hr	1.22	1.05	0.89	0.74	1.22	0.99	0.83	0.71

NOTE: Calculations for pm10 based on GE Data for Natural Gas Fuel v

APPENDIX 6.1-C

TOXIC POLLUTANT EMISSIONS INVENTORY
FOR
OPERATIONS

Toxic Emission Estimates - Gas Turbines
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per turbine):

Unit	Rating MMBTU	Load (%)	Hrs/Yr	Fuel (cfh)	Fuel (MMcfh)	EPA HHV
Turbine	490.35	100	1230	480735	0.48074	1020

Number of Turbines: 2

Turbine Toxic Emissions Information:

Compound	Factor (lb/MMBtu)	Control Efficiency (%)	Emissions (per turbine) (lb/hr)	(lb/yr)	(tons/yr)	Emissions (total) (lb/hr)	(lb/yr)	(tons/yr)	Emission Factor Source	Factors (lb/MMcf)
Acetaldehyde	4.00E-05	85%	2.94E-03	3.62E+00	1.81E-03	5.88E-03	7.24E+00	3.62E-03	AP-42	
Acrolein	6.40E-06	85%	4.71E-04	5.79E-01	2.90E-04	9.41E-04	1.16E+00	5.79E-04	AP-42	
Ammonia	-	-	3.33E+00	4.10E+03	2.05E+00	6.66E+00	8.19E+03	4.10E+00	Manufacturer	
Benzene	1.20E-05	85%	8.83E-04	1.09E+00	5.43E-04	1.77E-03	2.17E+00	1.09E-03	AP-42	
Butadiene (1,3)	4.30E-07	85%	3.16E-05	3.89E-02	1.95E-05	6.33E-05	7.78E-02	3.89E-05	AP-42	
Ethylbenzene	3.20E-05	85%	2.35E-03	2.90E+00	1.45E-03	4.71E-03	5.79E+00	2.90E-03	AP-42	
Formaldehyde	7.10E-04	85%	5.22E-02	6.42E+01	3.21E-02	1.04E-01	1.28E+02	6.42E-02	AP-42	
PAH										
Benzo(a)anthracene	2.22E-08	-	1.09E-05	1.34E-02	6.68E-06	2.17E-05	2.67E-02	1.34E-05	CATEF Mean	2.26E-05
Benzo(a)pyrene	1.36E-08	-	6.68E-06	8.22E-03	4.11E-06	1.34E-05	1.64E-02	8.22E-06	CATEF Mean	1.39E-05
Benzo(b)flouranthene	1.11E-08	-	5.43E-06	6.68E-03	3.34E-06	1.09E-05	1.34E-02	6.68E-06	CATEF Mean	1.13E-05
Benzo(k)flouranthene	1.08E-08	-	5.29E-06	6.50E-03	3.25E-06	1.06E-05	1.30E-02	6.50E-06	CATEF Mean	1.10E-05
Chrysene	2.47E-08	-	1.21E-05	1.49E-02	7.45E-06	2.42E-05	2.98E-02	1.49E-05	CATEF Mean	2.52E-05
Dibenz(a,h)anthracene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Indeno(1,2,3-cd)pryene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Naphthalene	1.63E-06	-	7.98E-04	9.82E-01	4.91E-04	1.60E-03	1.96E+00	9.82E-04	CATEF Mean	1.66E-03
Propylene Oxide	2.90E-05	85%	2.13E-03	2.62E+00	1.31E-03	4.27E-03	5.25E+00	2.62E-03	AP-42	
Toluene	1.30E-04	85%	9.56E-03	1.18E+01	5.88E-03	1.91E-02	2.35E+01	1.18E-02	AP-42	
Xylene	6.40E-05	85%	4.71E-03	5.79E+00	2.90E-03	9.41E-03	1.16E+01	5.79E-03	AP-42	

Notes:
- AP-42 Emission Factor Source - US EPA AP-42. April 2000, Section 3.1. Uncontolled emission factors for natural gas fired gas turbines.
- CATEF Emission Factor Source - CARB CATEF database, emission factors for natural gas fired gas turbines (controlled or uncontrolled).
- Ammonia Emission Factor Source - Riverside RERC Units 1 & 2 AFC.
- Spreadsheet Revised 01/01/08.

Toxic Emission Estimates - Black Start IC Engine
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per engine):

Unit	Rating MMBTU	Load (%)	Hrs/Yr	Fuel (cfh)	Fuel (MMcfh)
ICE	1.04	100	54	1020	0.00102

Number of Engines: 1

Toxic Emissions Information:

Compound	Factor (lb/MMBtu)	Control Efficiency (%)	Emissions (per turbine)			Emissions (total)			Emission Factor Source
			(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)	
Particulate Matter	3.10E-01	0%	3.22E-01	1.74E+01	8.70E-03	3.22E-01	1.74E+01	8.70E-03	CARB E.O. (U-R001-0331)

Toxic Emission Estimates - Cooling Tower
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per cooling tower):

Unit	Rating (gpm)	Drift Rate (%)	TDS (ppm)	Hrs/Yr
Cooling Tower	5190	0.001	-	1230

Number of Cooling Tower: 1

Cooling Tower Toxic Emissions Information:

Compound	Concentration (ppmW)	Drift Rate (%)	Emissions (per tower)			Emissions (total)			Emission Factor Source
			(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)	
Arsenic	0.018	0.001	4.67E-07	5.75E-04	2.87E-07	4.67E-07	5.75E-04	2.87E-07	Typical Analysis
Cadmium	0.003	0.001	7.79E-08	9.58E-05	4.79E-08	7.79E-08	9.58E-05	4.79E-08	Typical Analysis
Chloride	0.201	0.001	5.22E-06	6.42E-03	3.21E-06	5.22E-06	6.42E-03	3.21E-06	Typical Analysis
Chromium	0.015	0.001	3.90E-07	4.79E-04	2.40E-07	3.90E-07	4.79E-04	2.40E-07	Typical Analysis
Chromium (hexavalent)	0.005	0.001	1.30E-07	1.60E-04	7.99E-08	1.30E-07	1.60E-04	7.99E-08	Typical Analysis
Copper	0.081	0.001	2.10E-06	2.59E-03	1.29E-06	2.10E-06	2.59E-03	1.29E-06	Typical Analysis
Dichloroethene	0.013	0.001	3.38E-07	4.15E-04	2.08E-07	3.38E-07	4.15E-04	2.08E-07	Typical Analysis
Lead	0.012	0.001	3.12E-07	3.83E-04	1.92E-07	3.12E-07	3.83E-04	1.92E-07	Typical Analysis
Manganese	0.054	0.001	1.40E-06	1.72E-03	8.62E-07	1.40E-06	1.72E-03	8.62E-07	Typical Analysis
Nickel	0.015	0.001	3.90E-07	4.79E-04	2.40E-07	3.90E-07	4.79E-04	2.40E-07	Typical Analysis
Trichloroethene	0.010	0.001	2.60E-07	3.19E-04	1.60E-07	2.60E-07	3.19E-04	1.60E-07	Typical Analysis
Zinc	0.321	0.001	8.34E-06	1.03E-02	5.13E-06	8.34E-06	1.03E-02	5.13E-06	Typical Analysis

Notes:
- Spreadsheet Revised 01/01/08.

PAH List

California Air Toxics Emission Factors Search Result

Download these data as a comma delimited file

ID	System Type	Material Type	SCC	APC Device	Other Description	CAS	Substance	Max Emission factor	Mean	Median	Unit
4674	Turbine	Natural gas	20200203	None	None	85-01-8	Phenanthrene	2.35E-03	3.13E-04	8.57E-05	lbs/MMcf
4689	Turbine	Natural gas	20200203	None	None	129-00-0	Pyrene	1.27E-04	2.77E-05	1.18E-05	lbs/MMcf
4559	Turbine	Natural gas	20200203	None	None	83-32-9	Acenaphthene	1.22E-04	1.90E-05	5.23E-06	lbs/MMcf
4564	Turbine	Natural gas	20200203	None	None	208-96-8	Acenaphthylene	8.25E-05	1.47E-05	2.88E-06	lbs/MMcf
4579	Turbine	Natural gas	20200203	None	None	120-12-7	Anthracene	1.53E-04	3.38E-05	9.38E-06	lbs/MMcf
4594	Turbine	Natural gas	20200203	None	None	56-55-6	Benzo(a) anthracene	1.34E-04	2.26E-05	3.61E-06	lbs/MMcf
4599	Turbine	Natural gas	20200203	None	None	50-32-8	Benzo(a)pyrene	9.16E-05	1.39E-05	2.57E-06	lbs/MMcf
4604	Turbine	Natural gas	20200203	None	None	205-99-2	Benzo(b) fluoranthene	6.72E-05	1.13E-05	2.87E-06	lbs/MMcf
4609	Turbine	Natural gas	20200203	None	None	192-97-2	Benzo(e)pyrene	7.33E-07	5.44E-07	4.63E-07	lbs/MMcf
4614	Turbine	Natural gas	20200203	None	None	191-24-2	Benzo(g,h,i) perylene	8.25E-05	1.37E-05	3.03E-06	lbs/MMcf
4619	Turbine	Natural gas	20200203	None	None	207-08-9	Benzo(k) fluoranthene	6.72E-05	1.10E-05	2.87E-06	lbs/MMcf
4624	Turbine	Natural gas	20200203	None	None	218-01-9	Chrysene	1.50E-04	2.52E-05	4.99E-06	lbs/MMcf
4659	Turbine	Natural gas	20200203	None	None	193-39-5	Indeno(1,2,3-cd) pyrene	1.34E-04	2.35E-05	2.87E-06	lbs/MMcf
4664	Turbine	Natural gas	20200203	None	None	91-20-3	Naphthalene	7.88E-03	1.66E-03	9.26E-04	lbs/MMcf
4629	Turbine	Natural gas	20200203	None	None	53-70-3	Dibenz(a,h) anthracene	1.34E-04	2.35E-05	3.03E-06	lbs/MMcf
4639	Turbine	Natural gas	20200203	None	None	206-44-0	Fluoranthene	3.05E-04	4.32E-05	1.07E-05	lbs/MMcf
4644	Turbine	Natural gas	20200203	None	None	86-73-7	Fluorene	4.58E-04	5.80E-05	1.56E-05	lbs/MMcf

* Natural Gas Fired Turbines
* Factors are lb/mmcf
* With or without control.

Table 3.1-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_X) AND CARBON MONOXIDE (CO) FROM STATIONARY GAS TURBINES

Emission Factors[a]				
Turbine Type	Nitrogen Oxides		Carbon Monoxide	
Natural Gas-Fired Turbines[b]	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating
Uncontrolled	3.2 E-01	A	8.2 E-02[d]	A
Water-Steam Injection	1.3 E-01	A	3.0 E-02	A
Lean-Premix	9.9 E-02	D	1.5 E-02	D
Distillate Oil-Fired Turbines[e]	(lb/MMBtu)[f] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[f] (Fuel Input)	Emission Factor Rating
Uncontrolled	8.8 E-01	C	3.3 E-03	C
Water-Steam Injection	2.4 E-01	B	7.6 E-02	C
Landfill Gas-Fired Turbines[g]	(lb/MMBtu)[h] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[h] (Fuel Input)	Emission Factor Rating
Uncontrolled	1.4 E-01	A	4.4 E-01	A
Digester Gas-Fired Turbines[j]	(lb/MMBtu)[k] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[k] (Fuel Input)	Emission Factor Rating
Uncontrolled	1.6 E-01	D	1.7 E-02	D

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".

[b] Source Classification Codes (SCCs) for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020.

[d] It is recognized that the uncontrolled emission factor for CO is higher than the water-steam injection and lean-premix emission factors, which is contrary to expectation. The EPA could not identify the reason for this behavior, except that the data sets used for developing these factors are different.

[e] SCCs for distillate oil-fired turbines include 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[f] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[g] SCC for landfill gas-fired turbines is 2-03-008-01.

[h] Emission factors based on an average landfill gas heating value of 400 Btu/scf at 60°F. To convert from (lb/MMBtu), to (lb/10^6 scf) multiply by 400.

[j] SCC for digester gas-fired turbine is 2-03-007-01.

[k] Emission factors based on an average digester gas heating value of 600 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf) multiply by 600.

Table 3.1-2a. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Pollutant	Emission Factors[a] - Uncontrolled			
	Natural Gas-Fired Turbines[b]		Distillate Oil-Fired Turbines[d]	
	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[e] (Fuel Input)	Emission Factor Rating
CO_2[f]	110	A	157	A
N_2O	0.003[g]	E	ND	NA
Lead	ND	NA	1.4 E-05	C
SO_2	0.94S[h]	B	1.01S[h]	B
Methane	8.6 E-03	C	ND	NA
VOC	2.1 E-03	D	4.1 E-04[j]	E
TOC[k]	1.1 E-02	B	4.0 E-03[l]	C
PM (condensible)	4.7 E-03[l]	C	7.2 E-03[l]	C
PM (filterable)	1.9 E-03[l]	C	4.3 E-03[l]	C
PM (total)	6.6 E-03[l]	C	1.2 E-02[l]	C

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.

[b] SCCs for natural gas-fired turbines include 2-01-002-01, 2-02-002-01 & 03, and 2-03-002-02 & 03.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. Similarly, these emission factors can be converted to other natural gas heating values.

[d] SCCs for distillate oil-fired turbines are 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[e] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[f] Based on 99.5% conversion of fuel carbon to CO_2 for natural gas and 99% conversion of fuel carbon to CO_2 for distillate oil. CO_2 (Natural Gas) [lb/MMBtu] = (0.0036 scf/Btu)(%CON)(C)(D), where %CON = weight percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight, and D = density of fuel. For natural gas, C is assumed at 75%, and D is assumed at 4.1 E+04 lb/10^6scf. For distillate oil, CO_2 (Distillate Oil) [lb/MMBtu] = (26.4 gal/MMBtu) (%CON)(C)(D), where C is assumed at 87%, and the D is assumed at 6.9 lb/gallon.

[g] Emission factor is carried over from the previous revision to AP-42 (Supplement B, October 1996) and is based on limited source tests on a single turbine with water-steam injection (Reference 5).

[h] All sulfur in the fuel is assumed to be converted to SO_2. S = percent sulfur in fuel. Example, if sulfur content in the fuel is 3.4 percent, then S = 3.4. If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines, and 3.3 E-02 lb/MMBtu for distillate oil turbines (the equations are more accurate).

[j] VOC emissions are assumed equal to the sum of organic emissions.

[k] Pollutant referenced as THC in the gathered emission tests. It is assumed as TOC, because it is based on EPA Test Method 25A.

[l] Emission factors are based on combustion turbines using water-steam injection.

Table 3.1-2b. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Emission Factors[a] - Uncontrolled				
Pollutants	Landfill Gas-Fired Turbines[b]		Digester Gas-Fired Turbines[d]	
	(lb/MMBtu)[c]	Emission Factor Rating	(lb/MMBtu)[e]	Emission Factor Rating
CO_2[f]	50	D	27	C
Lead	ND	NA	< 3.4 E-06[g]	D
PM-10	2.3 E-02	B	1.2 E-02	C
SO_2	4.5 E-02	C	6.5 E-03	D
VOC[h]	1.3 E-02	B	5.8 E-03	D

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.
[b] SCC for landfill gas-fired turbines is 2-03-008-01.
[c] Emission factors based on an average landfill gas heating value (HHV) of 400 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 400.
[d] SCC for digester gas-fired turbine include 2-03-007-01.
[e] Emission factors based on an average digester gas heating value of 600 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 600.
[f] For landfill gas and digester gas, CO_2 is presented in test data as volume percent of the exhaust stream (4.0 percent to 4.5 percent).
[g] Compound was not detected. The presented emission value is based on one-half of the detection limit.
[h] Based on adding the formaldehyde emissions to the NMHC.

Table 3.1-3. EMISSION FACTORS FOR HAZARDOUS AIR POLLUTANTS FROM NATURAL GAS-FIRED STATIONARY GAS TURBINES[a]

Emission Factors[b] - Uncontrolled		
Pollutant	Emission Factor (lb/MMBtu)[c]	Emission Factor Rating
1,3-Butadiene[d]	< 4.3 E-07	D
Acetaldehyde	4.0 E-05	C
Acrolein	6.4 E-06	C
Benzene[e]	1.2 E-05	A
Ethylbenzene	3.2 E-05	C
Formaldehyde[f]	7.1 E-04	A
Naphthalene	1.3 E-06	C
PAH	2.2 E-06	C
Propylene Oxide[d]	< 2.9 E-05	D
Toluene	1.3 E-04	C
Xylenes	6.4 E-05	C

[a] SCC for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. Hazardous Air Pollutants as defined in Section 112 (b) of the *Clean Air Act*.

[b] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. These emission factors can be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this heating value.

[d] Compound was not detected. The presented emission value is based on one-half of the detection limit.

[e] Benzene with SCONOX catalyst is 9.1 E-07, rating of D.

[f] Formaldehyde with SCONOX catalyst is 2.0 E-05, rating of D.

APPENDIX 6.1-D

GREENHOUSE GAS EMISSIONS INVENTORY
FOR
OPERATIONS AND CONSTRUCTION ACTIVITIES

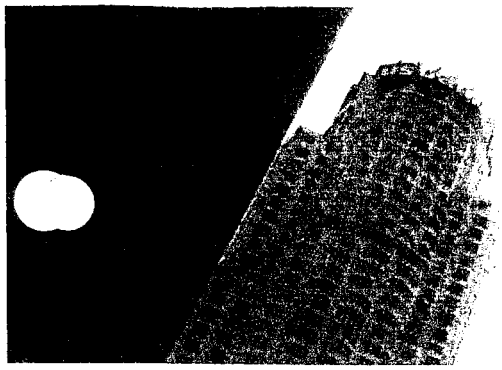
RERC 3 & 4
Greenhouse Gas Emission Inventory

Plant Operations (annual max emissions)

	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent(metric tons)
Turbines	MMBtu/yr	1,169,592	52.78	61,731	0.0059	7	0.0007	1	62,130
Black Start Diesel Engine	Gal/yr	3915	10.05	39	0.0003	0	0.0001	0	39
Total Annual on-site from Operations				**61,770**		**7**		**1**	**62,169**
			Climate Action Registry, Ver. 2.2, Table C.5		*Climate Action Registry, Ver. 2.2, Table C.6*		*Climate Action Registry, Ver. 2.2, Table C.6*		

Construction (project total)

On-site Diesel Fuel Consumption	Gal/yr	46,440	9.96	463	0.0003	0	0.0001	0	464
			Climate Action Registry, Ver. 2.2, Table C.3		*Climate Action Registry, Ver. 2.2, Table C.4 (similar Stationary Source)*		*Climate Action Registry, Ver. 2.2, Table C.4 (similar stationary source)*		
On-road vehicles									
Passenger	Miles	158,400		174	0.04	6	0.04	6	2,271
HD Trucks	Miles	7,875		19	0.06	0	0.05	0	151
				Construction emission workbook	*Climate Action Registry, Ver. 2.2, Table C.4*		*Climate Action Registry, Ver. 2.2, Table C.4*		
Total Construction Phase Emissions				**656**		**7**		**7**	**2,887**



California Climate Action Registry
515 S. Flower Street, Suite 1640
Los Angeles, CA 90071

California Climate Action Registry General Reporting Protocol

Reporting Entity-Wide Greenhouse Gas Emissions

Version 2.2 | March 2007

Emission Factors for Mobile Emissions

Table C.3: Carbon Dioxide Emission Factors for Transport Fuels (kg CO_2/gallon)

Fuel	kg CO_2/gallon
Aviation gasoline	8.24
Biodiesel	9.52
CA Low Sulfur Diesel	9.96
CA Reformulated gasoline, 5.7% ethanol	8.55
Crude Oil	10.14
Non-CA Diesel/Diesel No.2	10.05
Ethanol (E85)	6.10
Fischer Tropsch Diesel	9.13
Jet Fuel, Kerosene (Jet A or A-1)	9.47
Jet Fuel, Naphtha (Jet B)	9.24
Kerosene	9.67
Liquefied Natural Gas (LNG)	4.37
Liquefied Petroleum Gas (LPG)	5.92
Methanol	4.10
Motor Gasoline (Non CA and off-road)	8.78
Propane	5.67
Residual Oil	11.67
Fuels With Other Units Of Measure	
Natural Gas (CNG) per therm	5.28
Natural Gas (CNG) per gasoline gallon equivalent	6.86
Hydrogen per kg	0.0

Note: Emission factors are based on complete combustion and high heating value (HHV).
Source: California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999 (November 2002); Energy Information Administration, Emissions of Greenhouse Gases in the United States 2000, (2001), Table B1, page 140, see http://www.eia.doe.gov/oiaf/1605/ggrpt; propane and butane emission factors and fractions oxidized from U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, see http://www.epa.gov/ttn/chief/ap42/index.html. Methanol emission factor is calculated from the properties of the pure compounds; the fraction oxidized is assumed to be the same as for other liquid fuel.

Addendum to General Reporting Protocol, Version 2.2 (March 2007)

RE: Table C.5: *Carbon Dioxide Emission Factors and Oxidation Rates for Stationary Combustion*

It has come to our attention that some of the emission factors in the General Reporting Protocol Version 2.2 (GRP), Table C.5: *Carbon Dioxide Emission Factors and Oxidation Rates for Stationary Combustion,* are incorrect and do not match the emission factors in CARROT.

This is a typographical error in the GRP – a corrected version of Table C.5 is below. Please note that the "Adjusted kg CO_2/gallon" emission factors are correct below and match what is programmed into CARROT.

Fuel	Unadjusted kg CO_2/ MMBtu (CA)	Unadjusted kg CO_2/ MMBtu (US)	Unadjusted kg CO_2/ gallon	Fraction of Carbon Oxidized	Adjusted kg CO_2/ MMBtu (CA)	Adjusted kg CO_2/ MMBtu (US)	Adjusted kg CO_2/ gallon
Coal and Natural Gas							
Residential Coal	92.77	95.33	-	99.0%	91.8423	94.38	-
Commercial Coal	92.77	95.33	-	99.0%	91.8423	94.38	-
Industrial Coking Coal	-	93.72	-	99.0%	-	92.78	-
Industrial Other Coal	93.00	93.98	-	99.0%	92.07	93.04	-
Utility Coal	-	94.45	-	99.0%	-	93.51	-
Natural Gas	-	53.05	-	99.5%	-	52.78	-
Petroleum							
Distillate Fuel (Diesel)	-	73.15	10.15	99.0%	-	72.42	10.05
Kerosene	-	72.31	9.77	99.0%	-	71.59	9.67
Liquefied Petroleum Gas	-	62.30	5.95	99.0%	-	61.68	5.89
Motor Gasoline	-	70.91	8.87	99.0%	-	70.20	8.78
Reformulated Gasoline	-	70.43	8.64	99.0%	-	69.73	8.55
Residual Fuel	-	78.80	11.79	99.0%	-	78.01	11.67
Propane	-	-	5.70	99.5%	-	-	5.67
Butane	-	-	6.52	99.5%	-	-	6.49
Methanol (Neat)	-	-	4.11	99.0%	-	-	4.07
Crude Oil	-	74.18	10.24	99.0%	-	73.44	10.14
Still Gas	-	64.20	-	99.5%	-	63.88	-

Note: Unadjusted emission factors are based on complete (100%) combustion and high heating value (HHV). Adjusted emissions factors account for fraction of carbon oxidized. Emission factors for coking and utility coals are not given for California because they are not consumed in the state.

Sources: Emission factors are derived from: California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999 (November 2002); and Energy Information Administration, Emissions of Greenhouse Gases in the United States 2000 (2001), Table B1, page 140. Propane and butane emission factors and fractions oxidized from U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Methanol emission factor is calculated from the properties of the pure compounds; the fraction oxidized is assumed to be the same as for other liquid fuels.

Table C.6: Methane and Nitrous Oxide Emission Factors for Stationary Combustion by Sector and Fuel Type (kg/MMBTu)

NON-PETROLEUM FUELS			
Sector	**Fuel**	**kg CH_4/MMBtu**	**kg N_2O/MMBtu**
Industrial	Coal	0.0111	0.0016
	Petroleum	0.0022	0.0007
	Natural Gas	0.0059	0.0001
	Wood	0.0351	0.0047
Commercial/Institutional	Coal	0.0111	0.0016
	Petroleum	0.0111	0.0007
	Natural Gas	0.0059	0.0001
	Wood	0.3514	0.0047

PETROLEUM FUELS			
Sector	**Fuel**	**kg CH_4/gallon**	**kg N_2O/gallon**
Industrial	Distillate Fuel	0.0003	0.0001
	Kerosene	0.0003	0.0001
	Liquefied Petroleum Gas (LPG)	0.0002	0.0001
	Residual Fuel	0.0003	0.0001
Commercial/ Institutional	Distillate Fuel	0.0014	0.0001
	Kerosene	0.0014	0.0001
	Liquefied Petroleum Gas (LPG)	0.0010	0.0001
	Motor Gasoline	0.0013	0.0001
	Residual Fuel	0.0015	0.0001
Residential	Distillate Fuel	0.0014	0.0001
	Kerosene	0.0014	0.0001
	Liquefied Petroleum Gas (LPG)	0.0010	0.0001
	Motor Gasoline	0.0013	0.0001
	Propane	9.1 x 10-5	4.1 x 10-4
	Butane	9.1 x 10-5	4.1 x 10-4

Note: All emission factors have been converted to higher heating value (HHV), assuming LHV is 95% of HHV for coal and petroleum and is 90% of HHV for natural gas and wood.

Sources: Emission factors are derived from: U.S. EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000" (2002), Table C-2, page C-2. EPA obtained original emission factors from the Intergovernmental Panel on Climate Change, Revised IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual (1996), Tables 1-15 through 1-19, pages 1.53-1.57.

APPENDIX 6.1-E

EMISSIONS INVENTORY
FOR
CONSTRUCTION

RERC 3 & 4 Construction Emissions

(Due to existing site conditions, peak NOx and PM emissions Occur in January 2009)

January 2009

(Typical Activity - excavatiion, foundation, equipment / material delivery)

	NOx (lb/day)	CO (lb/day)	VOC (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Construction Equipment Combustion Emissions*	117.20	116.65	13.23	0.11	7.40	6.59
On-site Fugitive Emissions					17.05	3.58
Total Onsite Emissions	**117.20**	**116.65**	**13.23**	**0.11**	**24.45**	**10.17**
Passenger Vehicle - Combustion Emissions	1.21	11.62	1.19	0.01	0.10	0.06
Delivery Truck Combustion Emissions	8.72	7.86	1.09	0.01	3.14	0.27
Passenger Vehicle - Paved Road Dust					2.56	0.43
Delivery Truck - Paved Road Dust					42.09	7.11
Total Onroad Emissions	**9.93**	**19.49**	**2.28**	**0.02**	**47.89**	**7.88**
Total Daily Emissions	**127.13**	**136.14**	**15.51**	**0.14**	**72.35**	**18.05**

Project Total - November 2008 - October 2009

	NOx (lb/project)	CO (lb/project)	VOC (lb/project)	SOx (lb/project)	PM10 (lb/project)	PM2.5 (lb/project)
Construction Equipment Combustion Emissions*	9,652	15,597	1,145	10	657	585
On-site Fugitive Emissions					2,432	511
Total Onsite Emissions	**9,652**	**15,597**	**1,145**	**10**	**3,089**	**1,096**
Passenger Vehicle - Combustion Emissions	318	3,068	314	0	127	11
Delivery Truck Combustion Emissions	352	318	44	3	27	17
Passenger Vehicle - Paved Road Dust					676	114
Delivery Truck - Paved Road Dust					1,700	287
Total Onroad Emissions	**671**	**3,386**	**358**	**4**	**2,530**	**430**
Total Project Emissions	**10,323**	**18,983**	**1,503**	**14**	**5,619**	**1,525**

November 2008

(Typical Activiy - scraping, contouring)

	NOx (lb/day)	CO (lb/day)	VOC (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Construction Equipment Combustion Emissions*	43.34	15.92	2.94	0.04	1.94	1.73
On-site Fugitive Emissions					19.79	4.15
Total Onsite Emissions	**43.34**	**15.92**	**2.94**	**0.04**	**21.73**	**5.88**
Passenger Vehicle - Combustion Emissions	0.74	7.03	0.72	0.01	0.06	0.04
Delivery Truck Combustion Emissions	9.25	8.56	1.17	0.01	3.32	0.29
Passenger Vehicle - Paved Road Dust					1.42	0.24
Delivery Truck - Paved Road Dust					42.09	7.11
Total Onroad Emissions	**9.98**	**15.59**	**1.89**	**0.02**	**46.88**	**7.68**
Total Daily Emissions	**53.32**	**31.51**	**4.83**	**0.06**	**68.61**	**13.55**

* Construction equipment combustion emissions reflect total PM, rather than PM10.

City of Riverside ERC
Daily Maximum Construction-Related Emissions (lb/day)
January

	NOx	CO	VOC	SOx	PM10	PM2.5
Onsite Emissions	117.20	116.65	13.23	0.11	24.45	10.17
Onroad Emissions	9.93	19.49	2.28	0.02	47.89	7.88
Total Max. Pounds per Day	**127.13**	**136.14**	**15.51**	**0.14**	**72.35**	**18.05**

City of Riverside ERC
Total Construction-Related Emissions (lb/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Onsite Emissions	9652	15597	1145	10	3089	1095
Onroad Emissions	671	3386	358	4	2530	430
Total Pounds per Project	10323	18983	1503	14	5619	1525
Total Tons per Project	**5.2**	**9.5**	**0.8**	**0.01**	**2.8**	**0.8**

City of Riverside ERC
Daily Maximum Onsite Construction-Related Emissions (lb/day)
January

	NOx	CO	VOC	SOx	PM10	PM2.5
Construction Equipment Combustion Emissions	117.20	116.65	13.23	0.11	7.40	6.59
Unpaved Road Travel Fugitive PM Emissions					12.14	2.55
Grading / Bulldozing Fugitive PM Emissions					4.22	0.89
Earth Loading Fugitive PM Emissions					0.68	0.14
Disturbed Soil Wind Erosion PM Emissions					0.02	0.004
Total Max. Pounds per Day	**117.2**	**116.7**	**13.2**	**0.1**	**24.5**	**10.2**

City of Riverside ERC
Project On-site Construction Emissions
(lbs/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Construction Equipment Combustion Emissions	9652	15597	1145	10	657	584.60
Unpaved Road Travel Fugitive PM Emissions					2212	464.61
Grading / Bulldozing Fugitive PM Emissions					186	39.06
Earth Loading Fugitive PM Emissions					26	5.43
Disturbed Soil Wind Erosion PM Emissions					7	1.57
Granite Blasting						
Total Pounds per Project	**9652**	**15597**	**1145**	**10**	**3089**	**1095**
Total Tons per Project	**4.8**	**7.8**	**0.6**	**0.0**	**1.5**	**0.5**

City of Riverside ERC
January Project Off-site (Regional) Construction Emissions

(lbs / Day)

	NOx	CO	VOC	SOx	PM10	PM2.5
Passenger Vehicle - Combustion Emissions*	1.21	11.62	1.19	0.01	0.10	0.06
Delivery Truck Combustion Emissions*	8.72	7.86	1.09	0.01	3.14	0.27
Passenger Vehicle - Paved Road Dust					2.56	0.43
Delivery Truck - Paved Road Dust					42.09	7.11
Total Max. Pounds per Day	9.9	19.5	2.3	0.0	47.9	7.9

City of Riverside ERC
Project Off-site (Regional) Construction Emissions
(lbs / project and tons/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Passenger Vehicle - Combustion Emissions	318	3068	314	0	127	11
Delivery Truck Combustion Emissions	352	318	44	3	27	17
Passenger Vehicle - Paved Road Dust					676	114
Delivery Truck - Paved Road Dust					1700	287
Total Pounds per Project	671	3386	358	4	2530	430
Total Tons per Project	0.3	1.7	0.2	0.0	1.3	0.2

Monthly Site Construction Equipment Use
Riverside Energy Resource Center Units 3 and 4

						Nov-08			Dec-08			Jan-09			Feb-09			Mar-09	
Equipment	**Gasoline/ Diesel**	**Number of Units**	**Operating Hrs/Day Per Unit**	**Gals/Hr Per Unit**	**Total Fuel Use (Gals/day)**	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month
Truck Crane - Greater than 300 ton	D	1	5	7.50	37.50		0			0		10	375	37.5	15	562.5	37.5	10	375
Truck Crane - Greater than 200 ton	D	1	6	5.00	30.00		0			0			0		8	240	30	15	450
Crane - Mobile 65 ton	D	2	4	4.00	32.00		0			0		5	160	32	20	640	32	15	480
Cranes - Mobile 45 ton	D	1	4	4.00	16.00		0			0			0		5	80	16	5	80
Cranes - Mobile 35 ton	D	3	4	4.00	48.00		0		5	240	48	5	240	48	10	480	48	10	480
Bulldozer D10R	D	1	1	22.25	22.25	4	89	22.25		0			0			0			0
Bulldozer D4C	D	0	0	3.00	0.00		0			0			0			0			0
Excavator - Trencher (CAT320)	D	2	6	6.60	79.20		0		10	792	79.2	10	792	79.2	10	792	79.2	5	396
Excavator - Earth Scraper CAT 623	D	1	4	11.25	45.00	10	450	45		0			0			0			0
Excavator - Motor Grader (CAT140H)	D	1	4	6.00	24.00		0		8	192	24	8	192	24		0			0
Excavator - Backhoe/loader* Days per unit	D	3	4	2.50	30.00		0		22	660	30	15	450	30	15	450	30	10	300
Excavator - loader	D	2	4	5.00	40.00	10	400	40	10	400	40	10	400	40		0			0
Vibratory Roller	D	1	4	10.00	40.00		0			0			0			0			0
Portable Compaction Roller	D	1	4	10.00	40.00	5	200	40	12	480	40	5	200	40		0			0
Truck - Water	D	2	5	3.13	31.30	10	313	31.3	22	688.6	31.3	22	688.6	31.3	22	688.6	31.3	22	688.6
Forklift	D	5	5	2.50	62.50		0		10	625	62.5	22	1375	62.5	22	1375	62.5	22	1375
Dump Truck	D	1	1	3.13	3.13	10	31.3	3.13	22	68.86	3.13	22	68.86	3.13	5	15.65	3.13	5	15.65
Service Truck - 1 ton	D	2	0.5	1.56	1.56		0		22	34.32	1.56	22	34.32	1.56	22	34.32	1.56	10	15.6
Truck - Fuel/Lube	D	2	2	3.13	12.52	10	125.2	12.52	22	275.44	12.52	22	275.44	12.52	22	275.44	12.52	22	275.44
Concrete Pumper Truck	D	2	6	3.13	37.56		0		5	187.8	37.56	5	187.8	37.56	3	112.68	37.56		0
Tractor Truck 5th Wheel	D	1	3	3.13	9.39	5	46.95	9.39	22	206.58	9.39	5	46.95	9.39	10	93.9	9.39	10	93.9
Trucks - Pickup 3/4 ton	G	6	0.5	0.78	2.34	10	23.4	2.34	22	51.48	2.34	22	51.48	2.34	22	51.48	2.34	22	51.48
Trucks - 3 ton (vendors)	D	2	0.5	1.56	1.56	12	18.72	1.56	22	34.32	1.56	10	15.6	1.56	10	15.6	1.56	10	15.6
Diesel Powered Welder	D	3	4	1.27	15.24		0			0		22	335.28	15.24	22	335.28	15.24	22	335.28
Light Plants	D	4	3	1.27	15.24		0			0		10	152.4	15.24	10	152.4	15.24	5	76.2
Portable Compaction - Vibratory Plate	G	1	3	0.25	0.75		0		10	7.5	0.75	10	7.5	0.75	5	3.75	0.75	5	3.75
Portable Compaction - Vibratory Ram	D	1	3	0.25	0.75		0		10	7.5	0.75	10	7.5	0.75		0			0
Articulating Boom Platform	D	6	4	0.25	6.00		0			0		22	132	6	22	132	6	22	132
Pumps (will use elec.)	G	0	0	0.13	0.00		0			0			0			0			0
Air Compressor 185 CFM	D	1	6	1.27	7.62		0			0			0		22	167.64	7.62	15	114.3
Air Compressor 750 CFM	D	0	0	1.27	0.00		0			0			0			0			0
Concrete Vibrators (will use elec.)	D	0	0	0.25	0.00		0		0	0		0	0		0	0			0
Concrete Trowel Machine	D	1	2	1.27	2.54		0		5	12.7	2.54	5	12.7	2.54	3	7.62	2.54		0
Fusion Welder	D	0	0	1.27	0.00		0			0			0			0			0
Portable Power Generators	G	3	8	0.45	10.80		0		22	237.6	10.8	22	237.6	10.8	22	237.6	10.8	22	237.6
Total =					705		1698	207		5201.70	437.90		6438.03	544		6943	493		5991

Gasoline

Monthly Site Construction Equipment Use
Riverside Energy Resource Center Units 3 and 4

					Apr-09			May-09			Jun-09			Jul-09			Aug-09			S
Equipment	**Gasoline/ Diesel**	**Number of Units**	**Operating Hrs/Day Per Unit**	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days	Gal/ month	Gal/day	Days
Truck Crane - Greater than 300 ton	D	1	5	37.5	5	187.5	37.5		0			0			0			0		
Truck Crane - Greater than 200 ton	D	1	6	30	15	450	30	5	150	30		0			0			0		
Crane - Mobile 65 ton	D	2	4	32	10	320	32	5	160	32	5	160	32	5	160	32		0		
Cranes - Mobile 45 ton	D	1	4	16	5	80	16		0			0			0			0		
Cranes - Mobile 35 ton	D	3	4	48	10	480	48	10	480	48	5	240	48	5	240	48	5	240	48	5
Bulldozer D10R	D	1	1			0			0			0			0			0		
Bulldozer D4C	D	0	0			0			0			0			0			0		
Excavator - Trencher (CAT320)	D	2	6	79.2	5	396	79.2	5	396	79.2	5	396	79.2	5	396	79.2	5	396	79.2	
Excavator - Earth Scraper CAT 623	D	1	4			0			0			0			0			0		
Excavator - Motor Grader (CAT140H)	D	1	4			0		10	240	24		0			0			0		
Excavator - Backhoe/loader* Days per unit	D	3	4	30	10	300	30	5	150	30	5	150	30	5	150	30	5	150	30	
Excavator - loader	D	2	4			0			0			0			0			0		
Vibratory Roller	D	1	4			0			0			0			0			0		
Portable Compaction Roller	D	1	4			0		10	400	40	10	400	40		0			0		
Truck - Water	D	2	5	31.3	22	688.6	31.3	22	688.6	31.3	10	313	31.3	10	313	31.3	10	313	31.3	10
Forklift	D	5	5	62.5	22	1375	62.5	22	1375	62.5	10	625	62.5	10	625	62.5	10	625	62.5	10
Dump Truck	D	1	1	3.13		0			0			0		5	15.65	3.13		0		
Service Truck - 1 ton	D	2	0.5	1.56	10	15.6	1.56		0			0			0		4	6.24	1.56	4
Truck - Fuel/Lube	D	2	2	12.52	22	275.44	12.52	22	275.44	12.52		0			0		4	50.08	12.52	4
Concrete Pumper Truck	D	2	6			0			0			0			0			0		
Tractor Truck 5th Wheel	D	1	3	9.39	10	93.9	9.39		0			0			0			0		
Trucks - Pickup 3/4 ton	G	6	0.5	2.34	22	51.48	2.34	22	51.48	2.34	10	23.4	2.34	10	23.4	2.34	10	23.4	2.34	10
Trucks - 3 ton (vendors)	D	2	0.5	1.56		0		10	15.6	1.56	10	15.6	1.56	10	15.6	1.56	5	7.8	1.56	5
Diesel Powered Welder	D	3	4	15.24	22	335.28	15.24		0			0			0			0		
Light Plants	D	4	3	15.24		0			0			0			0			0		
Portable Compaction - Vibratory Plate	G	1	3	0.75	5	3.75	0.75	10	7.5	0.75	10	7.5	0.75		0			0		
Portable Compaction - Vibratory Ram	D	1	3			0			0			0			0			0		
Articulating Boom Platform	D	6	4	6		0			0			0			0			0		
Pumps (will use elec.)	G	0	0			0			0			0			0			0		
Air Compressor 185 CFM	D	1	6	7.62	15	114.3	7.62	15	114.3	7.62		0			0			0		
Air Compressor 750 CFM	D	0	0			0			0			0			0			0		
Concrete Vibrators (will use elec.)	D	0	0			0			0			0			0			0		
Concrete Trowel Machine	D	1	2			0			0			0			0			0		
Fusion Welder	D	0	0			0			0			0			0			0		
Portable Power Generators	G	3	8	10.8	22	237.6	10.8	22	237.6	10.8	10	108	10.8	10	108	10.8	10	108	10.8	5
Total =				453		5404	427		4742	413		2439	338		2047	301		1920	280	

Gasoline

Monthly Site Construction Equipment Use
Riverside Energy Resource Center Units 3 and 4

Equipment	Gasoline/ Diesel	Number of Units	Operating Hrs/Day Per Unit	ptember 009 Gal/ month	Gal/day	Days	Oct-09 Gal/ month	Gal/day	Days	Nov-09 Gal/ month	Gal/day	Total Project Fuel Use	Total Project Operating Hours
Truck Crane - Greater than 300 ton	D	1	5	0			0			0		1500	200
Truck Crane - Greater than 200 ton	D	1	6	0			0			0		1290	258
Crane - Mobile 65 ton	D	2	4	0			0			0		2080	520
Cranes - Mobile 45 ton	D	1	4	0			0			0		240	60
Cranes - Mobile 35 ton	D	3	4	240	48	5	240	48		0		3600	900
Bulldozer D10R	D	1	1	0			0			0		89	4
Bulldozer D4C	D	0	0	0			0			0		0	0
Excavator - Trencher (CAT320)	D	2	6	0			0			0		4752	720
Excavator - Earth Scraper CAT 623	D	1	4	0			0			0		450	40
Excavator - Motor Grader (CAT140H)	D	1	4	0		10	240	24		0		864	144
Excavator - Backhoe/loader* Days per unit	D	3	4	0			0			0		2760	1104
Excavator - loader	D	2	4	0		10	400	40		0		1600	320
Vibratory Roller	D	1	4	0		10	400	40		0		400	40
Portable Compaction Roller	D	1	4	0			0			0		1680	168
Truck - Water	D	2	5	313	31.3	10	313	31.3		0		6009.6	1920
Forklift	D	5	5	625	62.5	10	625	62.5		0		10625	4250
Dump Truck	D	1	1	0			0			0		215.97	69
Service Truck - 1 ton	D	2	0.5	6.24	1.56	4	6.24	1.56		0		152.88	98
Truck - Fuel/Lube	D	2	2	50.08	12.52	4	50.08	12.52		0		1928.08	616
Concrete Pumper Truck	D	2	6	0			0			0		488.28	156
Tractor Truck 5th Wheel	D	1	3	0			0			0		582.18	186
Trucks - Pickup 3/4 ton	G	6	0.5	23.4	2.34	10	23.4	2.34		0		449.28	576
Trucks - 3 ton (vendors)	D	2	0.5	7.8	1.56		0			0		162.24	104
Diesel Powered Welder	D	3	4	0			0			0		1341.12	1056
Light Plants	D	4	3	0			0			0		381	300
Portable Compaction - Vibratory Plate	G	1	3	0			0			0		41.25	165
Portable Compaction - Vibratory Ram	D	1	3	0			0			0		15	60
Articulating Boom Platform	D	6	4	0			0			0		396	1584
Pumps (will use elec.)	G	0	0	0			0			0		0	0
Air Compressor 185 CFM	D	1	6	0			0			0		510.54	402
Air Compressor 750 CFM	D	0	0	0			0			0		0	0
Concrete Vibrators (will use elec.)	D	0	0	0			0			0		0	0
Concrete Trowel Machine	D	1	2	0			0			0		33.02	26
Fusion Welder	D	0	0	0			0			0		0	0
Portable Power Generators	G	3	8	54	10.8		0			0		1803.6	4008
Total =				1320	171		2298	262		0	0	46440	20054

Gasoline

Site Combustion Emissions - January Construction Phase

			Base Factors g/bhp, If Tier 1 >50 hp (1)						Appendix A Table A3 Adjustment (2)						Adjustment (3)	Adjusted Factors					
Equipment	HP Cat	Tier	BSFC lb/hp-hr	NOx	CO	POC	SOx	PM10	Adj. Type	NOx	CO	POC	SOx	PM10	PM10 Fuel S	BSFC	NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Crawler Crane- Greater than 200 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Crane - Mobile 65 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Cranes -Mobile 45 ton	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	None	1	1	1	1	1	-0.086	0.367	5.65	0.87	0.34	0.0049	0.19
Cranes - Mobile 35 ton	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	None	1	1	1	1	1	-0.086	0.367	5.65	0.87	0.34	0.0049	0.19
Bulldozer D10R	300-600	1	0.367	6.0153	1.306	0.2025	0.00499	0.2008	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.71	2.00	0.21	0.0049	0.18
Bulldozer D4C	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	5.32	3.62	0.55	0.0055	0.49
Excavator- Trencher (CAT 320)	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Excavator- Earth Scraper	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Excavator-Motor Grader (CAT140H)	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Excavator- Backhoe/loader	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	6.16	6.08	1.19	0.0064	0.82
Excavator - loader (CAT928)	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Vibratory Roller	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Portable Compaction roller	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Truck- Water	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Forklift	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	5.32	3.62	0.55	0.0055	0.49
Dump Truck	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Service Truck- 1 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Truck- Fuel/Lube	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Concrete Pumper Truck	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Tractor Truck 5th Wheel	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Trucks- Pickup 3/4 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Trucks- 3 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Diesel Powered Welder	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.094	0.40	7.59	12.85	4.12	0.0062	1.48
Light Plants	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Portable Compaction- Vibratory Plate	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.095	0.408	6.90	5.00	1.80	0.0054	0.70
Portable Compaction- Vibratory Ram	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.095	0.408	6.90	5.00	1.80	0.0054	0.70
Articulating Boom Platforms	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	7.59	12.85	4.12	0.0063	1.46
Pumps	Gasoline	na	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Air Compressor 185 CFM	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Air Compressor 750 CFM	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Concrete Vibrators	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	6.56	7.65	1.89	0.0054	0.89
Concrete Trowel Machine	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	6.56	7.65	1.89	0.0054	0.89
Fusion Welder	25-50	1	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	7.59	12.85	4.12	0.0063	1.46
Portable Power Generators	Gasoline	na	Gasoline	10	400	2	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline

Site Combustion Emissions - January

Equipment	Tier	Adjusted factors lbs/gallon (4) NOx	CO	POC	SOx	PM10	Total Fuel Use (Gals/day)	Daily Emissions Lbs/day NOx	CO	POC	SOx	PM10	Total Fuel Use (Gals/project)	Total project Emissions Lbs/project (Based upon projected project fuel consumption) NOx	CO	POC	SOx	PM10
Truck Crane - Greater than 300 ton	1	237.87	31.88	13.16	0.21	7.09	37.5	8.92	1.20	0.49	0.01	0.27	1500	356.80	47.82	19.74	0.31	10.64
Truck Crane - Greater than 200 ton	1	237.87	31.88	13.16	0.21	7.09		0.00	0.00	0.00	0.00	0.00	1290	306.85	41.13	16.97	0.27	9.15
Crane - Mobile 65 ton	1	237.87	31.88	13.16	0.21	7.09	32	7.61	1.02	0.42	0.01	0.23	2080	494.76	66.31	27.37	0.43	14.75
Cranes - Mobile 45 ton	1	241.07	36.96	14.43	0.21	8.28		0.00	0.00	0.00	0.00	0.00	240	57.86	8.87	3.46	0.05	1.99
Cranes - Mobile 35 ton	1	241.07	36.96	14.43	0.21	8.28	48	11.57	1.77	0.69	0.01	0.40	3600	867.85	133.07	51.96	0.75	29.79
Bulldozer D10R	1	241.31	64.38	8.59	0.21	6.77		0.00	0.00	0.00	0.00	0.00	89	21.48	7.51	0.80	0.02	0.60
Bulldozer D4C	1	202.03	137.47	20.79	0.21	18.44		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Excavator - Trencher (CAT320)	1	226.75	56.00	15.00	0.21	10.88	79.2	17.96	4.43	1.19	0.02	0.86	4752	1077.51	266.09	71.30	0.99	51.68
Excavator - Earth Scraper CAT 623	1	223.74	48.29	13.68	0.21	9.43		0.00	0.00	0.00	0.00	0.00	450	100.68	21.73	6.16	0.09	4.24
Excavator - Motor Grader (CAT140H)	1	223.74	48.29	13.68	0.21	9.43	24	5.37	1.16	0.33	0.00	0.23	864	193.31	41.73	11.82	0.18	8.15
Excavator - Backhoe/loader* Days per u	1	200.23	197.65	38.81	0.21	26.63	30	6.01	5.93	1.16	0.01	0.80	2760	552.64	545.52	107.12	0.57	73.51
Excavator - loader	1	226.75	56.00	15.00	0.21	10.88	40	9.07	2.24	0.60	0.01	0.44	1600	362.80	89.60	24.01	0.33	17.40
Vibrstory Roller	1	226.75	56.00	15.00	0.21	10.88		0.00	0.00	0.00	0.00	0.00	400	90.70	22.40	6.00	0.08	4.35
Portable Compaction Roller	1	223.74	48.29	13.68	0.21	9.43	40	8.95	1.93	0.55	0.01	0.38	1680	375.88	81.14	22.98	0.35	15.85
Truck - Water	na	170.68	106.79	15.33	0.21	9.59	31.3	5.34	3.34	0.48	0.01	0.30	6009.6	1025.73	641.74	92.10	1.26	57.65
Forklift	1	202.03	137.47	20.79	0.21	18.44	62.5	12.63	8.59	1.30	0.01	1.15	10625	2146.60	1460.65	220.91	2.21	195.89
Dump Truck	na	170.68	106.79	15.33	0.21	9.59	3.13	0.53	0.33	0.05	0.00	0.03	215.97	36.86	23.06	3.31	0.05	2.07
Service Truck - 1 ton	na	74.40	59.47	5.57	0.21	4.83	1.56	0.12	0.09	0.01	0.00	0.01	152.88	11.38	9.09	0.85	0.03	0.74
Truck - Fuel/Lube	na	170.68	106.79	15.33	0.21	9.59	12.52	2.14	1.34	0.19	0.00	0.12	1323.09	320.09	200.89	29.55	0.40	18.50
Concrete Pumper Truck	na	170.68	106.79	15.33	0.21	9.59	37.56	6.41	4.01	0.58	0.01	0.36	488.28	83.34	52.14	7.48	0.10	4.68
Tractor Truck 5th Wheel	na	170.68	106.79	15.33	0.21	9.59	9.39	1.60	1.00	0.14	0.00	0.09	582.18	99.37	62.17	8.92	0.12	5.58
Trucks - Pickup 3/4 ton	na	62.81	677.30	46.28	0.27	1.56	2.34	0.15	1.58	0.11	0.00	0.00	449.28	28.22	304.30	20.79	0.12	0.70
Trucks - 3 ton (vendors)	na	74.40	59.47	5.57	0.21	4.83	1.56	0.12	0.09	0.01	0.00	0.01	162.24	12.07	9.65	0.90	0.03	0.78
Diesel Powered Welder	0	297.01	502.84	161.30	0.20	58.01	15.24	4.53	7.66	2.46	0.00	0.88	1341.12	398.32	674.37	216.32	0.27	77.80
Light Plants	0	270.01	195.66	70.44	0.21	27.64	15.24	4.11	2.98	1.07	0.00	0.42	381	102.87	74.55	26.84	0.08	10.53
Portable Compaction - Vibratory Plate	0	264.71	191.82	69.06	0.21	27.03	0.75	0.20	0.14	0.05	0.00	0.02	41.25	10.92	7.91	2.85	0.01	1.11
Portable Compaction - Vibratory Ram	0	264.71	191.82	69.06	0.21	27.03	0.75	0.20	0.14	0.05	0.00	0.02	15	3.97	2.88	1.04	0.00	0.41
Articulating Boom Platform	0	246.77	417.78	134.01	0.20	47.58	6	1.48	2.51	0.80	0.00	0.29	396	97.72	165.44	53.07	0.08	18.84
Pumps (will use elec.)	na	79.44	13813.38	748.58	0.27	2.35		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Air Compressor 185 CFM	0	270.01	195.66	70.44	0.21	27.64		0.00	0.00	0.00	0.00	0.00	510.54	137.85	99.89	35.96	0.11	14.11
Air Compressor 750 CFM	0	270.01	195.66	70.44	0.21	27.64		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Concrete Vibrators (will use elec.)	0	248.99	290.58	71.79	0.21	33.71		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Concrete Trowel Machine	0	248.99	290.58	71.79	0.21	33.71	2.54	0.63	0.74	0.18	0.00	0.09	33.02	8.22	9.59	2.37	0.01	1.11
Fusion Welder	0	246.77	417.78	134.01	0.20	47.58		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Portable Power Generators	0	144.44	5777.78	28.89	0.27	2.35	10.8	1.56	62.40	0.31	0.00	0.03	1803.6	260.52	10420.80	52.10	0.49	4.23
							544						46440					
							Totals	117.20	116.65	13.23	0.11	7.40		9652.17	15597.04	1145.05	9.80	658.85
							Lb/day						Tons/Project	4.83	7.80	0.57	0.00	0.33
													12-13 months					

(1) - Steady State Emission Factors from Table A2 of EPA November 2002 NR-009b Publication.
(2) - In use adjustment factors per Table A3 EPA November 2002 NR-009b Publication.
(3) - PM10 and SO2 adjustments due to Equation 5 and Equation 7 on pages 18 and 19, Respectively of EPA Report No. NR-009b
(4) - Calculation uses adjusted BSFC and assumed 7.1 lbs/gallon. The onroad and gasoline powered pump emission factors are not adjusted, except for SO2 adjusted for pumps per the gasoline powered 3/4 ton pickup value.

Emissions from On-Road Vehicle Travel - January Construction

Construction Vehicle (Mobile Source) Emission Factors

Vehicle Travel	CO	VOC	NOx	SOx	PM10	PM2.5	CO2
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Offsite (Heavy Duty Trucks - Diesel)	0.02016075	0.00278898	0.02236636	0.00002679	0.00805500	0.00069228	2.72330496
Offsite (Construction Worker Vehicle)	0.00968562	0.00099246	0.00100518	0.00001066	0.00008601	0.00005384	1.09755398

Source: SCAQMD Supplemental highest EMFAC2007 Emission Factor Summary, Match 2007

Construction Vehicle Number of Onroad Trips and Trip Length

Vehicle	No. of One-Way Trips/Day	No. of One-Way Trips/Project	One Way Trip Length (miles)
Offsite (Heavy Duty Trucks) material / equipment deliveries (150 total equip deliveries over 4 months, 75 equipment deliveries, 300 concrete deliveries. Only minimal material and equipment deliveries in November))	13	525	15
Offsite passenger (Construction Worker / visitor 30 avg workers over project life, 1.5 carpool rate, 30 workers in January, 10 visitor vehicless, 100 workers in max month	30	7920	20

Onroad Emissions - Daily Max.

	CO	VOC	NOx	SOx	PM10	PM2.5	CO2
Offsite (Heavy Duty Trucks - Diesel)	7.9	1.1	8.7	0.0	3.1	0.3	531.0
Offsite (Construction Worker, visitor Vehicle	11.6	1.2	1.2	0.0	0.1	0.1	658.5
Total Daily Onroad Emissions (lb/day)	19.5	2.3	9.9	0.0	3.2	0.3	1189.6

Onroad Emissions - Project Totals

	CO	VOC	NOx	SOx	PM10	PM2.5	CO2
Offsite (Heavy Duty Trucks - Diesel)	318	44	352	0	127	11	42892
Offsite (Construction Worker Vehicle)	3068	314	318	3	27	17	347705
Total Onroad Emissions (lb/project)	3386	358	671	4	154	28	390597

On-Site Fugitive Construction Emissions - January Construction Operations

On-site Vehicle Travel on Unpaved Roads - January

PM10 (lb) = VMT x F x (1-water suppression control efficiency)

$F = 2.1 \times (G/12) \times (H/30) \times ((I/3)^{0.7}) \times ((J/4)^{0.5}) \times ((365-K)/365)$ in lb/mile traveled

Truck Type		Trips or Hours / January Peak Day	Trips / Hours per Project	VMT/Trip or hour (onsite)	VMT/Day (onsite)	VMT/Project (onsite)	G (Silt Loading %)	H (Mean Vehicle Speed MPH)	I (Mean Vehicle Weight tons)	J (# Wheels)	K (# days/year w/ 0.01 inch precipitation)	F Uncontrolled Emission Factor (lb/VMT)	Daily Water Suppression Control Efficiency	Annual Water Suppression Control Efficiency	Peak Daily Emissions (lbs)	Project Emissions (lbs)
Dump Trucks (1 trucks 1 trips/day, 69 total trips per project. 300 ft off pavement round trip	round trips	1	69	0.057	0.057	3.920	13.2	5	22.7	10	10	2.44118	85%	85%	0.02	1.44
Service Trucks / Utility vehicles/ misc deliv. (2 trips / day, 184 total trips, 300 ft off pavement rpound trip average)	round trips	2	184	0.057	0.114	10	10.0	5	4	6	10	0.42494	85%	85%	0.01	0.67
Crew / Visitor Passenger Vehicles (10 employees during grading. 100 employees max in 6th month, 30 employees (average), 1.5 persons per vehicle 10 visitors/day remainder of project. 1000 ft off pavement round trip, average	round trips	77	7920	0.189	14.520	1500	10.0	10	2	4	10	0.42716	85%	85%	0.93	96.11
Tractor Trailer Trucks (heavy equipment / concrete deliveries) 18 trucks per day typ in Jan., 525 total trucks. 515 ft off pavement average round trip, avg vehicle wheels = 13.5	round trips	13	255	0.057	0.74	14	10.0	5	27	18	10	2.80155	85%	85%	0.31	6.09
Two water truck in motion an average 30 minutes per hour of combustion time, total 194 days of operation	hours	5	970	5	25	4850	13.2	5	29	10	10	2.89774	85%	85%	10.87	2108.11
Total															12.14	2212.41
				Roundtrip, Water Truck VMT reflects project Excavation. Other vehicles - estimated average round trip distance from fence to on-site destination			*Untreated surface = 13.2, for scraper from LOR report, crushed granite = 10*	*SCAQMD CEQA Table A-9-9-D-2 for passenger, reasonable estimate for HD given small area*	*SCAQMD CEQA Table A9-9-D3 or actual known typical weights*	*SCAQMD CEQA Table A9-9-D3*	*SCAQMD CEQA A9-9-D-4 (drought SCAB)*					

** Roadway, source #3 region and source #2 region graveled after grading. Travel Distance to Area Source #3 = 2600 ft round trip. Service trucks to region 3.*

Note: Dirt pushing emission factors used below reflect both blade and tire emissions.

On-Site Fugitive Construction Emissions During Grading Operations - January

Dirt Pushing / Bulldozing Operations

$E = ((0.45 \times (((G)^{1.5})/((H)1.4))) \times I) * J*.75$

E = PM_{10} Emissions from Dirt Pushing
G = Silt content of aggregate in percent
H = Moisture Content of the surface material
I = 2.2046 - conversion factor from kg/hr to lb/hr
J = Hours of pushing operation per day
0.75 = PM10:PM15 per EPA AP-42 11.9, table 1

Truck Type	G (Silt Content %)	H (Moisture Content)	J (Hours of pushing operation/day)	Hours of pushing operation/ project	Daily PM_{10} Emissions (lb)	Project PM_{10} Emissions (lb)
Excavator - Motor Grader (CAT 140H) 75% pushing	7.2	15	3	108	0.97	46.71
Excavator - Backhoe/loader (Caterpillar 430D) 50% pushing	7.2	15	6	160	1.95	69.20
Excavator - Loader (Caterpillar 928 loader) 50% pushing	7.2	15	4	160	1.30	69.20
Bulldozer - D10 50% pushing	7.2	15	0	2	0.00	0.87
Scraper - 50% utilization	7.2	15	0	32	0.00	13.84
Total					4.22	185.99
Source:	LOR Sieve Tests	*SCAQMD CEQA Table A9-9-F-2*				

On-Site Fugitive Construction Emissions During Grading Operations - January

Wind Erosion

E = ((1.7 x [G/1.5] x [(365-H)/235] x [I/15]) x J) x (I-control efficiency)
\
E = PM_{10} Emissions from wind erosion in pounds per acre

Control Efficiency 68%

G = Silt content of aggregate in percent
H = Number of Days with ≥ 0.25 mm (0.01 inch) of precipitation per year
I = Percentage of time that unobstructed wind speed exceeds 12 mph or 5.4 mps at mean pile height
J = Fraction of Total Suspended Particulate which is estimated at 0.5

Location	G (Silt Content %)	H (# days >0.01 inch precipitation)	I (% of time wind speed >12 mph)	Number of days during project	Daily PM_{10} Emissions per Acre (lbs)	Daily PM_{10} Emissions (5 disturbed acres)	Project PM_{10} Emissions per Acre (lbs)	Project PM_{10} Emissions (5 acres)
3 acres acres	13.2	10	1.7	365	0.0041	0.020	1.496	7.479
Source:	LOR Sieve Tests	*SCAQMD CEQA Table A9-9-E-2 (worst case - SCAB /drought)*	*November time is 0 hours. Average for Oct - Dec is 0.92%. Selected annual average to be prudent*					

On-Site Fugitive Construction Emissions During Grading Operations - January

Dirt Loading/Piling

E = [0.00112 x ([(G/5)$^{1.3}$]/[(H/2)$^{1.4}$])] x [I/J]

E = PM_{10} Emissions from dirt loading/handling

	m/s	mph
G = Mean wind speed in miles per hour	1.894	4.24

H = Moisture content of surface material
I = Pounds of dir loaded or handled per day
J = 2,000; convert lbs of dirt to tons of dirt

Location	G (Mean wind speed mph)	H (Moisture content)	I (Lbs of dirt handled/day)	Number of days during project	Daily PM_{10} Emissions (lbs)	Project PM_{10} Emissions (lbs)
Loader Operations, load 1 truck per day (or to piles)	4.24	15	40,000	10	0.68	6.79
	High of October and November	*SCAQMD CEQA Table A9-9-G-1*				
Scraper Operations						19.09
				total	0.68	25.88
Source:		CARB CEIDARS 9-26-02				

Fugitive PM10 Emissions - Travel on Paved Roads - January

E = V x F

E = PM_{10} Emissions from travel on paved roads
V = Vehicle miles traveled = W x X
W = Travel distance in miles
X = Number of Vehicles
F = Emission factor for travel on paved roads (Table A9 -9-B-1 for passenger vehicles))

Vehicle Type	Total number of vehicles/day	Travel Distance (miles)	Total Number Vehicles / Project	Vehicle Miles Traveled / Day)	Vehicle Miles Traveled / project)	G (Paved Road silt content)	F (Emission Factor)	Daily PM_{10} Emissions (lbs)	Project PM_{10} Emissions (lbs)
Passenger vehicle	30	40	7920	1200	316800	na	0.0021	2.56	676
Truck	13	30	525	390	15750	0.0041	0.11	42.09	1,700
Source:						Per CURE Guidance RERC 1 & 2	SCAQMD CEQA Guide Table A9-9-B-1 Passenger - 5% local st, 5% collector st, 90% freeway		
						SCAQMD CEQA Table A-9-C-1, 5% local, 5% collector, 90% freeway			

Boulder Blasting		
Total Boulder Mass (Tons)	0	Per Contractor Estimate
Mass of Boulders to Break (Tons)	0	
Duration (days)	1	
Uncontrolled PM10 Factor (lb/ton)	0.0008	MDAQMD Permit Guidance for Mineral Extracting Industry Assumes wet drilling, no other controls

	lb/day Process to be done in October	lb/project
Blasting PM10	0	0

City of Riverside ERC
Daily Maximum Construction-Related Emissions (lb/day)
November

	NOx	CO	VOC	SOx	PM10	PM2.5
Onsite Emissions	43.34	15.92	2.94	0.04	21.73	5.88
Onroad Emissions	9.98	15.59	1.89	0.02	46.88	7.68
Total Max. Pounds per Day	**53.32**	**31.51**	**4.83**	**0.06**	**68.62**	**13.56**

City of Riverside ERC
Total Construction-Related Emissions (lb/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Onsite Emissions	9695	15606	1148	10	3101	1099
Onroad Emissions	723	3687	389	4	2537	430
Total Pounds per Project	10418	19294	1537	14	5638	1529
Total Tons per Project	**5.2**	**9.6**	**0.8**	**0.01**	**2.8**	**0.8**

City of Riverside ERC
Daily Maximum Onsite Construction-Related Emissions (lb/day)
November

	NOx	CO	VOC	SOx	PM10	PM2.5
Construction Equipment Combustion Emissions	43.34	15.92	2.94	0.04	1.94	1.73
Unpaved Road Travel Fugitive PM Emissions					11.45	2.40
Grading / Bulldozing Fugitive PM Emissions					4.38	0.92
Earth Loading Fugitive PM Emissions					3.95	0.83
Disturbed Soil Wind Erosion PM Emissions					0.02	0.004
Total Max. Pounds per Day	**43.3**	**15.9**	**2.9**	**0.0**	**21.7**	**5.9**

City of Riverside ERC
Project On-site Construction Emissions
(lbs/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Construction Equipment Combustion Emissions	9695	15606	1148	10	659	586.21
Unpaved Road Travel Fugitive PM Emissions					2212	464.61
Grading / Bulldozing Fugitive PM Emissions					196	41.24
Earth Loading Fugitive PM Emissions					26	5.43
Disturbed Soil Wind Erosion PM Emissions					7	1.57
Total Pounds per Project	**9695**	**15606**	**1148**	**10**	**3101**	**1099**
Total Tons per Project	**4.8**	**7.8**	**0.6**	**0.0**	**1.6**	**0.5**

City of Riverside ERC
November Project Off-site (Regional) Construction Emissions

(lbs / Day)

	NOx	CO	VOC	SOx	PM10	PM2.5
Passenger Vehicle	0.74	7.03	0.72	0.01	0.06	0.04
Delivery Truck	9.25	8.56	1.17	0.01	3.32	0.29
Passenger Vehicle - Paved Road Dust					1.42	0.24
Delivery Truck - Paved Road Dust					42.09	7.11
Total Max. Pounds per Day	10.0	15.6	1.9	0.0	46.9	7.7

City of Riverside ERC
Project Off-site (Regional) Construction Emissions
(lbs / project and tons/project)

	NOx	CO	VOC	SOx	PM10	PM2.5
Passenger Vehicle	349	3342	342	0	27	17
Delivery Truck	373	346	47	3	134	12
Passenger Vehicle - Paved Road Dust					676	114
Delivery Truck - Paved Road Dust					1700	287
Total Pounds per Project	723	3687	389	4	2537	430
Total Tons per Project	0.4	1.8	0.2	0.0	1.3	0.2

Site Combustion Emissions - November Grading Phase

			Base Factors g/bhp, if Tier 1 >50 hp (1)						Appendix A Table A3 Adjustment (2)						Adjustment (3)	Adjusted Factors					
Equipment	HP Cat	Tier	BSFC lb/hp-hr	NOx	CO	POC	SOx	PM10	Adj. Type	NOx	CO	POC	SOx	PM10	PM10 Fuel S	BSFC	NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Crawler Crane- Greater than 200 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Crane - Mobile 65 ton	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	None	1	1	1	1	1	-0.086	0.367	5.58	0.75	0.31	0.0049	0.17
Cranes -Mobile 45 ton	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	None	1	1	1	1	1	-0.086	0.367	5.65	0.87	0.34	0.0049	0.19
Cranes - Mobile 35 ton	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	None	1	1	1	1	1	-0.086	0.367	5.65	0.87	0.34	0.0049	0.19
Bulldozer D10R	300-600	1	0.367	6.0153	1.306	0.2025	0.00499	0.2008	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.71	2.00	0.21	0.0049	0.16
Bulldozer D4C	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	5.32	3.62	0.55	0.0055	0.49
Excavator- Trencher (CAT 320)	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Excavator- Earth Scraper	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Excavator-Motor Grader (CAT140H)	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Excavator- Backhoe/loader	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	6.16	6.08	1.19	0.0064	0.82
Excavator - loader (CAT928)	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Vibratory Roller	100-175	1	0.367	5.6523	0.8667	0.3384	0.00499	0.2799	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.37	1.33	0.36	0.0049	0.26
Portable Compaction roller	175-300	1	0.367	5.5772	0.7475	0.3085	0.00499	0.2521	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.087	0.371	5.30	1.14	0.32	0.0049	0.22
Truck- Water	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Forklift	50-100	1	0.408	5.5988	2.3655	0.5213	0.00555	0.473	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	5.32	3.62	0.55	0.0055	0.49
Dump Truck	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Service Truck- 1 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Truck- Fuel/Lube	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Concrete Pumper Truck	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Tractor Truck 5th Wheel	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Trucks- Pickup 3/4 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Trucks- 3 ton	Onroad	na	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad	Onroad
Diesel Powered Welder	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.094	0.40	7.59	12.85	4.12	0.0052	1.48
Light Plants	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Portable Compaction- Vibratory Plate	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.095	0.408	6.90	5.00	1.80	0.0054	0.70
Portable Compaction- Vibratory Ram	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.095	0.408	6.90	5.00	1.80	0.0054	0.70
Articulating Boom Platforms	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	7.59	12.85	4.12	0.0063	1.46
Pumps	Gasoline	na	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Air Compressor 185 CFM	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Air Compressor 750 CFM	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	None	1	1	1	1	1	-0.094	0.40	6.90	5.00	1.80	0.0053	0.71
Concrete Vibrators	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	6.56	7.65	1.89	0.0054	0.89
Concrete Trowel Machine	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	Hi LF	0.95	1.53	1.05	1.01	1.23	-0.096	0.412	6.56	7.65	1.89	0.0054	0.89
Fusion Welder	25-50	0	0.408	6.9	5	1.8	0.00555	0.8	Lo LF	1.1	2.57	2.29	1.18	1.97	-0.113	0.481	7.59	12.85	4.12	0.0063	1.46
Portable Power Generators	Gasoline	na	Gasoline	10	400	2	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline

Site Combustion Emissions - November Grading Phase

Equipment	Tier	Adjusted factors lbs/gallon (4) NOx	CO	POC	SOx	PM10	Total Fuel Use (Gals/day)	Daily Emissions Lbs/day (November - High Fuel Consumption Earthmoving Phase) NOx	CO	POC	SOx	PM10	Total Fuel Use (Gals/project)	Total project Emissions Lbs/project (Based upon projected project fuel consumption) NOx	CO	POC	SOx	PM10
Truck Crane - Greater than 300 ton	1	237.87	31.88	13.16	0.21	7.09		0.00	0.00	0.00	0.00	0.00	1500	356.80	47.82	19.74	0.31	10.64
Truck Crane - Greater than 200 ton	1	237.87	31.88	13.16	0.21	7.09		0.00	0.00	0.00	0.00	0.00	1290	306.95	41.13	16.97	0.27	9.15
Crane - Mobile 65 ton	1	237.87	31.88	13.16	0.21	7.09		0.00	0.00	0.00	0.00	0.00	2080	494.76	66.31	27.37	0.43	14.75
Cranes - Mobile 45 ton	1	241.07	36.96	14.43	0.21	8.28		0.00	0.00	0.00	0.00	0.00	240	57.86	8.87	3.46	0.05	1.99
Cranes - Mobile 35 ton	1	241.07	36.96	14.43	0.21	8.28		0.00	0.00	0.00	0.00	0.00	3600	867.85	133.07	51.96	0.75	29.79
Bulldozer D10R	1	241.31	84.38	8.98	0.21	6.77	22.25	5.37	1.88	0.20	0.00	0.15	89	21.48	7.51	0.80	0.02	0.60
Bulldozer D4C	1	202.03	137.47	20.79	0.21	18.44		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Excavator - Trencher (CAT320)	1	226.75	56.00	15.00	0.21	10.88		0.00	0.00	0.00	0.00	0.00	4752	1077.51	266.09	71.30	0.99	51.68
Excavator - Earth Scraper CAT 623	1	223.74	48.29	13.68	0.21	9.43	45	10.07	2.17	0.62	0.01	0.42	450	100.68	21.73	6.16	0.09	4.24
Excavator - Motor Grader (CAT140H)	1	223.74	48.29	13.68	0.21	9.43		0.00	0.00	0.00	0.00	0.00	1056	236.27	51.00	14.44	0.22	9.96
Excavator - Backhoe/loader* Days per u	1	200.23	197.65	38.81	0.21	26.63		0.00	0.00	0.00	0.00	0.00	2760	552.64	545.52	107.12	0.57	73.51
Excavator - loader	1	226.75	56.00	15.00	0.21	10.88	40	9.07	2.24	0.60	0.01	0.44	1600	362.80	89.59	24.01	0.33	17.40
Vibratory Roller	1	226.75	56.00	15.00	0.21	10.88		0.00	0.00	0.00	0.00	0.00	400	90.70	22.40	6.00	0.08	4.35
Portable Compaction Roller	1	223.74	48.29	13.68	0.21	9.43	40	8.95	1.93	0.55	0.01	0.38	1680	375.88	81.14	22.98	0.35	15.85
Truck - Water	na	170.68	106.79	15.33	0.21	9.59	31.3	5.34	3.34	0.48	0.01	0.30	6009.6	1025.73	641.74	92.10	1.26	57.65
Forklift	1	202.03	137.47	20.79	0.21	18.44		0.00	0.00	0.00	0.00	0.00	10625	2146.60	1460.65	220.91	2.21	195.89
Dump Truck	na	170.68	106.79	15.33	0.21	9.59	3.13	0.53	0.33	0.05	0.00	0.03	215.97	36.86	23.06	3.31	0.05	2.07
Service Truck - 1 ton	na	74.40	59.47	5.57	0.21	4.83		0.00	0.00	0.00	0.00	0.00	152.88	11.38	9.09	0.85	0.03	0.74
Truck - Fuel/Lube	na	170.68	106.79	15.33	0.21	9.59	12.52	2.14	1.34	0.19	0.00	0.12	1928.08	329.09	205.89	29.55	0.40	18.50
Concrete Pumper Truck	na	170.68	106.79	15.33	0.21	9.59		0.00	0.00	0.00	0.00	0.00	488.28	83.34	52.14	7.48	0.10	4.68
Tractor Truck 5th Wheel	na	170.68	106.79	15.33	0.21	9.59	9.39	1.60	1.00	0.14	0.00	0.09	582.18	99.37	62.17	8.92	0.12	5.58
Trucks - Pickup 3/4 ton	na	62.81	677.30	46.28	0.27	1.56	2.34	0.15	1.58	0.11	0.00	0.00	449.28	28.22	304.30	20.79	0.12	0.70
Trucks - 3 ton (vendors)	na	74.40	59.47	5.57	0.21	4.83	1.56	0.12	0.09	0.01	0.00	0.01	162.24	12.07	9.65	0.90	0.03	0.78
Diesel Powered Welder	0	297.01	502.84	161.30	0.20	58.01		0.00	0.00	0.00	0.00	0.00	1341.12	398.32	674.37	216.32	0.27	77.80
Light Plants	0	270.01	195.66	70.44	0.21	27.64		0.00	0.00	0.00	0.00	0.00	381	102.87	74.55	26.84	0.08	10.53
Portable Compaction - Vibratory Plate	0	264.71	191.82	69.06	0.21	27.03		0.00	0.00	0.00	0.00	0.00	41.25	10.92	7.91	2.85	0.01	1.11
Portable Compaction - Vibratory Ram	0	264.71	191.82	69.06	0.21	27.03		0.00	0.00	0.00	0.00	0.00	15	3.97	2.88	1.04	0.00	0.41
Articulating Boom Platform	0	246.77	417.78	134.01	0.20	47.58		0.00	0.00	0.00	0.00	0.00	396	97.72	165.44	53.07	0.08	18.84
Pumps (will use elec.)	na	79.44	13613.38	748.58	0.27	2.35		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Air Compressor 185 CFM	0	270.01	195.66	70.44	0.21	27.64		0.00	0.00	0.00	0.00	0.00	510.54	137.85	99.89	35.96	0.11	14.11
Air Compressor 750 CFM	0	270.01	195.66	70.44	0.21	27.64		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Concrete Vibrators (will use elec.)	0	248.99	290.58	71.79	0.21	33.71		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Concrete Trowel Machine	0	248.99	290.58	71.79	0.21	33.71		0.00	0.00	0.00	0.00	0.00	33.02	8.22	9.59	2.37	0.01	1.11
Fusion Welder	0	246.77	417.78	134.01	0.20	47.58		0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
Portable Power Generators	0	144.44	5777.78	28.89	0.27	2.35		0.00	0.00	0.00	0.00	0.00	1803.6	260.52	10420.80	52.10	0.49	4.23
							207						46632					
							Totals	43.34	15.92	2.94	0.04	1.94		9695.13	15606.31	1147.68	9.84	658.66
							Lb/day						Tons/Project	4.85	7.80	0.57	0.00	0.33
													12-13 months					

(1) - Steady State Emission Factors from Table A2 of EPA November 2002 NR-009b Publication.
(2) - In use adjustment factors per Table A3 EPA November 2002 NR-009b Publication.
(3) - PM10 and SO2 adjustments due to Equation 5 and Equation 7 on pages 18 and 19, Respectively of EPA Report No. NR-009b
(4) - Calculation uses adjusted BSFC and assumed 7.1 lbs/gallon. The onroad and gasoline powered pump emission factors are not adjusted, except for SO2 adjusted for pumps per the gasoline powered 3/4 ton pickup value.

On-Site Fugitive Construction Emissions During Grading Operations - November

On-site Vehicle Travel on Unpaved Roads

PM10 (lb) = VMT x F x (1-water suppression control efficiency)

$F = 2.1 \times (G/12) \times (H/30) \times ((I/3)^{0.7}) \times ((J/4)^{0.5}) \times ((365-K)/365)$ in lb/mile traveled

Truck Type		Trips or Hours / November Peak Day	Trips / Hours per Project	VMT/Trip or hour (onsite)	VMT/Day (onsite)	VMT/Project (onsite)	G (Silt Loading %)	H (Mean Vehicle Speed MPH)	I (Mean Vehicle Weight tons)	J (# Wheels)	K (# days/year w/ 0.01 inch precipitation)	F Uncontrolled Emission Factor (lb/VMT)	Daily Water Suppression Control Efficiency	Annual Water Suppression Control Efficiency	Peak November Daily Emissions (lbs)	Project Emissions (lbs)
Dump Trucks (1 trucks 1 trips/day, 69 total trips per project. 300 ft off pavement round trip	round trips	1	69	0.057	0.057	3.920	13.2	5	22.7	10	10	2.44118	85%	85%	0.02	1.44
Service Trucks / Utility vehicles/ misc deliv. (2 trips / day, 184 total trips, 300 ft off pavement rpound trip average)	round trips	2	184	0.057	0.114	10	10.0	5	4	6	10	0.42494	85%	85%	0.01	0.67
Crew / Visitor Passenger Vehicles (10 employees during grading. 30 employees (average), 1.5 persons per vehicle 10 visitors/day remainder of project. 1000 ft off pavement round trip, average	round trips	20	7920	0.189	3.788	1500	10.0	10	2	4	10	0.42716	85%	85%	0.24	96.11
Tractor Trailer Trucks (heavy equipment / concrete deliveries) 3 trucks per day in Nov., 525 total trucks. 515 ft off pavement average round trip	round trips	13	255	0.057	0.74	14	10.0	5	27	18	10	2.80155	85%	85%	0.31	6.09
Two water truck in motion an average 30 minutes per hour of combustion time, total 194 days of operation	hours	5	970	5	25	4850	13.2	5	29	10	10	2.89774	85%	85%	10.87	2108.11
Total															11.45	2212.41
				Roundtrip, Water Truck VMT reflects project Excavation. Other vehicles - estimated average round trip distance from fence to on-site destination			*Untreated surface = 13.2, for scraper from LOR report, crushed granite = 10*	*SCAQMD CEQA Table A-9-9-D-2 for passenger, reasonable estimate for HD given small area*	*SCAQMD CEQA Table A9-9-D3 or actual known typical weights*	*SCAQMD CEQA Table A9-9-D3*	*SCAQMD CEQA A9-9-D-4 (drought SCAB)*					

** Roadway, source #3 region and source #2 region graveled after grading. Travel Distance to Area Source #3 = 2600 ft round trip. Service trucks to region 3.*

Note: Dirt pushing emission factors used below reflect both blade and tire emissions.

On-Site Fugitive Construction Emissions During Grading Operations - November

Dirt Pushing / Bulldozing Operations

$E = ((0.45 \times (((G)^{1.5})/((H)1.4))) \times I) * J*.75$

E = PM_{10} Emissions from Dirt Pushing
G = Silt content of aggregate in percent
H = Moisture Content of the surface material
I = 2.2046 - conversion factor from kg/hr to lb/hr
J = Hours of pushing operation per day
0.75 = PM10:PM15 per EPA AP-42 11.9, table 1

Truck Type	G (Silt Content %)	H (Moisture Content)	J (Hours of pushing operation/day)	Hours of pushing operation/ project	Daily PM_{10} Emissions (lb)	Project PM_{10} Emissions (lb)
Excavator - Motor Grader (CAT 140H) 75% pushing	7.2	15	3	132	0.97	57.09
Excavator - Backhoe/loader (Caterpillar 430D) 50% pushing	7.2	15	6	160	1.95	69.20
Excavator - Loader (Caterpillar 928 loader) 50% pushing	7.2	15	4	160	1.30	69.20
Bulldozer - D10 50% pushing	7.2	15	0.5	2	0.16	0.87
Total					4.38	196.37
Source:	LOR Sieve Tests	*SCAQMD CEQA Table A9-9-F-2*				

On-Site Fugitive Construction Emissions During Grading Operations - November

Wind Erosion

E = ((1.7 x [G/1.5] x [(365-H)/235] x [I/15]) x J) x (I-control efficiency)
\
E = PM_{10} Emissions from wind erosion in pounds per acre

Control Efficiency 68%

G = Silt content of aggregate in percent
H = Number of Days with ≥ 0.25 mm (0.01 inch) of precipitation per year
I = Percentage of time that unobstructed wind speed exceeds 12 mph or 5.4 mps at mean pile height
J = Fraction of Total Suspended Particulate which is estimated at 0.5

Location	G (Silt Content %)	H (# days >0.01 inch precipitation)	I (% of time wind speed >12 mph)	Number of days during project	Daily PM_{10} Emissions per Acre (lbs)	Daily PM_{10} Emissions (5 disturbed acres)	Project PM_{10} Emissions per Acre (lbs)	Project PM_{10} Emissions (5 acres)
3 acres	13.2	10	1.7	365	0.0041	0.020	1.496	7.479
Source:	LOR Sieve Tests	*SCAQMD CEQA Table A9-9-E-2 (worst case - SCAB /drought)*	*November time is 0 hours. Average for Oct - Dec is 0.92% Selected annual average to be prudent.*					

On-Site Fugitive Construction Emissions During Grading Operations - November

Dirt Loading/Piling

E = [0.00112 x ([(G/5)$^{1.3}$]/[(H/2)$^{1.4}$])] x [I/J]

E = PM_{10} Emissions from dirt loading/handling

	m/s	mph
G = Mean wind speed in miles per hour	1.894	4.24

H = Moisture content of surface material
I = Pounds of dir loaded or handled per day
J = 2,000; convert lbs of dirt to tons of dirt

Location	G (Mean wind speed mph)	H (Moisture content)	I (Lbs of dirt handled/day)	J (Lbs dirt handled / project)	Daily PM_{10} Emissions (lbs)	Project PM_{10} Emissions (lbs)
Loader Operations, load 3 trucks per day (or to piles)	4.24	15	120,000	400000	2.04	6.79
	High of October and November	*SCAQMD CEQA Table A9-9-G-1*				
Scraper Operations Uncontrolled PM10 (lb/day) = 0.21 lb/ton-mile x tons moved x miles moved * (1-0.68 control efficiency) (MRI, Improvement of Specific Emission Factors (BACM Project #1, March 29, 1996)		Avg. Haul Distance (Miles)	Tons of dirt handled per /day)	Number of days during project	Daily PM_{10} Emissions (lbs)	Project PM_{10} Emissions (lbs)
		0.095	300	10	1.91	19.09
				total	3.95	25.88
Source:						

Fugitive PM10 Emissions - Travel on Paved Roads - November

E = V x F

E = PM_{10} Emissions from travel on paved roads
V = Vehicle miles traveled = W x X
W = Travel distance in miles
X = Number of Vehicles
F = Emission factor for travel on paved roads (Table A9 -9-B-1 for passenger vehicles))

Vehicle Type	Total number of vehicles/day	Travel Distance (miles)	Total Number Vehicles / Project	Vehicle Miles Traveled / Day)	Vehicle Miles Traveled / project)	G (Paved Road silt content)	F (Emission Factor)	Daily PM_{10} Emissions (lbs)	Project PM_{10} Emissions (lbs)
Passenger vehicle	17	40	7920	667	316800	na	0.0021	1.42	676
Truck	13	30	525	390	15750	0.0041	0.11	42.09	1,700
Source:						SCAQMD CEQA Table A-9-C-1, 5% local, 5% collector, 90% freeway, w/ CURE adjustments per RERC 1 & 2	SCAQMD CEQA Guide Table A9-9-B-1 Passenger - 5% local st, 5% collector st, 90% freeway		

Boulder Blasting		
Total Boulder Mass (Tons)	0	Per Contractor Estimate
Mass of Boulders to Break (Tons)	0	
Duration (days)	1	
Uncontrolled PM10 Factor (lb/ton)	0.0008	MDAQMD Permit Guidance for Mineral Extracting Industry Assumes wet drilling, no other controls

	lb/day	lb/project
	Process to be done in October	
Blasting PM10	0	0

Emissions from On-Road Vehicle Travel - November

Construction Vehicle (Mobile Source) Emission Factors

Vehicle Travel	CO	VOC	NOx	SOx	PM10 Exh.	PM2.5	CO2
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Offsite (Heavy Duty Trucks - Diesel)	0.021949150	0.002992700	0.023712580	0.000025660	0.008507000	0.000739330	2.719434000
Offsite (Construction Worker Vehicle)	0.010548440	0.001079190	0.001102880	0.000010750	0.000085050	0.000052930	1.099532260

Source: SCAQMD's peak EMFAC2002 V2.2, 2008

Construction Vehicle Number of Onroad Trips and Trip Length

Vehicle	No. of One-Way Trips/Day	No. of One-Way Trips/Project	One Way Trip Length (miles)
Offsite (Heavy Duty Trucks) material / equipment deliveries (150 total equip deliveries over 4 months, 75 equipment deliveries, 300 concrete deliveries. Only minimal material and equipment deliveries in November))	13	525	15
Offsite passenger (Construction Worker / visitor 30 avg workers over project life, 1.5 carpool rate, 10 workers in November, 10 visitor vehicless	17	7920	20

Onroad Emissions - Daily Max.

	CO	VOC	NOx	SOx	PM10	PM2.5	CO2
Offsite (Heavy Duty Trucks - Diesel)	8.6	1.2	9.2	0.010	3.3	0.29	530.3
Offsite (Construction Worker, visitor Vehicle	7.0	0.7	0.7	0.01	0.06	0.04	366.5
Total Daily Onroad Emissions (lb/day)	15.6	1.9	10.0	0.02	3.4	0.3	896.8

Onroad Emissions - Project Totals

	CO	VOC	NOx	SOx	PM10	PM2.5	CO2
Offsite (Heavy Duty Trucks - Diesel)	346	47	373	0.4	134	12	42,831
Offsite (Construction Worker Vehicle)	3342	342	349	3	27	17	348,332
Total Onroad Emissions (lb/project)	3687	389	723	4	161	28	391,163

RERC 3 & 4
Greenhouse Gas Emission Inventory

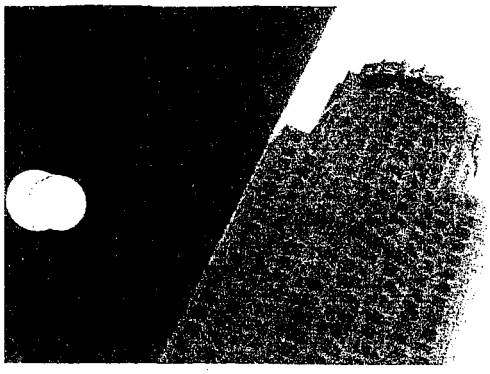
Plant Operations (annual max emissions)

	Units	Fuel Rate (units/yr)	CO_2 rate (kg/fuel unit)	CO_2/yr (metric tons)	CH_4 rate (kg/fuel unit)	CH_4/yr (metric tons)	N_2O rate (kg/fuel unit)	N_2O/yr (metric tons)	CO_2equivalent(metric tons)
Turbines	MMBtu/yr	1,169,592	52.78	61,731	0.0059	7	0.0007	1	62,130
Black Start Diesel Engine	Gal/yr	3915	10.05	39	0.0003	0	0.0001	0	39
Total Annual on-site from Operations				**61,770**		**7**		**1**	**62,169**
			Climate Action Registry, Ver. 2.2, Table C.5		*Climate Action Registry, Ver. 2.2, Table C.6*		*Climate Action Registry, Ver. 2.2, Table C.6*		

Construction (project total)

On-site Diesel Fuel Consumption	Gal/yr	46,440	9.96	463	0.0003	0	0.0001	0	464
			Climate Action Registry, Ver. 2.2, Table C.3		*Climate Action Registry, Ver. 2.2, Table C.4 (similar Stationary Source)*		*Climate Action Registry, Ver. 2.2, Table C.4 (similar stationary source)*		
On-road vehicles									
Passenger	Miles	158,400		174	0.04	6	0.04	6	2,271
HD Trucks	Miles	7,875		19	0.06	0	0.05	0	151
				Construction emission workbook	*Climate Action Registry, Ver. 2.2, Table C.4*		*Climate Action Registry, Ver. 2.2, Table C.4*		
Total Construction Phase Emissions				**656**		**7**		**7**	**2,887**

2248.2206xls3 - GHG, Feb. 2008



California Climate Action Registry
515 S. Flower Street, Suite 1640
Los Angeles, CA 90071

California Climate Action Registry General Reporting Protocol

Reporting Entity-Wide Greenhouse Gas Emissions

Version 2.2 | March 2007

Emission Factors for Mobile Emissions

Table C.3: Carbon Dioxide Emission Factors for Transport Fuels (kg CO_2/gallon)

Fuel	kg CO_2/gallon
Aviation gasoline	8.24
Biodiesel	9.52
CA Low Sulfur Diesel	9.96
CA Reformulated gasoline, 5.7% ethanol	8.55
Crude Oil	10.14
Non-CA Diesel/Diesel No.2	10.05
Ethanol (E85)	6.10
Fischer Tropsch Diesel	9.13
Jet Fuel, Kerosene (Jet A or A-1)	9.47
Jet Fuel, Naphtha (Jet B)	9.24
Kerosene	9.67
Liquefied Natural Gas (LNG)	4.37
Liquefied Petroleum Gas (LPG)	5.92
Methanol	4.10
Motor Gasoline (Non CA and off-road)	8.78
Propane	5.67
Residual Oil	11.67
Fuels With Other Units Of Measure	
Natural Gas (CNG) per therm	5.28
Natural Gas (CNG) per gasoline gallon equivalent	6.86
Hydrogen per kg	0.0

Note: Emission factors are based on complete combustion and high heating value (HHV).
Source: California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999 (November 2002); Energy Information Administration, Emissions of Greenhouse Gases in the United States 2000, (2001), Table B1, page 140, see http://www.eia.doe.gov/oiaf/1605/ggrpt; propane and butane emission factors and fractions oxidized from U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, see http://www.epa.gov/ttn/chief/ap42/index.html. Methanol emission factor is calculated from the properties of the pure compounds; the fraction oxidized is assumed to be the same as for other liquid fuel.

Addendum to General Reporting Protocol, Version 2.2 (March 2007)

RE: Table C.5: *Carbon Dioxide Emission Factors and Oxidation Rates for Stationary Combustion*

It has come to our attention that some of the emission factors in the General Reporting Protocol Version 2.2 (GRP), Table C.5: *Carbon Dioxide Emission Factors and Oxidation Rates for Stationary Combustion,* are incorrect and do not match the emission factors in CARROT.

This is a typographical error in the GRP – a corrected version of Table C.5 is below. Please note that the "Adjusted kg CO_2/gallon" emission factors are correct below and match what is programmed into CARROT.

Fuel	Unadjusted kg CO_2/ MMBtu (CA)	Unadjusted kg CO_2/ MMBtu (US)	Unadjusted kg CO_2/ gallon	Fraction of Carbon Oxidized	Adjusted kg CO_2/ MMBtu (CA)	Adjusted kg CO_2/ MMBtu (US)	Adjusted kg CO_2/ gallon
Coal and Natural Gas							
Residential Coal	92.77	95.33	-	99.0%	91.8423	94.38	-
Commercial Coal	92.77	95.33	-	99.0%	91.8423	94.38	-
Industrial Coking Coal	-	93.72	-	99.0%	-	92.78	-
Industrial Other Coal	93.00	93.98	-	99.0%	92.07	93.04	-
Utility Coal	-	94.45	-	99.0%	-	93.51	-
Natural Gas	-	53.05	-	99.5%	-	52.78	-
Petroleum							
Distillate Fuel (Diesel)	-	73.15	10.15	99.0%	-	72.42	10.05
Kerosene	-	72.31	9.77	99.0%	-	71.59	9.67
Liquefied Petroleum Gas	-	62.30	5.95	99.0%	-	61.68	5.89
Motor Gasoline	-	70.91	8.87	99.0%	-	70.20	8.78
Reformulated Gasoline	-	70.43	8.64	99.0%	-	69.73	8.55
Residual Fuel	-	78.80	11.79	99.0%	-	78.01	11.67
Propane	-	-	5.70	99.5%	-	-	5.67
Butane	-	-	6.52	99.5%	-	-	6.49
Methanol (Neat)	-	-	4.11	99.0%	-	-	4.07
Crude Oil	-	74.18	10.24	99.0%	-	73.44	10.14
Still Gas	-	64.20	-	99.5%	-	63.88	-

Note: Unadjusted emission factors are based on complete (100%) combustion and high heating value (HHV). Adjusted emissions factors account for fraction of carbon oxidized. Emission factors for coking and utility coals are not given for California because they are not consumed in the state.

Sources: Emission factors are derived from: California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999 (November 2002); and Energy Information Administration, Emissions of Greenhouse Gases in the United States 2000 (2001), Table B1, page 140. Propane and butane emission factors and fractions oxidized from U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Methanol emission factor is calculated from the properties of the pure compounds; the fraction oxidized is assumed to be the same as for other liquid fuels.

Table C.6: Methane and Nitrous Oxide Emission Factors for Stationary Combustion by Sector and Fuel Type (kg/MMBTu)

NON-PETROLEUM FUELS			
Sector	**Fuel**	**kg CH_4/MMBtu**	**kg N_2O/MMBtu**
Industrial	Coal	0.0111	0.0016
	Petroleum	0.0022	0.0007
	Natural Gas	0.0059	0.0001
	Wood	0.0351	0.0047
Commercial/Institutional	Coal	0.0111	0.0016
	Petroleum	0.0111	0.0007
	Natural Gas	0.0059	0.0001
	Wood	0.3514	0.0047

PETROLEUM FUELS			
Sector	**Fuel**	**kg CH_4/gallon**	**kg N_2O/gallon**
Industrial	Distillate Fuel	0.0003	0.0001
	Kerosene	0.0003	0.0001
	Liquefied Petroleum Gas (LPG)	0.0002	0.0001
	Residual Fuel	0.0003	0.0001
Commercial/ Institutional	Distillate Fuel	0.0014	0.0001
	Kerosene	0.0014	0.0001
	Liquefied Petroleum Gas (LPG)	0.0010	0.0001
	Motor Gasoline	0.0013	0.0001
	Residual Fuel	0.0015	0.0001
Residential	Distillate Fuel	0.0014	0.0001
	Kerosene	0.0014	0.0001
	Liquefied Petroleum Gas (LPG)	0.0010	0.0001
	Motor Gasoline	0.0013	0.0001
	Propane	9.1 x 10-5	4.1 x 10-4
	Butane	9.1 x 10-5	4.1 x 10-4

Note: All emission factors have been converted to higher heating value (HHV), assuming LHV is 95% of HHV for coal and petroleum and is 90% of HHV for natural gas and wood.

Sources: Emission factors are derived from: U.S. EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000" (2002), Table C-2, page C-2. EPA obtained original emission factors from the Intergovernmental Panel on Climate Change, Revised IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual (1996), Tables 1-15 through 1-19, pages 1.53-1.57.

APPENDIX 6.1-F

AIR DISPERSION MODELING AND AIR QUALITY IMPACT ASSESSMENT FOR OPERATIONS

APPENDIX 6.1-F
AIR DISPERSION MODELING AND AIR QUALITY IMPACT ASSESSMENT FOR CONSTRUCTION ACTIVITIES

6.1-F.1 Introduction

This section describes the air quality modeling results, in both magnitude and spatial extent, of estimated ground level concentrations resulting from emissions from the Riverside Energy Resource Center (RERC). Maximum modeled concentrations were added to the maximum background concentrations to calculate total impacts for the proposed project and entire facility (as described later) for comparison to state and national ambient air quality standards (AAQS).

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described in herein. All input and output modeling files are contained on a CD-ROM disk provided to the California Energy Commission (CEC) Staff and the South Coast Air Quality Management District (SCAQMD) under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the SCAQMD and presented to SCAQMD in air quality modeling protocols. A number of minor changes to the information presented in the air quality modeling protocols were required due to recent revisions in USEPA modeling guidance since the protocols were prepared (i.e., AERMOD Implementation Guide, revised January 9, 2008, and the AERSURFACE User's Guide (EPA-454/B-08-001) for the new USEPA program AERSURFACE released in January 2008. Also, in order to assess compliance with the recently revised state AAQSs for NO_2, distance-dependant NO_2/NO_X ratios given by the SCAQMD ("Final Localized Significance Threshold Methodology," June 2003, Pages 2-8 to 2-9) were used to assess 1-hour NO_2 impacts using an EXCEL spreadsheet of the PLOTFILE model output.

6.1-F.2 Primary Dispersion Model Selection and Options

For modeling the potential impact of the project in terrain that is both below and above stack top (defined as simple terrain when the terrain is below stack top and complex terrain when it is above stack top), the USEPA model AERMOD (version 07026) was used as well as the latest versions of the AERMOD preprocessors to determine surface characteristics (AERSURFACE version 08009), to process meteorological data (AERMET version 06341), and to determine receptor slope factors (AERMAP version 06341). The purpose of the AERMOD modeling analysis was to evaluate compliance with the California state and national AAQS.
The surface meteorological data processed for AERMOD was five recent years (2000-2004) of ASOS data from the Riverside Airport (located very close to the project site). Riverside Airport ASOS data were downloaded from the National Climatic Data Center (NCDC) website in unformatted hourly local climatological data (ULCD) format, converted to SAMSON format using the Russ Lee freeware program NCDC_CNV, missing data were interpolated as allowed by USEPA procedures, and ASOS variable winds were filled in as much as possible. These surface data were combined with upper air data from Miramar (also downloaded from the NCDC website) for the same time period.

As part of the input requirements into AERMET and AERMOD, a land use classification must be made. The area surrounding both the project site and the meteorological monitoring location was determined to be primarily urban (commercial/industrial and compact residential areas)

following the methods outlined by the Auer land use classification method (i.e., considering the land use within a 3-kilometer radius). As part of the AERMET input requirements, Albedo, Bowen Ratio, and Surface Roughness must be classified by season. These values were determined with the AERSURFACE program recently made available by USEPA using the latest USEPA guidance described above AERMOD input data options are listed below. Use of these options follows the USEPA's (November, 2005) modeling guidance, SDAPCD guidance, and/or sound scientific practice. An explanation of these options and the rationale for their selection is provided below.

- Default model option[1] for temperature gradients, wind profile exponents, and calm processing which includes final plume rise, stack-tip downwash, and elevated receptor terrain heights option;
- Urban characteristics based on the U.S. Census Bureau estimates of 2006 population for the Riverside city area (293761 persons, since the project area is separated by relatively unpopulated areas due to significant terrain features from San Bernardino and Los Angeles Counties included in the Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA) and Los Angeles-Long Beach-Riverside Consolidated MSA.
- All sources were modeled as urban sources to consider the urban heat island effects.

6.1-F.3 Additional Dispersion Models/Programs

Several other USEPA models and programs were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations. The models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274) and SCREEN3 (version 96043) for fumigation impacts. As mentioned above, 1-hour NO_2 impacts were calculated using EXCEL spreadsheets of the PLOTFILE outputs of 1-hour NO_X impacts and the SCAQMD distance-dependant NO_2/NO_X ratios.

6.1-F.4 Good Engineering Practice Stack Height Analysis

Good engineering practice (GEP) stack height was calculated by BPIP-PRIME as 112.5 feet for the proposed and existing turbines and cooling tower and 107.5 feet for the black-start engine based on structure and building dimensions. The design stack heights are 80 feet, approximately 46 feet, and 25 feet for the turbines, cooling tower cells, and black-start engine, respectively. Since these heights do not exceed formula GEP stack height, the stacks meet GEP guidance and can be modeled at their full heights. Also, since these heights are less than formula GEP stack heights, downwash effects were included in the modeling analysis. Again, BPIP-PRIME was used to generate the wind-direction-specific building dimensions for input into AERMOD. The attached building location plan shows the buildings and structures included in the downwash analysis.

6.1-F.5 Receptor Grid Selection and Coverage

Receptor and source base elevations were determined from the U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data using the 7½-minute format data (10-meter spacing between grid nodes). All coordinates were referenced to UTM North American Datum

---

[1]To reduce run times for the area source modeled for fugitive dust and the large number of point sources modeled for mobile combustion source equipment, the TOXICS keyword was used for modeling construction impacts.

1927 (NAD27), zone 11. Except for property fenceline receptors[2], receptor locations and elevations from the DEM files will be placed exactly on the DEM nodes. Every effort was made to maintain receptor spacing across DEM file boundaries.
Cartesian coordinate receptor grids are used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. The receptor grids used in this analysis are as follows:

- 10-meter resolution from the project fenceline and extending outwards in all directions 500 meters. This is called the downwash grid. In addition, receptors were placed at approximately 10-meter intervals along the property fenceline.
- 50-meter resolution that extends outwards from the edge of the downwash grid to 2 kilometers (km) in all directions. This is referred to as the intermediate grid.
- 200-meter resolution that extends outwards from the edge of the intermediate grid to 10 km from the facility in all directions. This is referred to as the coarse grid.
- 10-meter resolution around any location on the coarse and intermediate grids where a maximum impact is modeled that is above the concentrations on the downwash grid. In the modeling analyses, maximum 1-hour and 24-hour impacts due primarily to turbine emissions occurred in the intermediate grid south of the downwash grid (and 8-hour impacts due to turbine emissions occurred near the southern edge of the downwash grid). Therefore, impacts for 1-hour, 8-hour, and 24-hour averaging times were modeled with an additional 10-meter receptor grid referred to as the refined receptor grid.

Concentrations within the facility fenceline will not be calculated. The attached receptor grid figure displays the receptors grids used in the modeling assessment. The attached building location plan shows the property fenceline.

6.1-F.6 Meteorological Data Selection

The meteorological data for AERMOD were the ASOS data measured at the Riverside Airport just south of the facility location. Due to its proximity, these data are considered to be representative of the dispersion conditions for the project site. AERSURFACE runs for the project site and meteorological data locations give very similar results and confirm this. Five recent years (2000-2004) of hourly surface data were combined with concurrent upper air data from Miramar using the AERMET program. Because of the relatively homogeneous land use surrounding the meteorological data site, one 360-degree sector (to a distance of one km) was selected for Surface Roughness (USEPA guidance for Albedo and Bowen Ratio assumes one large ten km area for these parameters).

As part of the input requirements for AERMET/AERMOD, Albedo, Bowen Ratio, and Surface Roughness must be classified by season. These values were calculated with AERSURFACE for the meteorological data location (Riverside Airport) using recent USEPA guidance for the sizes of area selected and averaging used for each parameter. AERSURFACE was executed for arid conditions using dry conditions for spring, summer, and fall seasons and average conditions for the winter season. Since southern California has a Mediterranean-type climate, the summer results output by AERSURFACE for arid/dry conditions were applied to spring and summer seasons and the fall results output by AERSURFACE for arid/dry conditions and

---

[2] And sensitive receptors included in the construction impacts modeling of combustion sources for the Health Risk Assessment.

arid/average conditions were applied to the fall and winter seasons, respectively. The final results are shown below.

TABLE F-1
Riverside Airport Seasonal Parameters for AERMET

Month	Albedo	Bowen Ratio	Surface Roughness
Winter = Dec-Feb	0.18	1.23	0.153
Spring = Mar-May	0.18	2.12	0.153
Summer = Jun-Aug	0.18	2.12	0.153
Fall (Autumn) = Sep-Nov	0.18	2.72	0.153

6.1-F.7 AERMOD Screening Analysis Inputs/Results

Operational characteristics of the two proposed turbines, such as emission rates, exit velocity, and exit temperature, vary by operating load and ambient temperature. A screening modeling analysis, using AERMOD and one year of hourly meteorology (2004) was performed for the 100 percent load (with and without chiller), 75 percent load, and 50 percent load conditions in order to determine the turbine operating condition that will result in the highest modeled concentrations for averaging periods of 24-hours or less. These conditions were considered for three ambient temperature conditions: 40°F (a cold winter day), 59°F (annual average conditions), and 100°F (a hot summer day). For annual averagint times, 100% load conditions for the 59°F ambient temperatures (assumed to represent annual average conditions) were modeled (i.e., for chiller on and chiller off). The results of the load screening analysis are attached. The screening analysis shows that the worst-case load and ambient temperature condition is 100 percent load with the chiller on at 100°F for short-term averaging times and 100 percent load with the chiller off at 59°F for annual averaging times. Start-up, shutdown, and commissioning turbine NO_x and CO impacts were modeled with stack characteristics for the worst-case 1-hour screening condition (i.e., 100 percent load with chiller on at 100°F).

6.1-F.8 AERMOD Refined Analysis Inputs

Facility sources, including the black-start engine, were modeled in the analysis for comparisons with Significant Impact Levels (SILs) and CAAQS/NAAQS, as necessary. As described elsewhere, the proposed project consists of two new turbines (and one three-cell cooling tower for PM emissions). The existing facility consists of two turbines, a three-cell cooling tower (for PM emissions), and a black-start engine. All refined impact runs were executed for two source groups. The proposed project consisting of the two proposed turbines and new cooling tower for PM emissions was one source group. The entire facility (i.e., four turbines, black-start engine, and both cooling towers for PM emissions) was the second source group. Modeling was executed first for the regular receptor grids - i.e., downwash and property fenceline (10m), intermediate (50m), and coarse (200m) receptor grids covering all areas within 10 km of the facility. Maximum impacts for 1-hour and 24-hour averaging times (due to turbines) were predicted to occur in the 50m receptor grid (and 8-hour turbine impacts occurred near the edge of the downwash grid). Therefore, for 1-hour, 8-hour, and 24-hour averaging times, all pollutants were remodeled with a 10m REFINED receptor grid that enclosed all areas where Top-50 impacts occurred outside the 10m regular receptor grid. PM_{10} impacts for the two new turbines only (i.e., without the proposed cooling tower) for determining impacts in relation to SCAQMD 1309.1 for sources less than 500 MW in Zone 3 and not in an Environmental Justice (EJ) area were ratioed from the SO_2 impacts. As described

above, 1-hour NO_2 impacts were calculated using the SCAQMD distance-dependant NO_2/NO_X ratios ("Final Localized Significance Threshold Methodology," June 2003, Pages 2-8 to 2-9) to assess compliance with the new state 1-hour NO_2 AAQS.

For the turbines, start-up and shutdown emissions were also accounted for in the refined analysis for all short-term (24-hours or less) and long-term (annual) averages in the air quality modeling. Start-up of all four turbines (i.e., both the two proposed and the two existing turbines) was assumed to occur in a single hour for determining 1-hour NO_X and CO impacts. For 8-hour CO impacts, two startups and two shutdowns (of one hour each) and four hours of normal operating conditions were assumed to occur for all four turbines. Annual emission estimates already include emissions from start-up, shutdown, and maintenance activities. For commissioning activities, one new turbine (Turbine T4) was assumed to be commissioned for 1-hour (NO_X and CO impacts) or all 8-hours (CO impacts) with the other three turbines operating under normal operating conditions.

The worst-case modeling input information for each pollutant and averaging period are shown in Table F-2 for normal operating conditions, turbine startup/shutdown conditions, and turbine commissioning. As discussed above, the combustion turbine stack parameters used in modeling the impacts for each pollutant and averaging period reflected the worst-case operating condition for that pollutant and averaging period identified in the load screening analysis. Stack parameters associated with operation at 100 percent load with the fogger off at the average temperature of 59°F were used in modeling annual average impacts.

TABLE F-2
Stack Parameters and Emission Rates for Refined Modeling Analysis

	Stack Height (m)	Stack Temp. (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s)[a]			
					NO_X	SO_2	CO	$PM_{10/2.5}$
Averaging Period: 1-hour for Normal Operating Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	0.5223	0.0350	0.8295	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	0.5670	0.0353	0.8295	–
Black-Start Engine	7.620	718.71	53.083	0.3048	0.8177	5.04E-4	0.2482	–
Averaging Period: 3-hours for Normal Operating Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	–	0.0350	–	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	–	0.0353	–	–
Black-Start Engine	7.620	718.71	53.083	0.3048	–	1.68E-4	–	–
Averaging Period: 8-hours for Normal Operating Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	–	–	0.8295	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	–	–	0.8295	–
Black-Start Engine	7.620	718.71	53.083	0.3048	–	–	0.0310	–
Averaging Period: 24 hours for Normal Operating Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	–	0.0350	–	0.3779
Proposed Cooling Tower Cells (each)	14.000	310.15	6.725	4.2367	–	–	–	5.42E-5
Existing Turbines (each)	24.384	716.48	22.027	3.9624	–	0.0353	–	0.4032
Existing Cooling Tower Cells (each)	14.000	305.37	7.820	3.9624	–	–	–	1.26E-3
Black-Start Engine	7.620	718.71	53.083	0.3048	–	2.14E-5	–	0.00084
Averaging Period: Annual for Normal Operating Conditions[b]								
Proposed Turbines (each)	24.384	722.04	22.277	3.9624	0.0987	0.0049	–	0.0525
Proposed Cooling Tower Cells (each)	14.000	310.15	6.725	4.2367	–	–	–	7.67E-6
Existing Turbines (each)	24.384	716.48	22.027	3.9624	0.1237	0.0052	–	0.0561
Existing Cooling Tower Cells (each)	14.000	305.37	7.820	3.9624	–	–	–	1.91E-4
Black-Start Engine	7.620	718.71	53.083	0.3048	0.0101	6.21E-6	–	2.49E-4

Annual averaging periods include start-up/shutdown/maintenance emissions, where applicable

TABLE F-2 (concluded)
Stack Parameters and Emission Rates for Refined Modeling Analysis

	Stack Height (m)	Stack Temp. (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s)			
					NO_X	SO_2	CO	$PM_{10/2.5}$
Averaging Period: 1-hour for Turbine Start-up Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	1.3885	–	1.4616	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	2.0752	–	1.6632	–
Black-Start Engine	7.620	718.71	53.083	0.3048	0.8177	–	0.2482	–
Averaging Period: 8-hours for Turbine Start-up/Shutdown Conditions								
Proposed Turbines (each)	24.384	718.15	22.829	3.9624	–	–	1.1241	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	–	–	1.1827	–
Black-Start Engine	7.620	718.71	53.083	0.3048	–	–	0.0310	–
Averaging Period: 1-hour for Commissioning Single Proposed Turbine								
Proposed Turbine T3	24.384	718.15	22.829	3.9624	0.5223	–	0.8295	–
Proposed Turbine T4	24.384	718.15	22.829	3.9624	5.6902	–	5.8199	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	0.5670	–	0.8295	–
Black-Start Engine	7.620	718.71	53.083	0.3048	0.8177	–	0.2482	–
Averaging Period: 8-hours for Commissioning Single Proposed Turbine								
Proposed Turbine T3	24.384	718.15	22.829	3.9624	–	–	0.8295	–
Proposed Turbine T4	24.384	718.15	22.829	3.9624	–	–	5.8199	–
Existing Turbines (each)	24.384	716.48	22.027	3.9624	–	–	0.8295	–
Black-Start Engine	7.620	718.71	53.083	0.3048	–	–	0.0310	–

6.1-F.9 AERMOD Refined Analysis Results

Using the meteorological data, receptor grids, source characteristics, and model options described above, the AERMOD model was used to determine the magnitude and location of the maximum impacts for each pollutant and averaging period. In order to assess the significance of the modeled concentrations, the maximum concentrations were modeled and compared to the Class II Prevention of Significant Deterioration (PSD) Significant Impact Levels (SILs). In addition, impacts are added to maximum background concentrations and compared to the AAQS. Impacts are presented below for both the proposed project and for the entire facility.

Table F-3 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods for normal operations, for start-up/shutdown periods, and for initial commissioning activities **for the proposed project only (i.e., the two proposed turbines and the new cooling tower)**. All modeled pollutant concentrations for the proposed project are less than the SILs for those pollutants. This includes modeled impacts for normal operations, start-up/shutdown periods, and commissioning activities. Combined impacts (maximum proposed project impacts plus maximum background concentrations) are only greater than the AAQS for those pollutants and averaging times that the background concentrations are already greater than the AAQS. Since the proposed project impacts are less than SILs, emissions from the proposed project will not significantly affect the ambient air quality of the area.

TABLE F-3
Air Quality Impact Results for Refined Modeling Analysis of Proposed Project

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$)	($\mu g/m^3$)
Normal Operating Conditions							
NO_2	1-hour	1.685	172.7	174.4	-	338	-
	Annual	0.036	41.3	41.3	1	56	100
CO	1-hour	4.826	4571.4	4576.2	2000	23,000	40,000
	8-hour	1.779	3394.3	3396.1	500	10,000	10,000
SO_2	1-hour	0.204	52.2	52.4	-	655	-
	3-hour	0.108	41.8	41.9	25	-	1,300
	24-hour	0.033	39.2	39.2	5	105	365
	Annual	0.002	7.8	7.8	1	-	80
PM_{10}	24-hour	0.360	137.0	137.4	5	50	150
	Annual	0.019	64.0	64.0	1	20	-
PM_{10} Turbines Only	24-hour	0.359			5	SCAQMD 1309.1 SILs for sources <500 MW in Zone 3 and not in an EJ area	
	Annual	0.019			0.75		
$PM_{2.5}$	24-hour	0.360	98.7	99.1	-	-	35
	Annual	0.019	22.1	22.1	-	12	15
Start-up/Shutdown Periods							
NO_2	1-hour	4.479	172.7	177.2	-	338	-
CO	1-hour	8.504	4571.4	4579.9	2000	23,000	40,000
	8-hour	2.411	3394.3	3396.7	500	10,000	10,000
Commissioning Activities							
NO_2	1-hour	9.985	172.7	182.7	-	338	-
CO	1-hour	19.361	4571.4	4590.8	2000	23,000	40,000
	8-hour	6.773	3394.3	3401.1	500	10,000	10,000

Table F-4 summarizes maximum-modeled concentrations for each criteria pollutant and associated averaging periods for normal operations, for start-up/shutdown periods, and for initial commissioning activities **for the entire facility (i.e., all four turbines, both cooling towers, and the black-start engine)**. Again, combined impacts (maximum facility impacts plus maximum background concentrations) are only greater than the AAQS for those pollutants and averaging times where the background concentrations are already greater than the AAQS. This includes modeled impacts for normal operations, start-up/shutdown periods, and commissioning activities. For start-up/shutdown periods and commissioning activities, it was conservatively assumed that the black-start engine was also concurrently being tested. Again, since **proposed project** impacts are less than SILs, emissions from the proposed project will not significantly affect the ambient air quality of the area.

TABLE F-4
Air Quality Impact Results for Refined Modeling Analysis of Entire Facility

Pollutant	Avg. Period	Maximum Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total ($\mu g/m^3$)	Class II Significance Level ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS ($\mu g/m^3$)	($\mu g/m^3$)
Normal Operating Conditions							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
	Annual	0.100	41.3	41.4	1	56	100
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	3.674	3394.3	3398.0	500	10,000	10,000
SO_2	1-hour	0.411	52.2	52.6	-	655	-
	3-hour	0.209	41.8	42.0	25	-	1,300
	24-hour	0.063	39.2	39.3	5	105	365
	Annual	0.004	7.8	7.8	1	-	80
PM_{10}	24-hour	0.725	137.0	137.7	5	50	150
	Annual	0.040	64.0	64.0	1	20	-
$PM_{2.5}$	24-hour	0.725	98.7	99.4	-	-	35
	Annual	0.040	22.1	22.1	-	12	15
Start-up/Shutdown Periods							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	5.038	3394.3	3399.3	500	10,000	10,000
Commissioning Activities							
NO_2	1-hour	20.313	172.7	193.0	-	338	-
CO	1-hour	61.845	4571.4	4633.2	2000	23,000	40,000
	8-hour	8.438	3394.3	3402.7	500	10,000	10,000

6.1-F.10 Fumigation Impacts

A fumigation analysis with the USEPA Model SCREEN3 (version 96043) was conducted for inversion breakup fumigation impacts. Since the site location is greater than 3000 meters from any large body of water (like the Pacific Ocean), shoreline fumigation impacts are not expected to occur based on USEPA guidance given in "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised" (EPA-454/R-92-019).

Inversion breakup fumigation impacts of 1.027 micrograms/cubic meter ($\mu g/m^3$) for a unitized emission rate (1 gram/second, g/s) were predicted to occur at 18,621 meters from the turbine stacks (no inversion breakup fumigation impacts are predicted for the much shorter black-start engine stack). These results are predicted to occur by SCREEN3 for rural conditions of F stability and 2.5 m/s wind speeds at the stack release heights. Since the site vicinity is urban in nature, SCREEN3 impacts were evaluated in both rural and urban modes for the turbine stacks at the inversion breakup distance for all SCREEN3 meteorological conditions. At this distance, the maximum urban impact was 2.3833 times higher than the maximum rural impact (i.e., 0.9371 $\mu g/m^3$ vs. 0.3932 $\mu g/m^3$ for 1 g/s emissions for urban and rural conditions, respectively). Thus, the inversion breakup fumigation impact was adjusted to 2.448 $\mu g/m^3$ for a unitized emission rate to account for urban dispersion conditions (i.e., 2.3833 x 1.027 $\mu g/m^3$).

At the inversion breakup distance, the maximum black-start engine impact was 1.607 $\mu g/m^3$ for a 1 g/s emission rate under urban conditions for all SCREEN3 meteorological conditions. These unitized impacts were used to calculate 1-hour inversion breakup impacts for all pollutants by multiplying the unitized impacts by the pollutant emission rates (in g/s). The fumigation impacts from the two new proposed turbines are added to the black-start engine impacts at the same location to obtain combined pollutant impacts for the facility. The inversion breakup impacts for the proposed project and black start engine are summarized in Table F-5.

Inversion breakup impacts can be similarly calculated to the entire facility (i.e., all four turbines with the black-start engine). These impacts are shown in Table F-6.

As shown above, maximum SCREEN3 impacts at all offsite locations under normal urban dispersion conditions are very much higher than fumigation impacts. Fumigation impacts are also less than the maximum facility AERMOD impacts predicted to occur in the general vicinity of the project site under normal operating conditions as shown in Table F-7.

Since 1-hour fumigation impacts are less than the maximum overall SCREEN3 and AERMOD 1-hour impacts, no further analysis of additional short-term averaging times (3-hour, 8-hour, or 24-hour) is required as described in Section 4.5.3 of "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised" (EPA-454/R-92-019). Also, the AERMOD impact analyses presented previously are conservative for this project (two new proposed turbines) and for the entire facility.

TABLE F-5

Inversion Breakup Impacts for the Proposed Project and Black Start Engine

Pollutant /Avg.Time	Impacts ($\mu g/m^3$) at Inversion Breakup Location			Maximum Impacts from SCREEN3 for Normal Dispersion
	Fumigation Impacts for Turbines	BS Engine Impacts	Total Impacts	
NO_X 1-hour	2.557	1.314	3.871	1157
SO_2 1-hour	0.171	0.001	0.172	0.713
CO 1-hour	4.061	0.399	4.460	351.2

TABLE F-6

Inversion Breakup Impacts for the Entire Facility with Black Start Engine

Pollutant /Avg.Time	Impacts ($\mu g/m^3$) at Inversion Breakup Location			Maximum Impacts from SCREEN3 for Normal Dispersion
	Fumigation Impacts for Turbines	BS Engine Impacts	Total Impacts	
NO_X 1-hour	5.333	1.314	6.647	1157
SO_2 1-hour	0.344	0.001	0.345	1.058
CO 1-hour	8.122	0.399	8.521	351.2

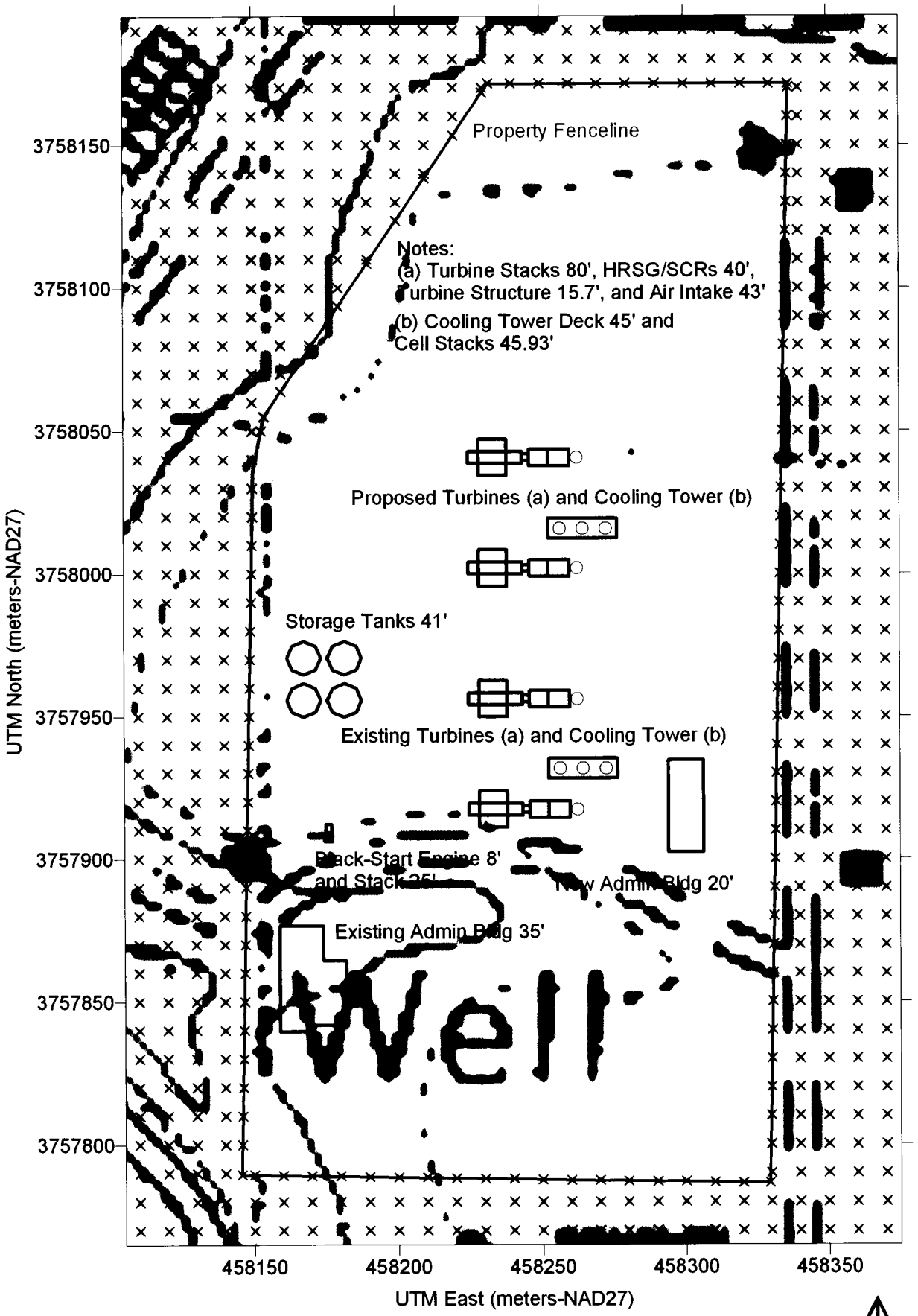
TABLE F-7

Inversion Breakup Impacts Compared to AERMOD Maximum Impacts

Pollutant /Avg.Time	Impacts (μg/m^3) for Proposed Project (Two Proposed Turbines)		Impacts (μg/m^3) for Entire Facility (Four Turbines and Black-Start Engine)	
	Fumigation Impacts	Maximum AERMOD Impacts	Fumigation Impacts	Maximum AERMOD Impacts
NO_X 1-hour	2.557	3.039 (NO_X)	6.647	20.313 (NO_2)
SO_2 1-hour	0.171	0.204	0.345	0.411
CO 1-hour	4.061	4.826	8.521	61.8

```
458262.7,3758040.54,"T4"
458262.7,3758001.85,"T3"
458262.7,3757956.05,"T2"
458262.7,3757917.36,"T1"
458256.68,3757931.72,"Ex CT"
458264.67,3757931.72
458272.66,3757931.72
458256.68,3758015.73,"New CT"
458264.67,3758015.73
458272.66,3758015.73
```

Riverside Energy Resource Center
Onsite Structures, Property Fenceline, and Nearby Receptors

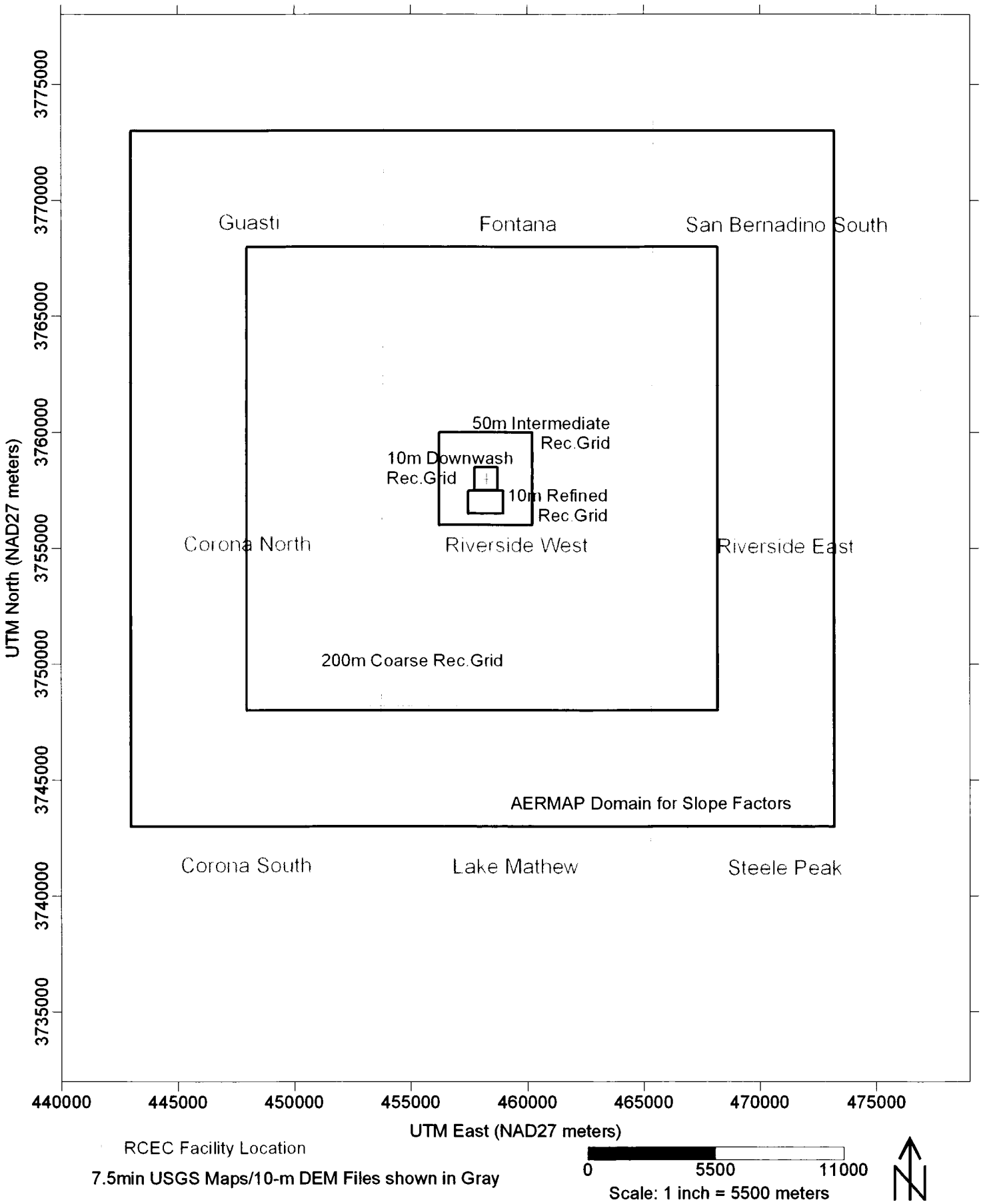


Source: Seamless DRG Files of 1:24,000 Scale
USGS Maps for Riverside West and Fontana Quads

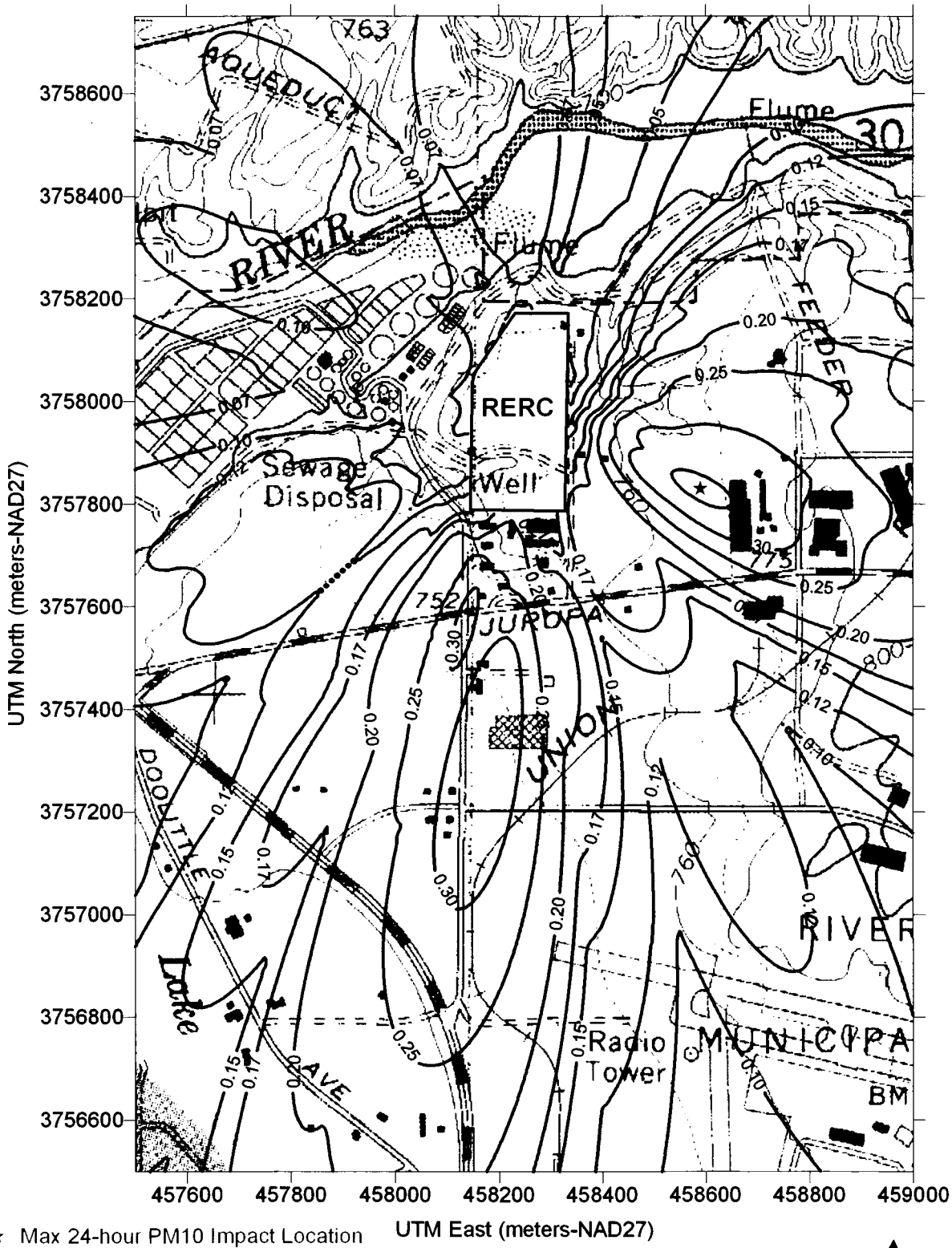
0 50 100
Scale: 1" = 50 meters

N

Riverside Energy Resource Center - AERMOD Receptor Grids



Riverside Energy Resource Center Proposed Project
Maximum 24-Hour PM10 Impacts (ug/m3)



★ Max 24-hour PM10 Impact Location

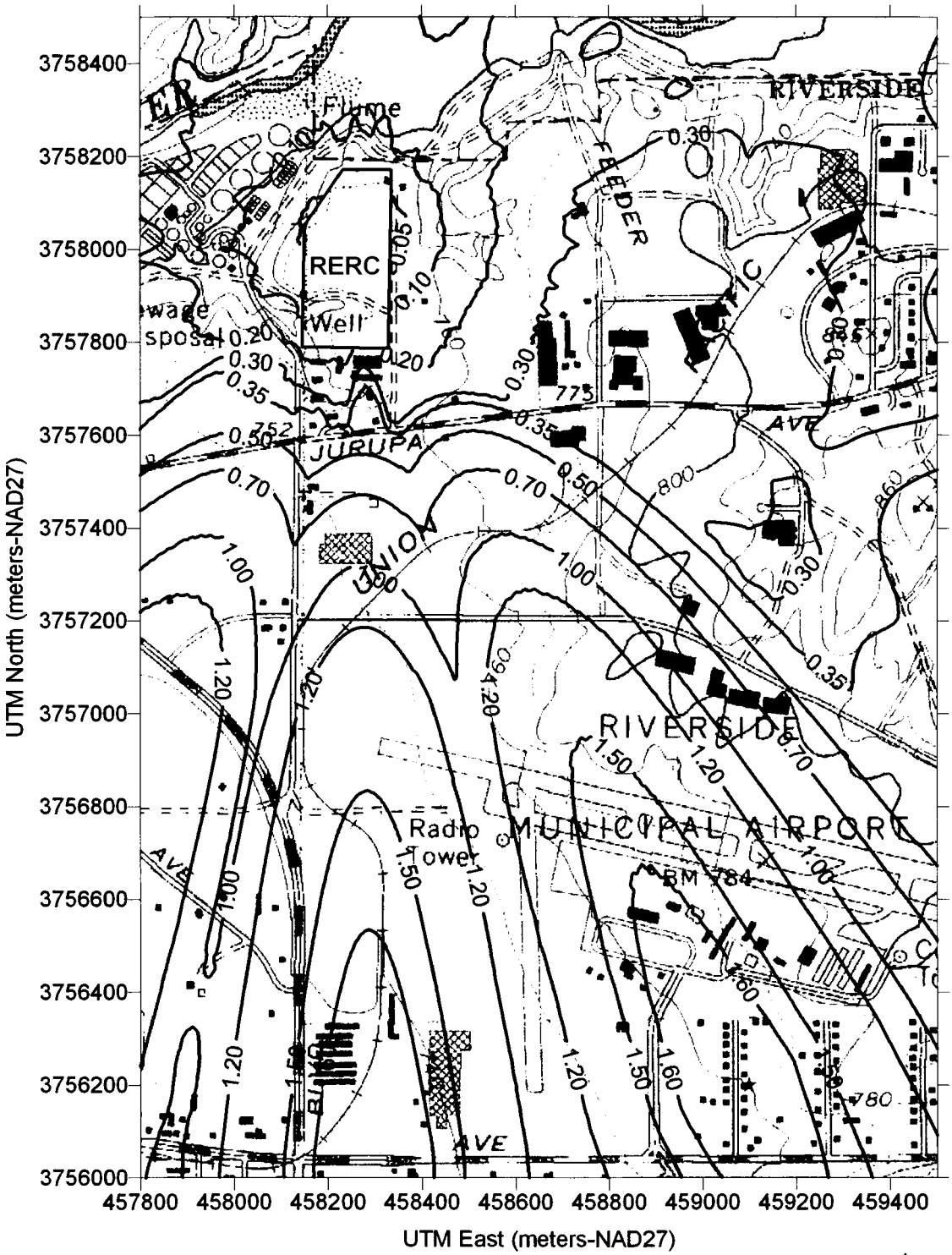
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash + Refined Receptor Grids (Isopleths)

0 300 600

Scale: 1" = 300 meters

N

Riverside Energy Resource Center Proposed Project
Maximum 1-Hour NO2 Impacts (ug/m3)
based on SCAQMD NO2/NOx Ratios



★ Max 1-hour NO2 Impact Location

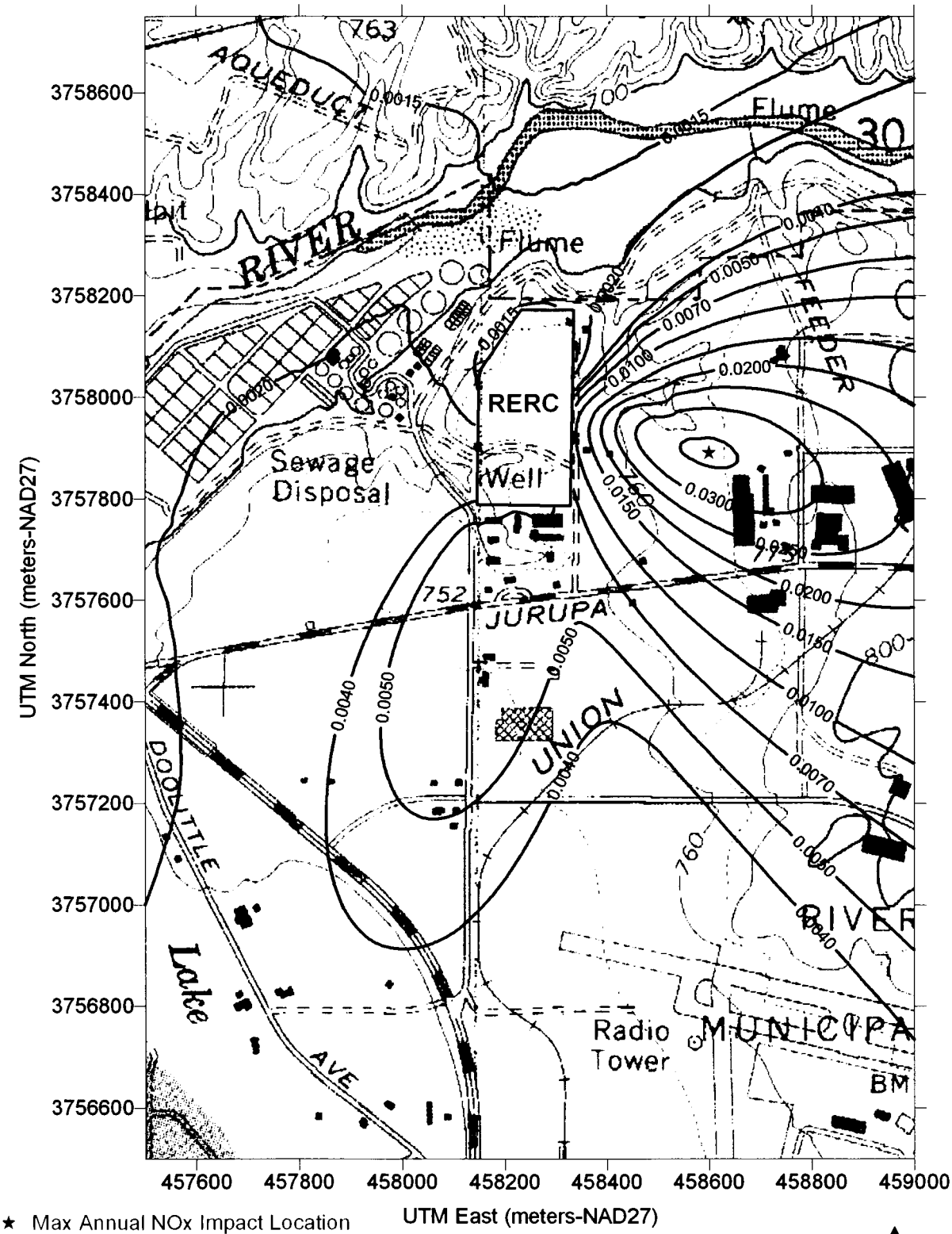
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash + Refined Receptor Grids (Isopleths)

0 350 700

Scale: 1" = 350 meters

N

Riverside Energy Resource Center Proposed Project
Maximum Annual NOx Impacts (ug/m3)



★ Max Annual NOx Impact Location

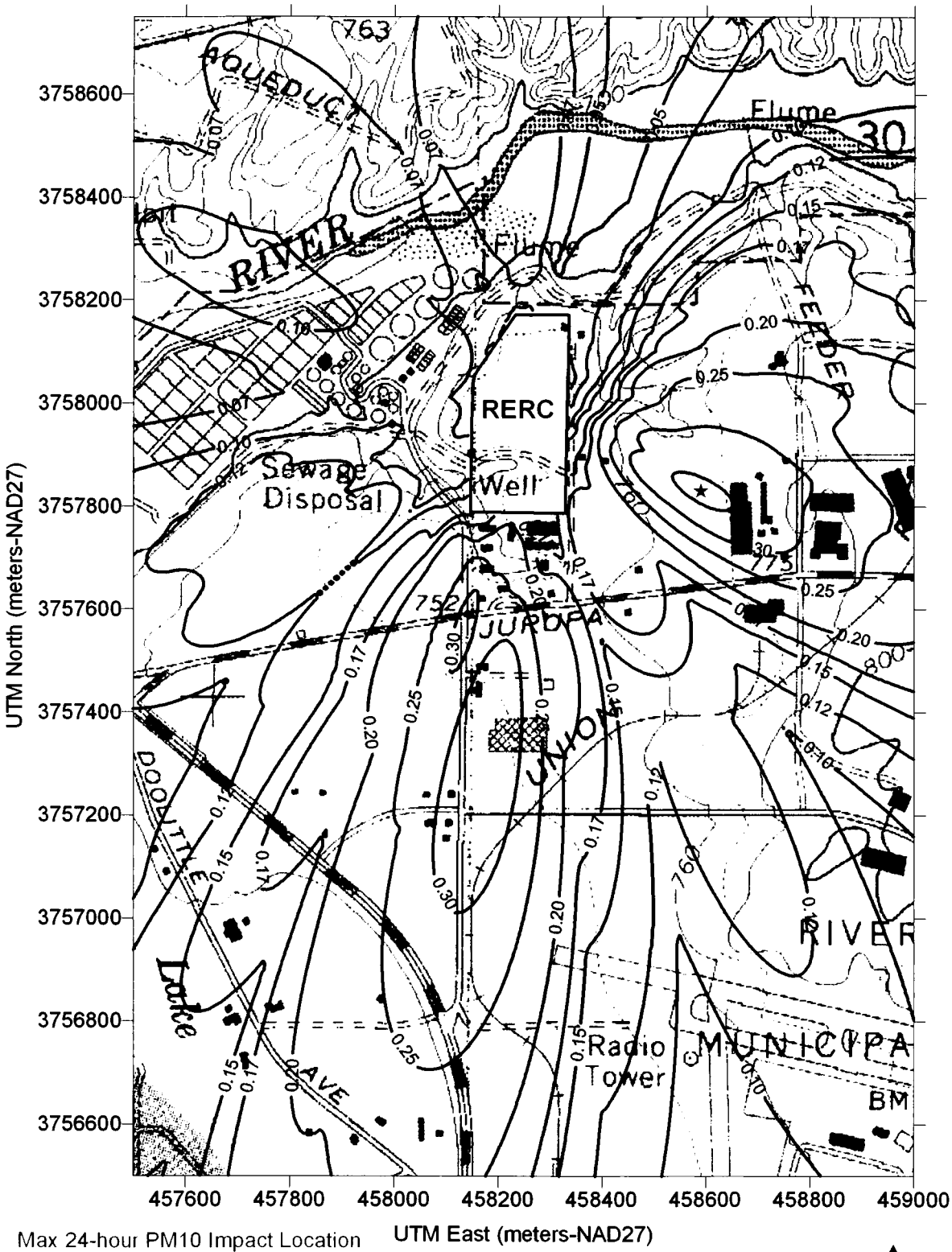
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash + Refined Receptor Grids (Isopleths)

0 300 600

Scale: 1" = 300 meters

N

Riverside Energy Resource Center Proposed Project
Maximum 24-Hour PM10 Impacts (ug/m3)



★ Max 24-hour PM10 Impact Location

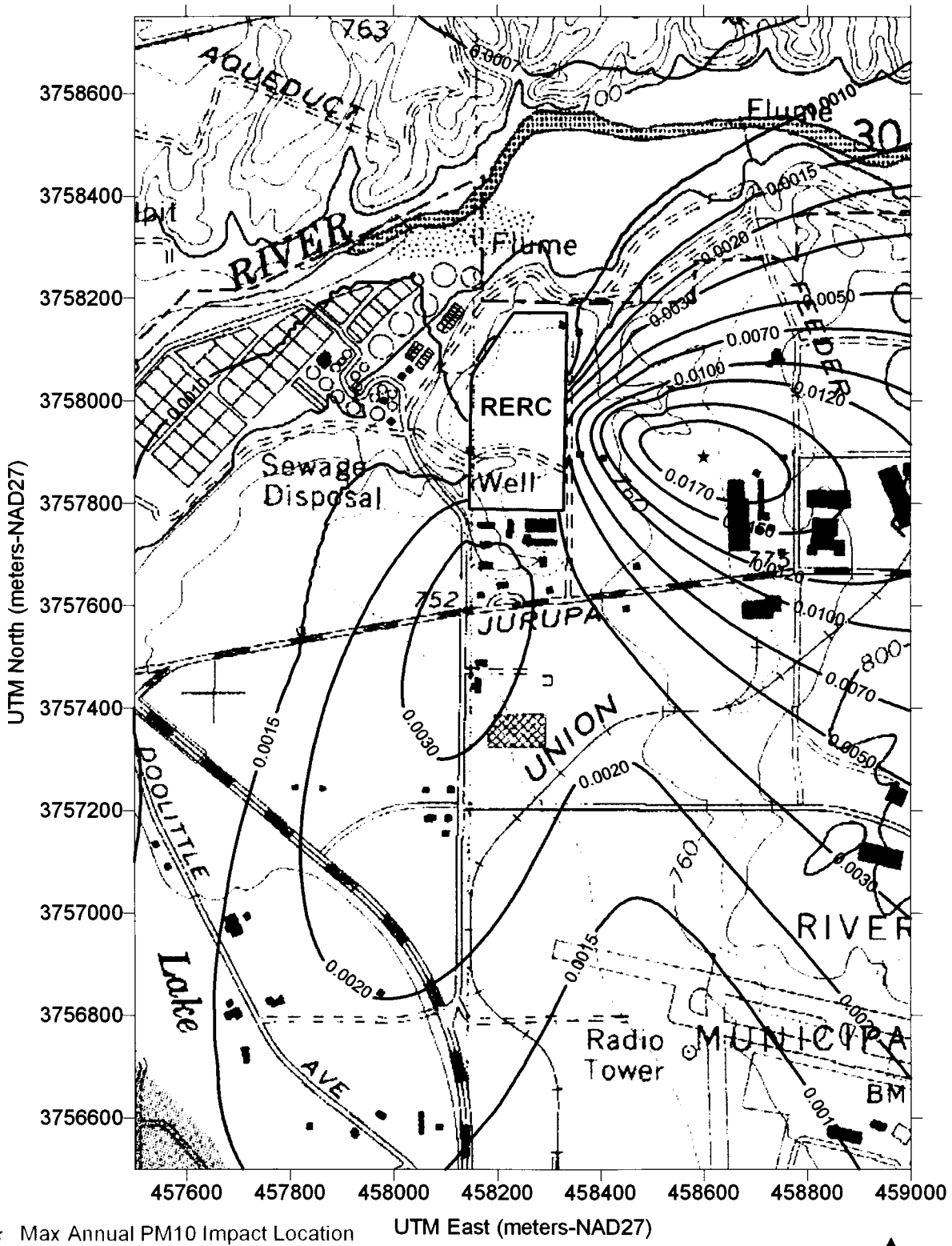
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash + Refined Receptor Grids (Isopleths)

0 300 600

Scale: 1" = 300 meters

N

Riverside Energy Resource Center Proposed Project
Maximum Annual PM10 Impacts (ug/m3)



★ Max Annual PM10 Impact Location

Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash + Refined Receptor Grids (Isopleths)

0 300 600

Scale: 1" = 300 meters

N

APPENDIX 6.1-G

AIR DISPERSION MODELING AND AIR QUALITY IMPACT ASSESSMENT FOR CONSTRUCTION

APPENDIX 6.1-G
AIR DISPERSION MODELING AND AIR QUALITY IMPACT ASSESSMENT FOR CONSTRUCTION ACTIVITIES

6.1-G.1 Introduction

Ambient air quality impacts from emissions during the construction of the two new turbines at the RERC were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions, and fugitive dust.

6.1-G.2 Existing Ambient Levels

Monitoring stations used to establish the ambient background levels facility operations were also used for the construction modeling impact analysis. Contained in the attachment, the maximum concentrations of NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ recorded for 2004 through 2006 at those monitoring stations and the selected maximum background concentrations are presented.

6.1-G.3 Dispersion Model Inputs

As in the analysis of project operating impacts, the USEPA model AERMOD was used to estimate ambient impacts from construction activities. A detailed discussion of the AERMOD dispersion model and the modeling options, meteorological data, and receptor grids used for the facility is included in Section 6.1.9 and Appendix 6.1-F.

The emission sources for the construction site were grouped into two categories: exhaust emissions from mobile and stationary combustion equipment and fugitive dust emissions. Combustion equipment exhaust emissions were modeled as 10' high point sources placed at regular 20-meter intervals around the 3-acre construction area. Dust emissions were modeled as an area source with an effective plume height of 0.5 meters that covered the total 3-acre construction area. The construction impacts modeling analysis used the 10-meter spaced downwash and fenceline receptor grids from the project operating impact analysis.

To determine the construction impacts in relation to the short-term state and national ambient air quality standards (AAQS, i.e., 24 hours and less), the worst-case daily onsite construction emission levels were used. For pollutants with annual average AAQS, the annual onsite emission levels were used. Except for the use of the TOXICS keyword (used in place of DFAULT to decrease the execution times needed to model the larger number of point sources and the fugitive dust area source), the same meteorological data and modeling options in the project operating impact analysis was used for the construction impacts analysis.

6.1-G.4 Construction Modeling Results

Based on the emission rates of NO_x, SO_2, CO, PM_{10}, and $PM_{2.5}$ and the meteorological data, the AERMOD model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, PM_{10}, and $PM_{2.5}$. The annual impacts are based on the annual emission rates of these pollutants.

The annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465). The annual average NO_2 concentration was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_X ratio. The one-hour NO_2 concentration was calculated using an EXCEL spreadsheet of the PLOTFILE outputs based on the distant-dependant NO_2/NO_X ratios given by SCAQMD (*"Final Localized Significance Threshold Methodology,"* June 2003, Pages 2-8 to 2-9).

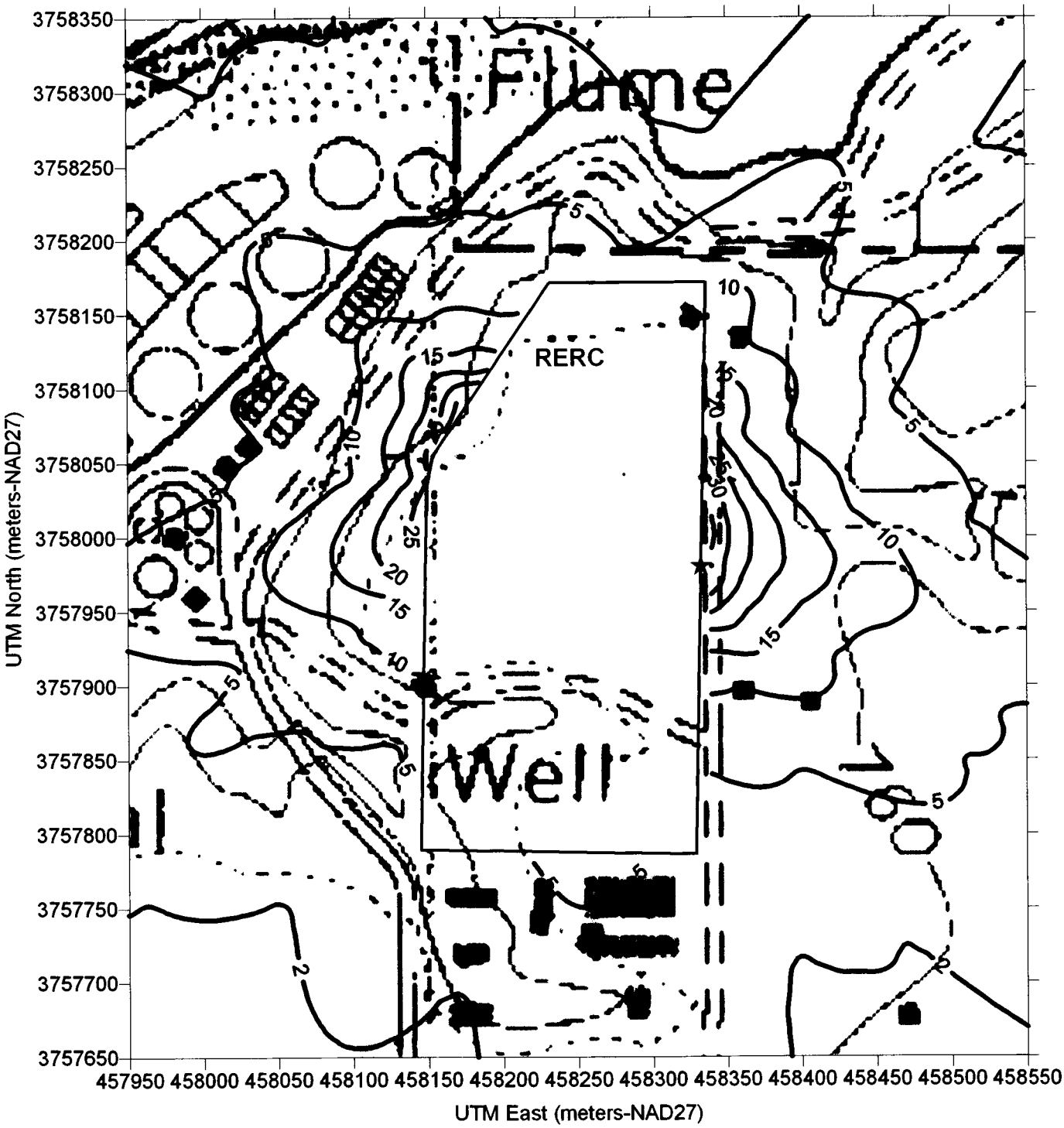
As shown in Table G-1, maximum modeled impacts without background concentrations for construction activities for all modeled pollutants are less than the most stringent state and national AAQS. Also included are the maximum background levels selected and the resulting total impacts (maximum modeled impacts plus maximum background concentrations). As can be seen, the state and national 24-hour and annual PM_{10} and $PM_{2.5}$ AAQS are already exceeded (or nearly exceeded in the case of the national 24-hour PM_{10} AAQS) by background concentrations in the absence of the construction emissions for the project site. For these pollutants where background concentrations are nearly equal to or exceed the AAQS, total impacts (modeled plus background) are obviously greater than the AAQS.

The AERMOD model over-predicts construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the AERMOD model are derived from observations of hot plumes associated with typical smoke stacks. The AERMOD model does compensate for plume temperature; however, for ambient temperature plumes the model assumes negligible buoyancy and dispersion. Consequently, ambient concentrations in cold plumes remain high even at significant distances from a source. The construction site impacts predicted for this site are not unusual in comparison to the modeled impacts for most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause measurable violations of AAQS. The input and output modeling files are being provided to the CEC and SCAQMD electronically. In addition to the maximum impacts presented above, construction impacts due to diesel PM emissions from the combustion equipment were modeled for nine sensitive receptors, representing the nearest residences in nine different distinct directions. The results of this analysis are presented in the Health Risk Assessment.

TABLE G-1
Maximum Construction impacts

Pollutant	Averaging Time	Maximum Construction Impacts (μg/m^3)	Maximum Background (μg/m^3)	Total Impact (μg/m^3)	State AAQS (μg/m^3)	National AAQS (μg/m^3)
NO_2[a]	1-hour	18.1	172.7	190.8	338	-
	Annual	4.2	41.3	45.5	56	100
SO_2	1-hour	0.22	52.2	52.4	655	-
	3-hour	0.10	41.8	41.9	-	1300
	24-hour	0.04	39.2	39.2	105	365
	Annual	0.01	7.8	7.8	-	80
CO	1-hour	228.8	4571.4	4800.2	23,000	40,000
	8-hour	101.2	3394.3	3495.5	10,000	10,000
PM_{10}	24-hour	42.1	137.0	179.1	50	150
	Annual	7.5	64.0	71.5	20	-
$PM_{2.5}$	24-hour	10.4	98.7	109.1	-	35
	Annual	1.8	22.1	23.9	12	15

Construction for Riverside Energy Resource Center
Maximum 24-Hour PM10 Impacts (ug/m3)



★ Max 24-hour PM10 Impact Location

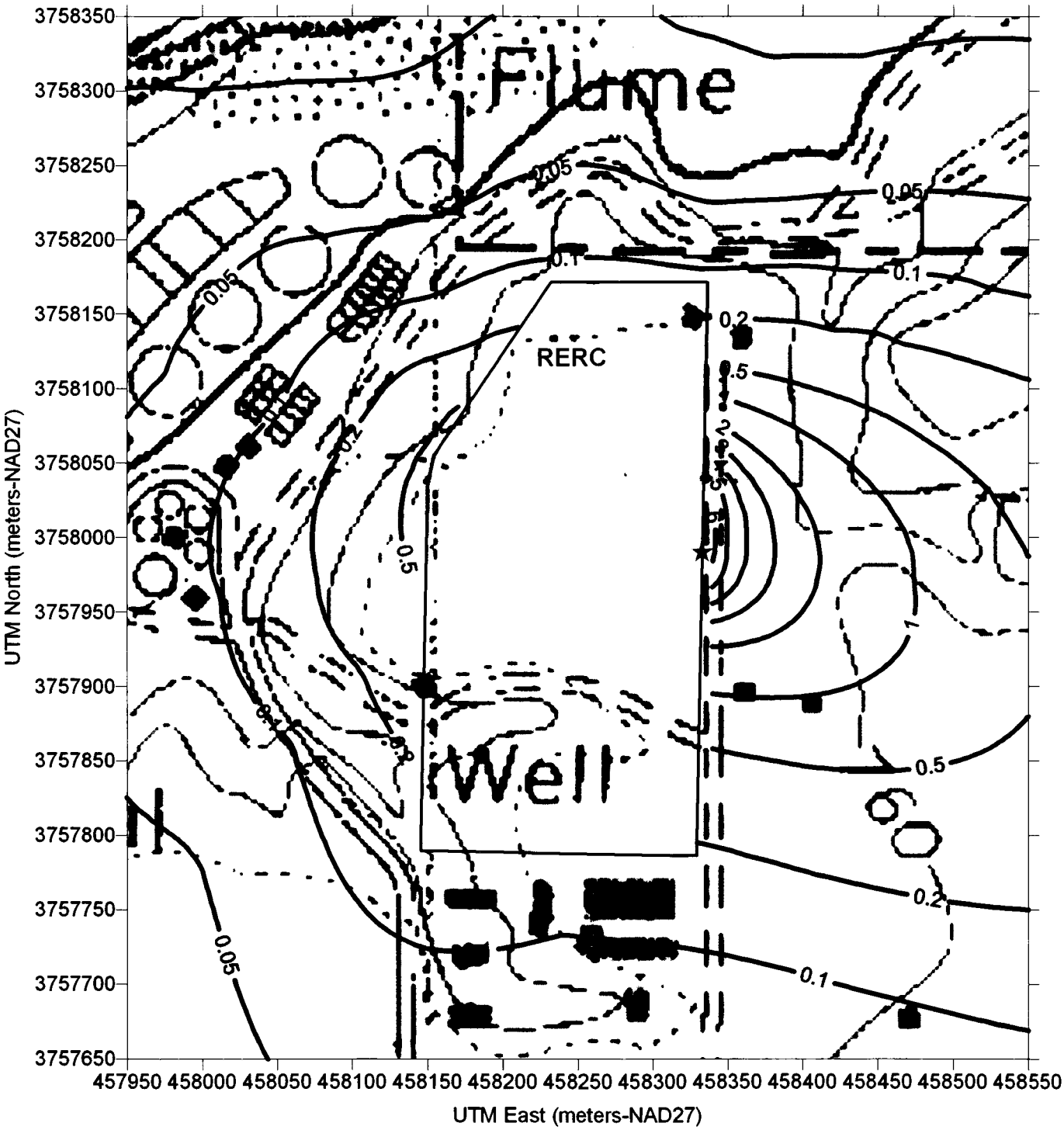
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash Receptor Grid (Isopleths)

0 100 200

Scale: 1" = 100 meters

N

Construction for Riverside Energy Resource Center
Maximum Annual PM10 Impacts (ug/m3)



★ Max Annual PM10 Impact Location

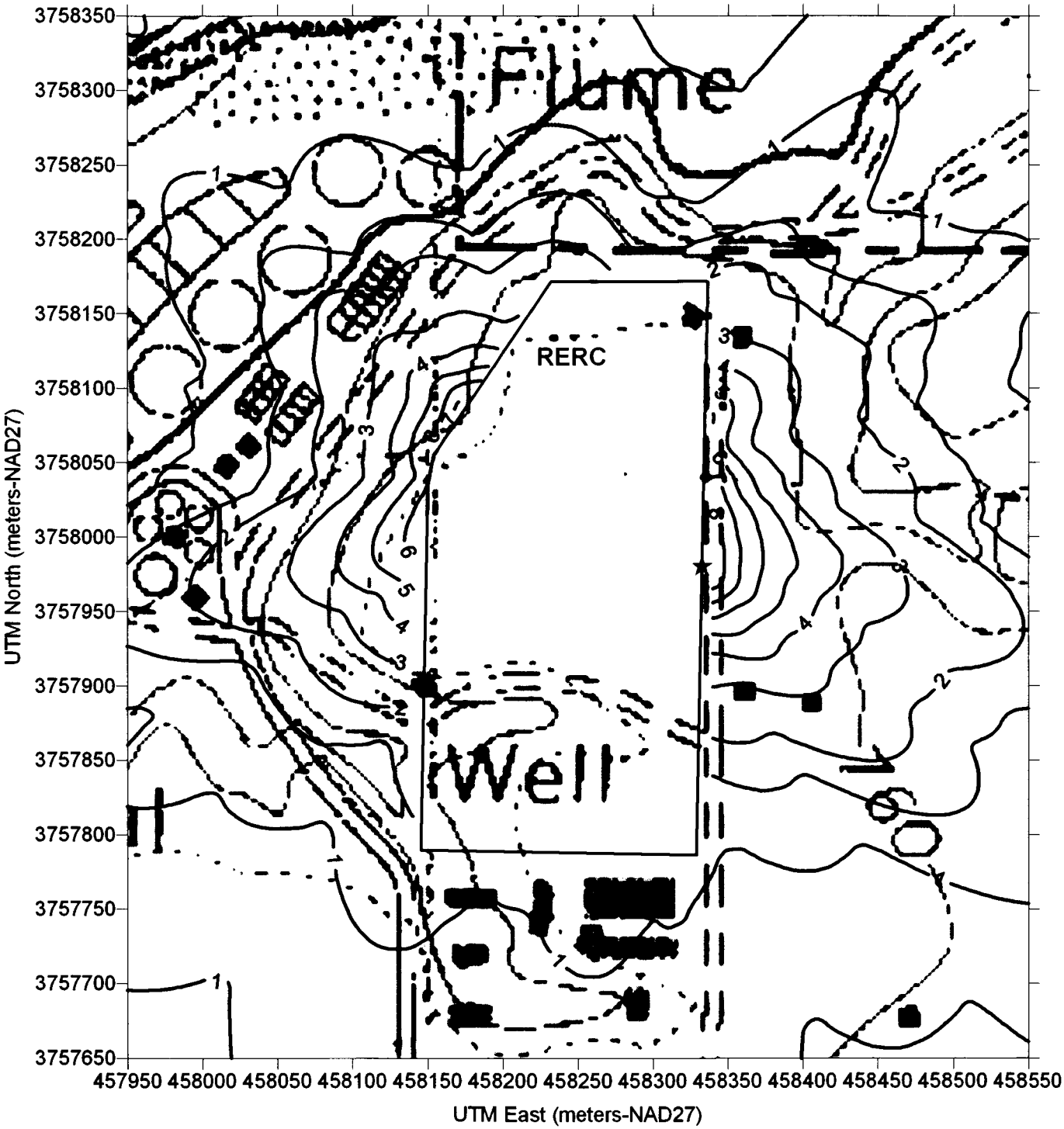
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash Receptor Grid (Isopleths)

0 100 200

Scale: 1" = 100 meters

N

Construction for Riverside Energy Resource Center
Maximum 24-Hour PM2.5 Impacts (ug/m3)



★ Max 24-hour PM2.5 Impact Location

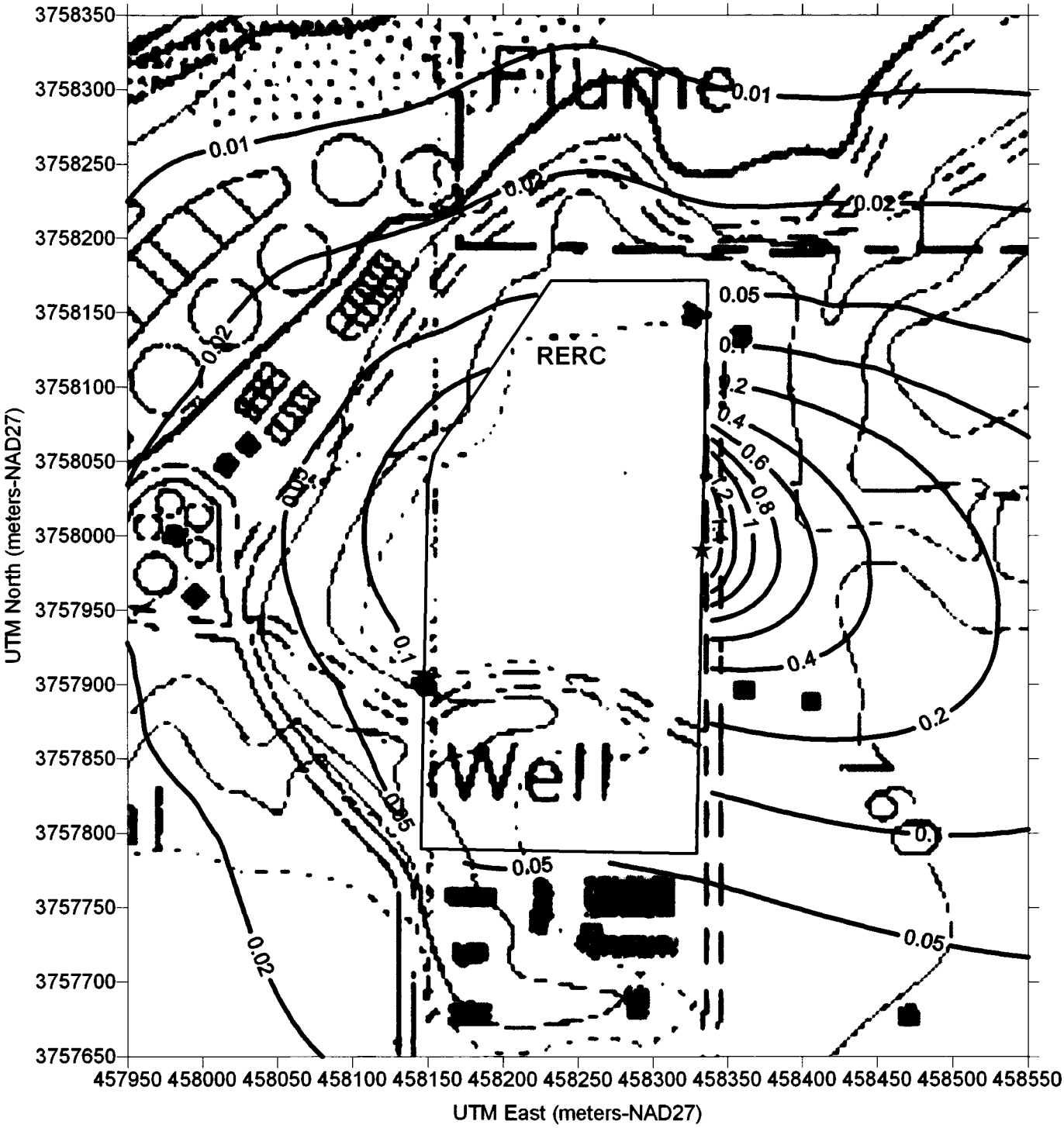
Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash Receptor Grid (Isopleths)

0 100 200

Scale: 1" = 100 meters

N

Construction for Riverside Energy Resource Center
Maximum Annual PM2.5 Impacts (ug/m3)



★ Max Annual PM2.5 Impact Location

Sources: Seamless DRG Files of 7.5' USGS Riverside West Quad (Basemap) and 10-m Downwash Receptor Grid (Isopleths)

0 100 200

Scale: 1" = 100 meters

APPENDIX 6.1-H

ANALYSIS
OF
BEST AVAILABLE CONTROL TECHNOLOGY

BACT for Large Natural Gas-Fired Turbines in Peaking Applications

In order to comply with the Best Available Control Technology (BACT) requirements put forth by the South Coast Air District, the State of California and the Federal Government, a technology assessment has been done for emission control strategies applicable to the LM6000 gas-fired turbines at RERC. Several sources were utilized in the retrieval of the presented BACT data, including:

- CARB BACT guidelines and clearinghouse database;
- CEC Power Plant Siting Cases and SPPE applications;
- EPA BACT/RACT/LAER clearinghouse database.

BACT Determinations

Maximum emission reduction that may be achieved in practice and is financially feasible is the goal of the BACT program. The RERC project is expected to comply with the most stringent emission limits determined to be BACT based on recently permitted facilities. Other similar projects involving simple cycle turbines for peaking applications have been permitted at a BACT level of 2.5 ppmvd (@ 15% O2) NO_X. This was achieved through the use of SCR (with ammonia injection) and either water injection or dry low- NO_X burners, and is based on a 1-hour averaging period.

CO emissions have been permitted at a BACT level of 6 ppmvd (@ 15% O2) over a 1-hour averaging period for similar operations in California. This was accomplished through the use of turbines with more efficient combustion coupled with an oxidation catalyst, both of which represent the technology that will be employed at RERC. Although the San Francisco Electric Reliability Program (SFERP) was permitted at 4 ppmvd (@ 15% O2) for CO, the level is based on an averaging period of 3-hours. For the new turbines at RERC, the 1-hour average will be used in conjunction with SCAQMD policy and 6 ppmvd (@ 15% O2) is still considered to represent the use of BACT.

VOC emissions have been controlled at other recently permitted projects to a BACT level of 2 ppmvd (@ 15% O2). The use of an oxidation catalyst will reduce VOCs to this BACT level and will be used at RERC.

In order to control the emission of PM_{10} and SO_X, the use of clean pipeline natural gas as fuel is considered to be BACT for these pollutants. Other similar projects have been permitted recently that use natural gas as control technology. RERC will use natural gas as fuel for the proposed GE LM6000 turbines.

Ammonia emissions occur as a result of the use of an SCR as it injects ammonia into the exhaust to break down NO_X. Although many projects have been permitted for 10 ppmvd

(@ 15% O2) ammonia, RPU proposes 5 ppmvd (@ 15% O2) as BACT for this pollutant in accordance with CEC and SCAQMD policy. The ammonia-slip at the RERC project is expected to comply with the most stringent ammonia emission level achieved in practice of 5 ppmvd (@ 15% O2).

Overall, the RERC project will meet the BACT requirements as determined by similar projects that were permitted recently.

Table A-6.1-1: BACT Determinations

Name	Make, Model	Emission Limits (dry @ 15%e O_2)	Emission Controls	Permit Date
Riverside Energy Resource Center	GE LM6000 Sprint PC NxGen	NO_X: 2.5 ppm CO: 6.0 ppm VOC: 2.0 ppm NH_3: 5 ppm	SCR & Water Injection; Oxidation Catalyst; Natural Gas	12/2004 (SPPE) 02/2005 (PTC)
Modesto Electric Generation Project	GE LM6000 Sprint	NO_X: 2.5 ppm CO: 6.0 ppm VOC: 2.0 ppm	SCR & Water Injection; Oxidation Catalyst; Natural Gas	2/2004 (SPPE)
Niland Gas Turbine Plant	GE LM6000 PD Sprint NxGen	NO_X: 2.5 ppm CO: 6.0 ppm VOC: 2.0 ppm NH_3: 5 ppm	SCR & Dry Low-NO_x Burners; Oxidation Catalyst; Natural Gas	10/2006 (SPPE) 08/08/2007 (ATC)
San Francisco Electric Reliability Project	GE LM6000	NO_X: 2.5 ppm CO: 4.0 ppm* VOC: 2.0 ppm	SCR & Water Injection; Oxidation Catalyst; Natural Gas	4/2006 (AFC)

Recently permitted projects similar to the RERC project.
*3-hr Average

Evaluation of Emissions Control Technology

SCR

Selective Catalytic Reduction is a common form of emission control for a variety of engines and turbines and is often used in combination with dry low-NO_X burners (DLN) or water injection. SCR systems have been demonstrated to be technologically feasible. With SCR there is also an associated ammonia emission for which BACT is 5.0 ppm (@15% O_2). The proposed project at RERC will incorporate Water Injection.

EMx

EmeraChem markets EMx as the current generation of SCONOx, offering an emission reduction of NOx, CO and VOCs. EmeraChem also claims the product may reduce SOx

and PM emissions on certain gas turbines. As with the original SCONOx system (marketed by Goal Line Environmental Technologies LLC), ammonia is not used in the process and emissions will have no ammonia slip. EMx claims to be able to reduce NOx to levels below 2.5 ppmvd (@ 15% O2) when uncontrolled NO_X is 25 ppmvd (@ 15% O_2). Addtionally, EmeraChem claims to achieve CO and VOC reductions to below 1.0 ppmvd (@ 15% O2) as well as 95% SOx and 30% PM reductions. To date, the only turbine to which this system has been applied is the GE LM2500 in a combined-cycle application with low exhaust temperatures. EMx has yet to be applied to a simple-cycle LM6000 turbine. Therefore, since EMx has not been verified to effectively reduce emissions incorporated with simple cycle applications, and because EMx is not expected to reduce NO_X to levels below those achieved by SCR, the system is not considered to be BACT.

Improved Combustion

The increased efficiency of newer turbine technology has led to more complete combustion of fuel. This drives down the emission of CO and VOCs in the exhaust of the turbine. The GE LM6000 is representative of this new technology and will be used at RERC.

Oxidation Catalyst

An oxidation catalyst controls the emission of CO and VOCs emitted from combustion sources and is considered BACT for simple cycle CTGs. Within this system CO and VOCs are broken down and released in the form of water and CO_2. An oxidation catalyst system will be employed at RERC to control CO and VOC emissions.

High Quality Natural Gas

High quality pipeline natural gas is BACT for the reduction of SO_X and PM based upon similar, recently permitted projects. Natural gas is the only fuel that will be used in the LM6000 turbines at RERC.

Based upon recently permitted projects of a similar nature and the availability and feasibility of control devices, RPU proposes the following emission limits as BACT for the LM6000 turbines at RERC:

NO_X: 2.5 ppmvd (@15% O_2), 1-hr, SCR

CO: 6 ppmvd (@15% O_2), 1-hr, Oxidation Catalyst/Improved combustion technology.

VOC: 2 ppmvd (@15% O_2), 1-hr, Oxidation Catalyst/Improved combustion technology.

SO_X/PM_{10}: Natural Gas Combustion.

Ammonia: 5 ppmvd (@15% O_2)

BACT for Emergency Diesel Black Start Engine

The project will include an emergency diesel-fired black start engine driving an electrical generator. The engine proposed for installation at the RERC facility will meet EPA emission requirements for Tier II engines rated at greater than 750 horsepower. Values reflect State stationary ATCM, SCAQMD BACT guidelines and SCAQMD Emergency Internal Combustion Engine certification policy.

Based on EPA Certification Standards RPU seeks to permit the black-start engine at the following levels:

NO_x + NMHC: 4.8 g/bhp-hr, EPA Tier II

CO: 2.6 g/bhp-hr, EPA Tier II

PM: 0.15 g/bhp-hr, EPA Tier II

SO_2: Ultra-Low Sulfur Diesel (fuel sulfur content no greater than 0.0015% by weight)

APPENDIX 6.3-A

MSHCP BURROWING OWL SURVEY INSTRUCTIONS

BURROWING OWL SURVEY INSTRUCTIONS
For the
Western Riverside Multiple Species Habitat Conservation Plan Area

PURPOSE OF THE SURVEYS

According to the Multiple Species Habitat Conservation Plan (MSHCP), surveys for the burrowing owl are to be conducted as part of the environmental review process. The MSHCP Additional Surveys Needs and Procedures identify a specific burrowing owl survey area within the MSHCP Plan Area. The MSHCP also identifies species-specific objectives for the burrowing owl, namely species-specific objectives 5 and 6, both of which require burrowing owl surveys if suitable habitat occurs on a proposed project site.

Although the MSHCP references the California Department of Fish and Game Staff report which is based on the Burrowing Owl Consortium Guidelines, the purpose of the following instructions is to clarify the methods necessary to obtain sufficient information to address consistency with; 1) specific conservation requirements of the MSHCP as identified in species-specific Objective 5, and 2) ensure direct mortality of burrowing owls is avoided through implementation of species-specific objective 6 (Pre-construction surveys). Note that surveys conducted to address burrowing owl species-specific objective 5 are necessary during the project design phase while surveys to address species-specific objective 6 are to be conducted just prior to project construction. Habitat assessments and burrowing owl surveys should be conducted by a biologist knowledgeable in burrowing owl habitat, ecology, and field identification of the species and burrowing owl sign.

STEP I: HABITAT ASSESSMENT

Burrowing Owl Habitat Description: Burrowing owls use a variety of natural and modified habitats for nesting and foraging that is typically characterized by low growing vegetation. Burrowing owl habitat includes, but is not limited to, native and non-native grassland, interstitial grassland within shrub lands, shrub lands with low density shrub cover, golf-courses, drainage ditches, earthen berms, unpaved airfields, pastureland, dairies, fallow fields, and agricultural use areas.

Burrowing owls typically use burrows made by fossorial (adapted for burrowing or digging) mammals, such as ground squirrels (*Spermaphilus beecheyi*) or badgers (*Taxidea taxus*), they often utilize manmade structures, such as earthen berms; cement culverts; cement, asphalt, rock, or wood debris piles; or openings beneath cement or asphalt pavement. Burrowing owls are often found within, under, or in close proximity to man-made structures.

The first step in the assessment process is to walk the property to identify the presence of burrowing owl habitat on the project site. If habitat is found on the site, then walk a 150-meter (approximately 500 feet) buffer zone around the project boundary. If permission to access the buffer area cannot be obtained, do not trespass on adjacent property but visually inspect the adjacent habitat areas with binoculars and/or spotting scopes. Habitat assessments that do not include walking the property will not be accepted. Driving by a site and reporting it as disturbed or under agricultural/dairy use is not acceptable.

If burrowing owl habitat occurs on-site, both Step II (focused surveys, census, and mapping) and Preconstruction Surveys are required. If burrows are found during the habitat assessment then suitable habitat is present and Step II is required. However, lack of identifying burrows during the habitat assessment does not negate the need for the systematic search for burrows included as part of the Step II survey instructions. If burrowing owl habitat is not present on-site (i.e. if the site is completely covered by chaparral, cement or asphalt) Step II of the survey is not necessary. No Pre-construction surveys are necessary if there is no suitable habitat on-site.

A written report (with photographs of the site) detailing results of the habitat assessment should be prepared, indicating whether or not the project site contains suitable burrowing owl habitat. Simply reporting that the site is disturbed or under agricultural/dairy use is not acceptable.

STEP II- LOCATING BURROWS AND BURROWING OWLS

Completion of the following will constitute an acceptable burrowing owl survey. A minimum of one site visit must occur, but additional visits may be warranted depending on the results of the first site visit. Surveys conducted during the breeding season March 1 - August 31 are required to describe if, when, and how the site is used by burrowing owls. Negative results during surveys outside the breeding season are not conclusive proof that owls do not use the project site and may not provide an accurate picture of the number of owls that may utilize the site. Surveys that are conducted outside the breeding season will likely need to be repeated during the breeding season; therefore, it is recommended that surveys only be conducted during the breeding season (unless conducting Preconstruction surveys).

All surveys shall be conducted as described in Parts A and B below. Surveys should be conducted during weather that is conducive to observing owls outside their burrows and detecting burrowing owl sign. Surveys will not be accepted if they are conducted during rain, high winds (> 20 mph), dense fog, or temperatures over 90 °F. Part B surveys should be conducted in the morning one hour before sunrise to two hours after sunrise or in the early evening two hours before sunset to one hour after sunset. Count and map all burrowing owl sightings, occupied burrows, and burrows with owl sign. Record the location of all owls including numbers of pairs and juveniles and any behavior such as courtship and mating. Map the extent of all suitable habitat. It should be noted that owl sign may not be detectable if surveys under Part A are conducted within 5 days following rain. Absence of burrowing owl sign cannot be used to confirm absence of the species if the focused burrow survey (Part A) is conducted within 5 days of rain; therefore, in this instance, completion of all four focused burrowing owl surveys (Part B) is required.

Part A: Focused Burrow Surveys

A focused burrow survey that includes natural burrows or suitable man-made structures needs to be conducted as described below.

1. A systematic survey for burrows including burrowing owl sign should be conducted by walking through suitable habitat over the entire survey area (i.e. the project site and within 150 meters). Pedestrian survey transects need to be spaced to allow 100% visual coverage of the ground surface.

   The distance between transect center lines should be no more than 30 meters (approximately 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more qualified surveyors conduct concurrent surveys.

2. The location of all suitable burrowing owl habitat, potential owl burrows, burrowing owl sign, and any owls observed should be recorded and mapped, including GPS coordinates. If the survey area contains natural or man-made structures that could potentially support burrowing owls, or owls are observed during the burrow surveys, the systematic surveys should continue as prescribed in Part B. If no potential burrows are detected, no further surveys are required. A written report including photographs of the project site, location of burrowing owl habitat surveyed, location of transects, and burrow survey methods should be prepared. If the report indicates further surveys are not required, then the report should state the reason(s) why further focused burrowing owl surveys are not necessary.

Part B: Focused Burrowing Owl Surveys

Focused Burrowing Owl Surveys will consist of site visits on four separate days. The first one may be conducted concurrent with the Focused Burrow Survey.

1. Upon arrival at the survey area and prior to initiating the walking surveys, surveyors using binoculars and/or spotting scopes should scan all suitable habitat, location of mapped burrows, owl sign, and owls, including perch locations to ascertain owl presence. This is particularly important if access has not been granted for adjacent areas with suitable habitat.

2. A survey for owls and owl sign should then be conducted by walking through suitable habitat over the entire project site and within the adjacent 150 m (approx. 500 feet). These “pedestrian surveys” should follow transects (i.e. Survey transects that are spaced to allow 100% visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx 100 feet.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more qualified surveyors conduct concurrent surveys.) It is important to minimize disturbance near occupied burrows during all seasons.

3. If access is not obtained, then the area adjacent to the project site shall also be surveyed using binoculars and/or spotting scopes to determine if owls are present in areas adjacent to project site. This 150-meter buffer zone is included to fully characterize the population. If the site is determined not to be occupied, no further surveys are required until 30 days prior to grading (see Pre-construction Surveys below).

STEP III: REPORTING REQUIREMENTS

After completion of appropriate surveys, a final report shall be submitted to the Riverside County Environmental Programs Department and the RCA Monitoring Program Administrator, which discusses the survey methodology, transect width, duration, conditions, and results of the survey. Appropriate maps showing burrow locations shall be included.

PRE-CONSTRUCTION SURVEYS

All project sites containing burrows or suitable habitat (based on Step I/Habitat Assessment) whether owls were found or not, require pre-construction surveys that shall be conducted within 30 days prior to ground disturbance to avoid direct take of burrowing owls (MSHCP Species-Specific Objective 6).

APPENDIX 6.3-B

SPECIES OCCURRENCE LIST

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Plants								
Abronia villosa var. *aurita*	Chaparral sand-verbena	None	None		1B.1	Chaparral, coastal scrub.	Sandy areas; 80-1600m.	**Absent:** Though there is one recent record (1993) and one historic record (1934) within ten miles, there is no suitable habitat within the project area.
Allium munzii	Munz's onion	FE	ST	MSHCP	1B.1 CA-Endemic	Chaparral, coastal scrub, cismontane woodland, pinyon-juniper woodland, valley and foothill grasslands.	Heavy clay soils; grows in grasslands and openings within shrublands or woodlands, 300-1070m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Ambrosia pumila	San Diego ambrosia	FE	None	MSHCP	1B.1	Chaparral, coastal scrub, valley and foothill grassland, vernal pools.	Disturbed areas in sandy loam or clay soils, 20-415m.	**Absent:** Though there is one historic record (1940) within ten miles, there is no suitable habitat within the project area.
Arenaria paludicola	Marsh sandwort	FE	SE		1B.1	Bogs and fens, freshwater marshes and swamps.	Within dense mats of *Typha*, *Juncus*, and *Scirpus*, etc., 3-170m.	**Absent:** Though there is one historic record (1899) within ten miles, there is no suitable habitat within the project area.
Astragalus hornii var. hornii	Horn's milk-vetch	None	None		1B.1	Meadows and seeps, playas.	Lake margins, alkaline sites. 60-850m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Atriplex coronata var. notatior	San Jacinto Valley crownscale	FE	None	MSHCP	1B.1 CA-Endemic	Playas, chenopod scrub, valley and foothill grassland, vernal pools. Found only within the San Jacinto River Valley.	Dry, alkaline flats, 139-500m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Atriplex parishii	Parish's saltscale	None	None	MSHCP	1B.1	Coastal bluff scrub, coastal scrub.	Alkaline soils, 25-1900m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Berberis nevinii	Nevin's barberry	FE	SE	MSHCP	1B.1 CA-Endemic	Coastal scrub, chaparral, cismontane woodland.	In Conejo volcanic substrates, often on exposed roadcuts, sometimes occupies oak woodland habitat, 295-825m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Brodiaea filifolia	Thread-leaved brodiaea	FT	SE	MSHCP	1B.1 CA-Endemic	Cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools.	Usually associated with annual grassland and vernal pools; often surrounded by shrubland habitats. Clay soils, 25-860m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Calochortus plummerae	Plummer's mariposa lily	None	None	MSHCP	1B.2 CA-Endemic	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest.	Occurs on rocky and sandy sites, usually of granitic or alluvial material, 100-1700m.	**Absent:** Though there are three recent records (1995, two from 1998) within ten miles, there is no suitable habitat within the project area.
Calochortus weedii var. *intermedius*	Intermediate mariposa lily	None	None	MSHCP	1B.2 CA-Endemic	Coastal scrub, chaparral, valley and foothill grassland.	Dry, rocky open slopes and rock outcrops, 120-850m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Carex comosa	Bristly sedge	None	None		2.1	Coastal prairie, and valley and foothill grassland.	Marshes and swamps, lake margins, 0-625m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Caulanthus simulans	Payson's jewelflower	None	None	MSHCP	4.2 CA-Endemic	Pinyon-juniper woodland, chaparral, coastal scrub.	Rocky steep slopes, north-facing slopes, and ridgelines on sandy or granitic soils; often found in burned areas or other disturbed sites such as streambeds, 90-2200m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Centromedia pungens ssp. *laevis*	Smooth tarplant	None	None	MSHCP	1B.1 CA-Endemic	Valley and foothill grassland, chenopod scrub, meadows, playas, riparian woodland.	Alkali meadow, alkali scrub; also in disturbed place, 0-480m.	**Absent:** Though there is one recent record (1995) and one historic record (1905) within ten miles, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Chorizanthe parryi var. *parryi*	Parry's spineflower	None	None	MSHCP	List 3.2 CA-Endemic	Chaparral, coastal scrub	Sandy or rocky soils, openings within vegetation, 40-1705m.	**Absent:** Though there are two recent records (1981, 1992) and two historic records (1903, 1917) within ten miles, there is no suitable habitat within the project area.
Chorizanthe polygonoides var. *longispina*	Long-spined spineflower	None	None	MSHCP	1B.2	Chaparral, coastal scrub, meadows, valley and foothill grassland.	Gabbroic clay, 30-1530m.	**Absent:** Though there are ten recent records (eight from 1992, two from 1993) within ten miles, there is no suitable habitat within the project area.
Chorizanthe xanti var. *leucotheca*	White-bracted spineflower	None	None		1B.2	Mojavean desert scrub, pinyon-juniper woodland.	300 - 1200m.	**Absent:** Though there is one historic record (1932) within ten miles, there is no suitable habitat within the project area.
Cladium californicum	California saw-grass	None	None		2.2	Freshwater and alkali marshes and seeps.	Freshwater or alkaline moist habitats. 60-600m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Cordylanthus maritimus ssp. *maritimus*	Salt marsh bird's-beak	FE	SE		1B.2	Coastal dunes, coastal salt marshes.	Slightly raised hummocks, 0-30m	**Absent:** Though there is one historic record (1888) within ten miles, there is no suitable habitat within the project area.
Cupressus forbesii	Tecate cypress	None	None		CNPS 1B.1	Closed-cone coniferous forest and chaparral.	Primarily on north-facing slopes; groves often associated with chaparral, 250-1500m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Dodecahema leptoceras	Slender-horned spineflower	FE	SE	MSHCP	1B.1 CA-Endemic	Chaparral, coastal scrub (alluvial fan sage scrub). Historically from Los Angeles, Riverside and San Bernardino Counties. Extirpated from much of range.	Flood deposited terraces and washes. Associates include *Encelia, Dalea,*and *Lepidospartum*, 200-760m.	**Absent:** Though there is one recent record (1983) within ten miles, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Dudleya multicaulis	Many-stemmed dudleya	None	None	MSHCP	1B.2 CA-Endemic	Chaparral, coastal scrub, valley and foothill grassland.	In heavy, often clay-type soils or grassy slopes, 15-790m.	**Absent:** Though there is one recent record (1996) within ten miles, there is no suitable habitat within the project area.
Eriastrum densifolium ssp. *sanctorum*	Santa Ana River woollystar	FE	SE	MSHCP	1B.1 CA-Endemic	Coastal scrub, chaparral. Formerly known from Orange and San Bernardino Counties, now known from one extended population.	In sandy or gravelly soils on river floodplains or terraced fluvial deposits, 91-610m.	**Absent:** Though there are four recent CNDDB record (three from 1994, one from 1998) within ten miles and one MSHCP record within five kilometers (no date given), there is no suitable habitat within the project area.
Erodium macrophylla	Round-leaved filaree	None	None	MSHCP	1B.1	Cismontane woodland, valley and foothill grassland.	Clay soils, 15-1200m.	**Absent:** Though there is one recent record (1993) within ten miles, there is no suitable habitat within the project area.
Galium californicum ssp. *primum*	California bedstraw	None	None	MSHCP	1B.2 CA-Endemic	Chaparral, lower montane coniferous forest.	Granitic or sandy soils, 1350-1700m.	**Absent:** Though there is one historic record (1891) within ten miles, there is no suitable habitat within project area.
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower	None	None		List 1A CA-Endemic	Marshes and swamps (coastal salt and freshwater). Historical from southern California.	10-1675m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Hordeum intercedens	Vernal barley	None	None	MSHCP	3.2	Coastal dunes, coastal scrub, valley and foothill grassland, vernal pools.	Saline flats and depressions, 5-1000m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Horkelia cuneata ssp. *puberula*	Mesa horkelia	None	None		1B.1 CA-Endemic	Chaparral, cismontane woodland, coastal scrub.	Sandy or gravelly soils, 70-810m.	**Absent:** Though there are four historic records (1885, 1888, and two from 1940) within ten miles, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Imperata brevifolia	California satintail	None	None		2.1	Chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps, riparian scrub.	Mesic, often alkali soils, 0-500m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None	None	MSHCP	1B.1	Coastal salt marshes, playas, valley and foothill grasslands, vernal pools.	Usually found on alkaline soils in playas, sinks, and grasslands, 1-1220m.	**Absent:** Though there is one recent record (1989) within ten miles, there is no suitable habitat within the project area.
Juglans californica californica	Southern California black walnut	None	None	MSHCP	4.2 CA-Endemic	Chaparral, cismontane woodland, and coastal scrub.	Alluvial soils, 50-900m.	**Absent:** Though there is one recent record (1991) within five kilometers, there is no suitable habitat within the project area.
Lepechinia cardiophylla	Heart-leaved pitcher sage	None	None	MSHCP	1B.2	Closed-cone coniferous forest, chaparral, cismontane woodland.	550-1370m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	None	None		1B.2	Chaparral, coastal scrub.	Dry soils, shrubland, 1-885m.	**Absent:** Though there are three recent CNDDB records (1989, 1997, and 1998) and two historic CNDDB records (1962, 1964) within ten miles, and one historic MSHCP record (1952) within five kilometers, there is no suitable habitat within the project area.
Lycium parishii	Parish's desert-thorn	None	None		2.3	Coastal scrub, Sonoran desert scrub.	Sandy plains and desert washes, 305-1000m.	**Absent:** Though there is one record (no date given) within ten miles, there is no suitable habitat within the project area.
Monardella pringlei	Pringle's monardella	None	None		List 1A CA-Endemic	Coastal scrub.	Sandy soils, 300-400m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Mucronea californica	California spineflower	None	None		4.2 CA-Endemic	Chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland.	Sandy soils, 0-1400m.	**Absent:** Though there is one historic record (1904) within five kilometers, there is no suitable habitat within the project area.
Muhlenbergia californica	California muhly	None	None	MSHCP	4.3	Coastal sage, chaparral, lower montane coniferous forest, meadows	Streams or seeps, 400-2,000 m	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Myosurus minimus ssp. apus	Little mousetail	None	None	MSHCP	3.1	Valley and foothill grassland, vernal pools.	Alkaline soils, 20-640m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Nasturtium gambelii	Gambel's water cress	FE	ST		1B.1	Marshes and swamps	Freshwater and brackish marshes at the margins of lakes and along streams, in or just above water level, 5-1305 m	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Navarretia fossalis	Spreading navarretia	FE	None	MSHCP	1B.1	Shadscale Scrub, Freshwater Wetlands freshwater-marsh, vernal-pools	freshwater-marsh, vernal-pools	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Navarretia prostrata	Prostrate navarretia	None	None	MSHCP	List 1B.1 CA-Endemic	Coastal scrub, valley and foothill grassland, vernal pools.	Alkaline soils in grassland, or in vernal pools. 15-700m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Orcuttia californica	California orcutt grass	FE	SE	MSHCP	1B.1	Vernal pools		**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Phacelia stellaris	Brand's phacelia	None	None	MSHCP	1B.1	Openings within coastal sage scrub	Below 400 m	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Phacelia suaveolens ssp. *keckii*	Santiago Peak phacelia	None	None		1B.3	Closed-cone coniferous forest, chaparral.	Open areas, sometimes along creeks, 545-1600m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Ribes divaricatum var. *parishii*	Parish's gooseberry	None	None		1B.1 CA-Endemic	Riparian woodland.	65-100m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Rorippa gambelii	Gambel's water cress	FE	SE		1B.1	Freshwater or brackish marshes and swamps.	5-330m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Satureja chandleri	San Miguel savory	None	None	MSHCP	1B	Chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland.	Rocky, Gabbroic or metavolcanic substrate. 120-1005m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Senecio aphanactis	Rayless ragwort	None	None		2.2	Chaparral, cismontane woodland, and coastal scrub.	Drying alkaline flats. 15-1800m.	**Absent:** Though there is one historic record (1909) within ten miles, there is no suitable habitat within the project area.
Sidalcea neomexicana	Salt spring checkerbloom	None	None		2.2	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, playas.	Alkali springs and marshes. 15-1530m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Sphenopholis obtusata	Prairie wedge grass	None	None		2.2	Cismontane woodland, meadows and seeps.	Mesic soils, 300-2000m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Symphyotrichum defoliatum	San Bernardino aster	None	None		List 1B.2 CA-Endemic	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland.	In vernally mesic soils near ditches, streams, springs, 2-2040 m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Texosporium sancti-jacobi	Woven-spored lichen	None	None			Chaparral.	Open sites. In California with *Adenostoma fasciculatum*, *Eriogonum* sp., and *Selaginella* sp. At pinnacles, on small mammal pellets. 290-660m.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Trichostema austromonanum ssp. *compactum*	Hidden Lake blue curls	FT	None	MSHCP		Lake margins in lodgepole Forest, Red Fir Forest, Closed-cone Pine Forest	San Jacinto Mountains	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Invertebrates								
Linderiella occidentalis santarosae	California linderiella	None	None	MSHCP, IUCN:NT		Unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.	Seasonal pools with very low alkalinity, conductivity, and total dissolved solids.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Streptocephalus wootoni	Riverside fairy shrimp	FE	None	MSHCP, IUCN:EN		Tectonic swales and/or earth slump basins in grassland and coastal sage scrub.	Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Brachinecta lynchii	Vernal pool fairy shrimp	FT	None	MSHCP, IUCN:VU		Cool-water seasonal vernal pools	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Cicindela tranquebarica viridissima	Greenest tiger beetle	None	None			Inhabits the woodlands adjacent to the Santa Ana River basin.	Usually found in open spots between trees.	**Absent:** Though there is one recent record (1987) within ten miles, there is no suitable habitat within the project area.
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	FE	None	MSHCP		Found only in areas of the Delhi Sands formation in southwestern San Bernardino and northwestern Riverside Counties.	Requires fine, sandy soils, often with wholly or partly consolidated dunes and sparse vegetation.	**Absent:** Though there are four recent records (two in 1996, 2000, and 2001) and one historic record (1941) within ten miles, there is no suitable habitat within the project area.
Carolella busckana	Busck's gallmoth	None	None			Unknown	Unknown	**Absent:** Though there is one historic record (1906) within ten miles, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Euphydryas editha quino	Quino checkerspot butterfly	FE	None	MSHCP, Xerces:CI		Sunny openings within chaparral and coastal sage shrublands.	Hills and mesas near the coast. Need high densities of food plants *Plantago erecta, P. insularis, Orthocarpus purpurescens*.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Ceratochrysis longimala	A cuckoo wasp	None	None			Unknown	Unknown	**Absent:** Though there is one historic record (1906) within ten miles, there is no suitable habitat within the project area.
Fish								
Gila orcutti	Arroyo chub	None	SC	MSHCP, FSS		Los Angeles basin in southern coastal streams.	Slow water stream sections with mud or sand bottoms. Feed heavily on aquatic vegetation and associated invertebrates.	**Absent:** Though there are six recent CNDDB records (1995, 1996, 1997, 1998, 2000, and 2001) within ten miles and five recent MSHCP records (last record from 1997) within five kilometers, there is no suitable habitat within the project area.
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	None	SC	FSS		Headwaters of Santa Ana and San Gabriel Rivers. May be extirpated from the Los Angeles River system.	Requires permanent flowing streams with summer water temperatures of 17-20° C. Usually inhabits shallow cobble and gravel riffles.	**Absent:** Though there is one recent CNDDB record (1996) within ten miles and one historic MSHCP record (1974) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Catostomus santaanae	Santa Ana sucker	FT	SC	MSHCP, IUCN:VU, FSS		Endemic to Los Angeles basin south coastal streams.	Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water and algae.	**Absent:** Though there are nine recent CNDDB records (1998, 2000, 2004, three in 1991, and three in 2001) within ten miles and eight MSHCP records (last record from 1997) within five kilometers, there is no suitable habitat within the project area.
Amphibians								
Spea hammondii	Western spadefoot	None	SC	MSHCP, BLMS, IUCN:NT		Occurs primarily in grassland habitat, but can be found in valley-foothill hardwood woodlands.	Vernal pools or rain pools that persist with more than three weeks of standing water. Riparian habitats with suitable water resources may also be utilized.	**Absent:** Though there are two recent CNDDB records (1978, 1993) within ten miles and two MSHCP records (no dates given) within five kilometers, there is no suitable habitat within the project area.
Bufo californicus	Arroyo toad	FE	SC	MSHCP, IUCN:EN		Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, and desert wash.	Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	**Absent:** Though there are three historic records (last record from 1907) within five kilometers, there is no suitable habitat within the project area.
Rana aurora draytonii	California red-legged frog	FT	SC	MSHCP, IUCN:NT		deep-water pools with dense stands of overhanging willows and an intermixed fringe of cattails	dense, shrubby or emergent riparian vegetation closely associated with deep (greater than 2 1/3-foot deep) still or slow moving water	**Absent:** Though there are two historic records (last record from 1974) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Reptiles								
Emys marmorata	Western pond turtle	None	SC	MSHCP, IUCN:VU		Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation.	Require basking sites and sandy, open upland sites for egg-laying.	**Absent:** Though there are two historic records (last record from 1974) within five kilometers, there is no suitable habitat within the project area.
Anniella pulchra	California legless lizard	None	SC	FSS		Sandy or loose loamy soils under sparse vegetation.	Soil moisture is essential. They prefer soils with a high moisture content.	**Absent:** Though there are three historic records (last record from 1974) within five kilometers, there is no suitable habitat within the project area.
Coleonyx variegatus abbotti	San Diego banded gecko	None	None	MSHCP		Primarily a desert species, but also occurs cismontane chaparral, desert scrub, and open sand dunes.	Rocks, boards, fallen yucca stems, cow dung, and other litter serve as diurnal refugia.	**Absent:** Though there is one recent CNDDB record (2003) within ten miles and two historic MSHCP records (last record from 1974) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Phrynosoma coronatum	Coast horned lizard	None	SC	MSHCP, FSS (blainvilli pop.), BLMS (frontale pop.)		Inhabits coastal sage scrub and chaparral in arid and semi-arid climate conditions.	Prefers friable, rocky or shallow sandy soil.	**Not likely to occur:** Though there are six recent CNDDB records (1992, two in 1998, and three in 1989) and two historic records (1951, 1957) within ten miles and two MSHCP records (no date given) within five kilometers, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Sceloporus orcutti orcutii	Granite spiny lizard	None	None	MSHCP		Chaparral, coastal scrub, riparian woodland, yellow pine forest, pinyon-juniper woodlands.	Closely tied to fractured granodiorite rock outcrops, often present under granite flakes on boulders.	**Absent:** Though there are three historic records (last record from 1917) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Aspidoscelis hyperythra beldingi	Orange-throated whiptail	None	SC	MSHCP, IUCN:DD		Inhabits low elevation coastal scrub, chaparral and valley-foothill hardwood habitats.	Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food - termites.	**Not likely to occur:** Though there are ten recent CNDDB records (1990, 1993, two from 2003, and six from 1989) and eight historic records (1951, 1955, 1961, 1963, 1980, two from 1957, and one no date given) within ten miles and two historic MSHCP records (last record from 1974) within five kilometers, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Aspidoscelis tigris stejnegeri	Coastal whiptail	None	None	MSHCP		Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland and riparian areas.	Sandy or rocky soils, soils may be compacted or firm.	**Not likely to occur:** Though there is one recent CNDDB record (2001) within ten miles and one MSHCP record (no date given) within five kilometers, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Lichanura trivirgata roseofusca	Coastal rosy boa	None	None	FSS, BLMS		Chaparral; coastal canyons and hillsides, canyons, washes and mountains.	Prefers moderate to dense vegetation and rocky cover; habitats with a mix of brushy cover and rocky soil.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Diadophis punctatus modestus	San Bernardino ringneck snake	None	None	FSS		Most common in open, relatively rocky areas. Often in somewhat moist microhabitats near intermittent streams.	Avoids moving through open or barren areas by restricting movements to areas of surface litter or herbaceous vegetation.	**Absent:** Though there is one record (no date given) within five kilometers, there is no suitable habitat within the project area.
Lampropeltis zonata	California mountain kingsnake	None	SC	MSHCP, FSS		Inhabits a variety of habitats, including valley-foothill hardwood, coniferous, chaparral, riparian, and wet meadows.	Wooded areas near streams with rock outcrops, talus, or rotting logs exposed to the sun.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Thamnophis hammondii	Two-striped garter snake	None	SC	MSHCP, BLMS, FSS, IUCN:DD		wetland habitats such as streams, creeks and pools	streams with rocky beds and bordered by willows, also ponds, lakes, wetlands and vernal pools; mixed oak, oak woodlands and chaparral on coastal slopes	**Absent:** Though there is one historic record (1974) within five kilometers, there is no suitable habitat within the project area.
Thamnophis sirtalis infernalis	Californnia red-sided garter snake	None	SC	MSHCP		marshes, meadows, sloughs, ponds and slow-moving water courses	marsh and upland habitats for foraging; refugia near permanent water with riparian vegetation , and meadows adjacent to marshlands	**Absent:** Though there are two historic records (last record from 1974) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Crotalus ruber ruber	Northern red-diamond rattlesnake	None	SC	MSHCP		Chaparral, woodland, grassland, and desert areas.	Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	**Not likely to occur:** Though there are four recent CNDDB records (1988, 1992, 1996, and 2003) and eight historic records (1947, 1959, two from 1931, two from 1939, and two with no date given) within ten miles and two MSHCP records (no date given) within five kilometers, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Birds								
Phalacrocorax auritus albociliatuse	Double-crested cormorant	None	SC	MSHCP, IUCN:LC		Require lakes, rivers, reservoirs, estuaries, or use the ocean for foraging. Nest on mainland in tall trees, wide rock ledges on cliffs, or rugged slopes near (or in) the aquatic environments.	Perching sites must be barren of vegetation.	**Absent:** Though there are seven recent records (last record from 1998) within five kilometers, there is no suitable habitat within the project area.
Botaurus lentiginosus	American bittern	None	None	MSHCP, IUCN:LC		Emergent habitat of freshwater marshes and vegetated borders of ponds and lakes.	Marshes, meadows, and along the edges of shallow ponds.	**Absent:** Though there are three recent records (last record from 1998) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Nycticorax nycticorax nycticorax	Black-crowned night heron	None	None	MSHCP, BLMS, IUCN:LC		Various wetland habitats, including salt, brackish, and freshwater marshes, swamps, streams, lakes, and agricultural fields.	Nests in a platform of sticks placed in tree or cattails. Nests colonially; more than a dozen nests may be in a single tree.	**Absent:** Though there are four recent records (last record from 1998) within five kilometers, there is no suitable habitat within the project area.
Cathartes aura meridionalis	Turkey vulture	None	None	MSHCP		Forested or partly forested areas with nest sites such as rock outcrops, fallen trees, and abandoned buildings that are isolated from human and perhaps other mammalian disturbance.	Uses large trees, rock outcrops, and riparian thickets for roosting, perching, and sunning.	**Present:** Observed foraging within burrowing owl mitigation area within the project area. There are five recent records (last record from 1999) within five kilometers of project area. Suitable foraging habitat within project area, but no suitable nesting habitat. Suitable nesting sites in large Cottonwood trees along Santa Ana River.
Aquila chrysaetos	Golden eagle	None	SC, FP	MSHCP, BLMS, CDFS, IUCN:LC, BCC		Rolling foothill or coast-range terrain, where open grassland turns to scattered oaks, sycamores, or large digger pines.	Cliff-walled canyons provide nesting habitat in most parts of range; also large trees in open areas.	**Absent:** Though there are two recent records (last record from 1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Haliaeetus leucocephalus	Bald eagle	FD	SE, FP	MSHCP, CDFS, IUCN:LC		Ocean shorelines, lake margins, and river courses for both nesting and wintering. Most nests within one mile of water.	Nests in large, old-growth, or dominant live tree with open branches, especially Ponderosa Pine. Roosts communally in winter.	**Absent:** Though there are five historic records (1981 and four from 1975) within ten miles, there is no suitable foraging or nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Circus cyaneus	Northern harrier	None	SC	MSHCP, IUCN:LC		Coastal salt marsh and fresh-water marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain springs.	Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Absent:** Though there are five recent records (last record from 1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Elanus leucurus	White-tailed kite	None	FP	MSHCP		Nests in rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**May occur:** There are four recent records within five kilometers, and suitable foraging habitat within the burrowing owl mitigation area within the project area. There is no suitable nesting habitat within the project area.
Accipter cooperii	Cooper's hawk	None	SC	MSHCP, IUCN:LC		Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms, on river floodplains; also live in oaks.	**Absent:** Though there are eight recent records (last record from 1999) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Accipiter striatus	Sharp-shinned hawk	None	SC	MSHCP, IUCN:LC		Found in ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats but prefers riparian areas.	Requires north facing slopes with plucking perches. Nests usually within 275 ft of water.	**Absent:** Though there are three recent records (last record from 1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Buteo swainsoni	Swainson's hawk	None	ST	MSHCP, ABC, Audubon, USBC, FSS, BCC		Open desert, sparse shrub lands, grassland, or cropland containing scattered, large trees or small groves.	Nests in scattered trees within grassland, shrubland, or agricultural landscapes, especially along stream courses or in open woodlands.	**Absent:** Though there are two recent records (last record from 1999) within five kilometers, there is no suitable foraging or nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Buteo regalis	Ferruginous hawk	None	SC	MSHCP, Audubon, BLMS, IUCN:NT, BCC		Open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys and fringes or pinyon-juniper habitats.	Mostly eats lagomorphs, ground squirrels, and mice.	**Absent:** Though there are three recent records (last record from 1995) within five kilometers and recent observations above the project area, there is no suitable foraging or nesting habitat within the project area.
Falco mexicanus	Prairie falcon	None	SC	MSHCP, IUCN:LC, BCC		Inhabits dry, open terrain, either level or hilly.	Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	**Absent:** Though there is one recent record (1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Charadrius montanus	Mountain plover	None	SC	MSHCP, ABC, Audubon, BLMS, IUCN:VU, USBC, BCC		Nest in dry, open, shortgrass prairies or grasslands and winter in shortgrass plains, plowed fields, open sagebrush areas, and sandy deserts Relatively open areas with little vegetative cover where it forages for insects.	Relatively open areas with little vegetative cover where it forages for insects.	**Absent:** Though there is one historic record (1909) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	FC	SE	MSHCP, IUCN:LC, FSS, BCC		Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian thickets of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	**Absent:** Though there are three recent records (last record from 1993) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Asio otus	Long-eared owl	None	SC			Found in dense riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses.	Require adjacent open land productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	**Absent:** Though there is one historic record (1889) within five kilometers, there is no suitable foraging or nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Asio flammeus flammeus	Short-eared owl	None	SC	ABC, Audubon, IUCN:LC, USBC		Usually found in open areas with few trees, such as grasslands, prairies, tundra, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands.	Requires dense vegetation and tall grasses, brush; wetlands are used for resting and roosting cover; may roost on the ground	**Absent:** Though there is one recent record (1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Athene cunicularia	Burrowing owl	None	SC	MSHCP, BLMS, IUCN:LC, BCC		Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	Subterranean nester, dependent upon burrowing mammals, especially California ground squirrel.	**Present:** Observed inhabiting artificial burrows within the burrowing owl mitigation area within the project area. There are 11 recent CNDDB records (1989, 1998, 2005, 2007, two in 2002, two in 2003, and three in 2006) and one historic record (1986) within ten miles and seven historic MSHCP records (last record from 1982) within five kilometers of the project area. Suitable foraging and nesting habitat occurs within the burrowing owl mitigation area within the project area.
Chaetura vauxi vauxi	Vaux's swift	None	SC	IUCN:LC		Nest sites associated only with old growth stands of Douglas-fir. Forages over most terrains and habitats.	Roosts in hollow trees and snags, and occasionally in chimneys and buildings.	**Absent:** Though there are three recent records (last record from 1999) within five kilometers, there is no suitable foraging or nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Picoides pubescens turatie	Downy woodpecker	None	None	MSHCP		Generally nests in deciduous (often willow) woodlands, deciduous growth/oak woodlands, orchards, suburban plantings, and occasionally in conifers.	Requires abundant snags, and tree/shrub, tree/herbaceous, and shrub/herbaceous ecotones.	**Absent:** Though there are 18 recent records (last record from 1999) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Sphyrapicus thyroideus thyroideus	Williamson's sapsucker	None	None	MSHCP		Montane spruce-fir, Douglas fir, lodgepole pine, ponderosa pine forests and mixed deciduous-coniferous forest, oak-juniper and pine-oak forests	Cavity-nester, most often in Aspen trees.	**Absent:** Though there are two recent records (last record from 1998) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Empidonax traillii extimus	Southwestern willow flycatcher	FE	SE	MSHCP, Audubon, USBC		Restricted to riparian woodlands along streams and rivers with mature, dense stands of willows (*Salix* spp.), cottonwoods (*Populus* spp.) or smaller spring fed or boggy areas with willows or alders (*Alnus* spp.).	Nests from zero to 13 feet above ground in thickets of trees and shrubs approximately 13 to 23 feet tall with a high percentage of canopy cover and dense foliage.	**Absent:** Though there is one recent CNDDB record (1991) within ten miles and six recent MSHCP records (last record from 1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Lanius ludovicianus	Loggerhead shrike	None	SC	MSHCP, IUCN:LC, BCC		Savannah, scrub, orchards, grassland.	Nests in dense, thorny shrubs and small trees. Uses thorns and barb wire fences to hook prey items.	**May occur:** There is one recent CNDDB record (1994) within ten miles and 15 recent MSHCP records (last record from 1999) within five kilometers, and suitable foraging habitat within the burrowing owl mitigation area within the project area. No suitable nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Vireo bellii pusillus	Least Bell's vireo	FE	SE	MSHCP, ABC, Audubon, IUCN:NT, USBC, BCC		Summer resident of southern California. Inhabits low riparian growth in vicinity of water or in dry river bottoms, below 2,000 ft.	Nests placed along margins of bushes or twigs projecting into pathways, usually willow, *Baccharis*, mesquite.	**Absent:** Though there are ten recent CNDDB records (1987, 1994, 1999, 2004, 2007, two from 2001, and three from 2003) and two historic records (1983, 1978) within ten miles and eight recent MSHCP records (last record from 1998) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Eremophila alpestris actia	California horned lark	None	SC	MSHCP, IUCN:LC		Open habitats, usually where trees and large shrubs are absent.	Breed in level or gently sloping shortgrass prairie, montane meadows, "bald" hills, opens coastal plains, fallow grain fields, and alkali flats	**Absent:** Though there are 16 historic records (last record from 1905) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Tachycineta bicolor	Tree swallow	None	None	MSHCP		Frequents valley foothill and montane riparian habitats below 2,700 m (9000 ft) for breeding within its range.	Nests almost exclusively in cavity-containing trees or snags with cavities that are near, or preferably in, water. Forage primarily over and around ponds, marshes, rivers, lakes, and estuaries.	**Absent:** Though there are five recent records (last record from 1998) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Campylorhynchus brunneicapillus cousei	Cactus wren	None	SC	MSHCP		Southern California coastal sage scrub.	Requires tall *Opuntia* cactus for nesting and roosting.	**Not likely to occur:** Though there are ten recent records (last record from 1991) within five kilometers, the cacti within the burrowing owl mitigation area within the project area is considered marginal nesting and roosting habitat.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Polioptila californica californica	Coastal California gnatcatcher	FT	SC	MSHCP, ABC, Audubon, IUCN:LC, USBC		Obligate permanent resident of coastal sage scrub below 2,500 ft in southern California.	Low, coastal sage scrub, in arid washes, on mesas and slopes. Prefers stands dominated by *Artemisia californica*.	**Absent:** Though there are 37 recent CNDDB records (dates from 1988-2006) and one historic record (1924) within ten miles and three historic MSHCP records (last record from 1980) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Catharus ustulatus	Swainson's thrush	None	None	FSS, MSHCP		Nests and forages near water in wooded riparian habitats.	Willow thickets of the lowlands along shaded streams.	**Absent:** Though there is one recent record (1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Vermivora ruficapilla ridgwayi	Nashville warbler	None	None	MSHCP		Breeds in pine, hardwood and conifer forests in the Sierras and in montane chaparral habitats	In summer habitat in the San Gabriel and San Bernardino Mountains, where breeding is presumed but not observed to occur, individuals are found on shaded slopes within mixed coniferous forests with California black oaks and yellow pines and brush communities with Manzanita.	**Absent:** Though there are three recent records (last record from 1997) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Dendroica petechia brewsteri	Yellow warbler	None	SC	MSHCP, IUCN:LC		Riparian woodlands. Prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging.	Low, bushy, open-canopy riparian woodland.	**Absent:** Though there is one recent CNDDB record (2000) within ten miles and three recent MSHCP records (last record from 1997) within five kilometers, there is no suitable foraging or nesting habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Oporornis tolmiei tolmiei	MacGillivray's warbler	None	None	MSHCP		Inhabits valley foothill riparian, coastal Douglas-fir, redwood, montane riparian and desert riparian habitats. Prefers secondary-growth woodlands, brushy areas near water and dense willow canyon drainages	Requires dense undergrowth and moderate cover.	**Absent:** Though there is one recent record (1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Wilsonia pusilla pileolata	Wilson's warbler	None	None	MSHCP		Breeding habitats include montane meadows and low, dense willow thickets often on steep slopes.	Prefer native willow habitat during spring migration.	**Absent:** Though there are 11 recent records (last record from 1998) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Icteria virens	Yellow-breasted chat	None	SC	MSHCP, IUCN:LC		Found in dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories. Nesting areas are associated with streams, swampy ground, and the borders of small ponds.	Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forage and nest within 10 ft of the ground.	**Absent:** Though there is one recent CNDDB record (2000) within ten miles and 16 recent MSHCP records (last record from 1999) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	None	SC	MSHCP, IUCN:LC		Resident in southern California coastal sage scrub and sparse mixed chaparral.	Frequents relatively steep, often rocky hillsides with grass and forb patches.	**Not likely to occur:** Though there are four recent CNDDB records (1997, 1999, 2001, and 2003) within ten miles and four recent MSHCP records (last record from 1999) within five kilometers, the burrowing owl mitigation area within the project area is considered marginal foraging and nesting habitat.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Amphispiza belli belli	Bell's sage sparrow	None	SC	MSHCP, IUCN:LC, BCC		Nests in hard chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range.	Nests located on the ground beneath shrub or in a shrub 6-18 inches above ground.	**Not likely to occur:** Though there are two recent CNDDB records (1993, 2001) within ten miles and 11 recent MSHCP records (last record from 1999) within five kilometers, the burrowing owl mitigation area within the project area is considered marginal foraging and nesting habitat.
Zonotrichia lincolnii alticola	Lincoln's sparrow	None	None	MSHCP		Breeds in wet montane meadows of corn lily, sedges and low willows.	Prefer dense, low underbrush often in disturbed edges with grasses and weeds mixed with shrubs.	**Absent:** Though there are four recent records (last record from 1995) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Agelaius tricolor	Tricolored blackbird	None	SC	MSHCP, ABC, Audubon, BLMS, IUCN:LC, USBC, BCC		Highly colonial species, most numerous in the Central Valley and vicinity. Largely endemic to California.	Requires open water, protective nesting substrate and foraging area with insect prey within a few km of the colony.	**Absent:** Though there are two recent CNDDB records (1992, 1999) and one historic record (1950) within ten miles and six historic MSHCP records (last record from 1974) within five kilometers, there is no suitable foraging or nesting habitat within the project area.
Carduelis lawrencei	Lawrence's goldfinch	None	None	BCC, ABC, Audubon, IUCN:LC, USBC		Nests in open oak or other arid woodland and chaparral, near water. Nearby herbaceous habitats used for feeding.	Closely associated with oaks.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Mammals								
Myotis yumanensis	Yuma myotis	None	None	BLMS, IUCN:LC, WBWG:LM		Riparian, desert scrub, moist woodlands and forests. Nursery colonies usually are in buildings, caves and mines, and under bridges.	Near open water. Nursery colonies usually are in buildings, caves and mines, and under bridges.	**Absent:** Though there is one recent record (1997) within ten miles, there is no suitable roosting habitat within the project area. May occasionally forage over the project area.
Antrozous pallidus	Pallid bat	None	SC	BLMS, IUCN:LC, FSS, WBWG:H		Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites. Arid, low elevations (<6,000 feet); roost in deep crevices in rock faces, buildings, or bridges.	**Absent:** Though there is one historic record (1974) within five kilometers, there is no suitable roosting habitat within the project area. May occasionally forage over the project area.
Nyctinomops femorosaccus	Pocketed free-tailed bat	None	SC	IUCN:LC, WBWG:M		Variety of arid areas within pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian.	Rocky areas with high cliffs.	**Absent:** Though there are two recent records (1988, 1997) and two historic records (1985, 1986) within ten miles, there is no suitable roosting habitat within the project area. May occasionally forage over the project area.
Eumops perotis californicus	California mastiff bat	None	SC	BLMS, IUCN:LC, WBWG:H		Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Absent:** Though there are three recent records (1992, 1993, and 1997) and two historic records (1933, 1954) within ten miles, there is no suitable roosting habitat within the project area. May occasionally forage over the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Lasiurus xanthinus	Western yellow bat	None	SC	WBWG:H, IUCN:LC		Found in wooded areas and desert scrub.	Roosts in foliage, particularly in palm trees.	**May occur:** There are four recent records (1989, 1999, and two from 1996) and one historic record (1984) within ten miles, and suitable roosting habitat within palm trees within the project area.
Mustela frenata latriostra	Long-tailed weasel	None	None	MSHCP		Chaparral, coastal scrub, grassland, riparian forest.	Areas supporting large populations of small mammals (burrows) and birds. Appears to be partially restricted to habitats in close proximity to standing water.	**Absent:** Though there is one historic record (1974) within five kilometers, there is no suitable habitat within the project area.
Taxidea taxus	American badger	None	SC	IUCN:LC		Grasslands, savannas, and mountain meadows.	Friable soils, and relatively open, uncultivated ground.	**Absent:** Though there is one historic record (1974) within five kilometers, there is no suitable habitat within the project area.
Canis latrans clepticus	Coyote	None	None	MSHCP		Chaparral, coastal scrub, grassland, short-grass prairie, semiarid sagebrush, and broken forests.	Natal dens are associated with brush-covered slopes, thickets, hollow logs, rocky ledges, and burrows.	**Not likely to occur:** Though there is one historic record (1974) within five kilometers, the chain link fence topped with barbed wire that surrounds the project area likely represents an effective barrier to foraging coyotes.
Lynx rufus californicus	Bobcat	None	None	MSHCP		Primarily in foothills comprised of chaparral, but also in coastal scrub, grassland, woodland, and riparian forest.	Rocky and brushy areas near springs or other perennial water sources.	**Absent:** Though there is one historic record (1974) within five kilometers, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None	SC	MSHCP, IUCN:VU, FSS		Coastal scrub, grassland.	Areas of sparse vegetation in fine, sandy soils.	**Absent:** Though there are four recent records (2000, 2001, and two from 1999) and one historic record (1912) within ten miles, there is no suitable habitat within the project area.
Chaetodipus fallax fallax	Northwestern San Diego pocket mouse	None	SC	MSHCP, IUCN:DD		Coastal scrub, chaparral, grasslands.	Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	**Absent:** Though there are 11 recent CNDDB records (1991, 1994, 1995, two from 1999, and six from 1992) within ten miles and two recent MSHCP records (last record from 1995) within five kilometers, there is no suitable habitat within the project area.
Dipodomys stephensi	Stephens' kangaroo rat	FE	ST	MSHCP		Primarily annual and perennial grasslands, but also occurs in coastal scrub and sagebrush with sparse canopy cover.	Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	**Not likely to occur:** Though there are 28 recent records within ten miles, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE	SC	MSHCP, IUCN:DD		Riversidean alluvial fan sage scrub.	Sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub.	**Absent:** There is no suitable habitat within the project area and no records within ten miles.
Onychomys torridus ramona	Southern grasshopper mouse	None	SC	IUCN:DD		Desert scrub.	Requires friable soils for digging. Prefers low to moderate shrub cover.	**Absent:** Though there are two historic records (1908, 1923) within ten miles, there is no suitable habitat within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Neotoma lepida intermedia	San Diego desert woodrat	None	SC	MSHCP, IUCN:DD		Coastal scrub, chaparral, grassland, oak woodland.	Particularly abundant around rock outcrops, boulders, cholla cacti patches, rocky cliffs and slopes, and areas of dense undergrowth.	**Not likely to occur:** Though there is one recent CNDDB record (1999) within ten miles and one historic MSHCP record (1974) within five kilometers, the burrowing owl mitigation area habitat within project area has not likely been colonized by this species from adjacent areas (if, in fact they occur within close proximity to the project area).
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	SC	MSHCP, IUCN:LC		Coastal sage scrub habitats in southern California.	Intermediate canopy stages of shrub habitats and open shrub/herbaceous and tree/herbaceous edges.	**Absent:** Though there are three recent CNDDB records (1997, 1999, and 2001) within ten miles and three recent MSHCP records (last record from 1999) within five kilometers, the chain link fence that surrounds the project area likely represents an effective barrier.
Sylvilagus bachmani cinerascens	Brush rabbit	FE	SE	MSHCP, IUCN:LC		Most often in chaparral, but also coastal scrub and oak woodland.	Brushy areas; concentrate their activities at the edge of brushy habitats.	**Absent:** Though there is one historic record (1974) within five kilometers, the chain link fence that surrounds the project area likely represents an effective barrier.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Habitats								
Riversidean Alluvial Fan Sage Scrub		None	None			Open vegetation on alluvial fans and outwashes on sandy, rocky alluvia during infrequent floods.	At the base of the San Gabriel Mountains. Dominated by *Artemesia tridentata, Eriogonum fasciculatum, Eriodictyon crassifolium, Yucca whipplei*, and *Lepidospartum squamatum*.	**Absent:** Not identified within the project area.
Southern California Arroyo Chub/Santa Ana Sucker Stream		None	None			Streams having sand, rubble, or boulder bottoms of clear water with riparian vegetation comprised of *Alnus rhombifolia, Platanus racemosa*, and *Salix* spp.	Streams within Southern California known to host Arroyo Chub/Santa Ana Sucker	**Absent:** Not identified within the project area.
Southern Coast Live Oak Riparian Forest		None	None			Bottom lands and outer floodplains along larger streams, on fine-grained rich alluvium.	Dominated by *Quercus agrifolia*; open to locally dense evergreen riparian woodland, rich in herbs.	**Absent:** Not identified within the project area.
Southern Cottonwood Willow Riparian Forest		None	None			Sub-irrigated and frequently overflowed lands along rivers and streams.	Dominated by *Populus fremontii*, *P. trichocarpa*, and tree willows; tall, open, broadleaved winter-deciduous riparian forest with a shrubby willow understory.	**Absent:** Not identified within the project area.
Southern Interior Cypress Forest		None	None			isolated stands of *Cupressus forbesii* or *Cupressus arizonica* ssp. *Stephensonii*, found on Otay Mountain.	The understory consists of chaparral and scrub	**Absent:** Not identified within the project area.
Southern Riparian Forest		None	None			Dominated by elements characteristic of Southern Coast Live Oak Riparian Forest, Southern Arroyo Willow Riparian Forest, or Southern Cottonwood Willow Riparian Forest.		**Absent:** Not identified within the project area.

Scientific Name	Common Name	Federal Status	State Status	Other	CNPS Status	General Habitat	Micro Habitat	Potential For Occurrence
Southern Riparian Scrub		None	None			Open to impenetrable habitat dominated by *Salix* spp. Relatively fine-grained sand and gravel bars.	Along and at the mouths of most perennial and many intermittent streams of the Coast and Transverse Rangessouthe of Pt. Conception.	**Absent:** Not identified within the project area.
Southren Sycamore Alder Riparian Woodland		None	None			Very rocky streambeds subject to seasonally high-intensity flooding.	Dominated by *Platanus racemosa* and often *Alnus rhombifolia*; tall, open, broadleafed winter-deciduous streamside stands which seldom form a closed canopy.	**Absent:** Not identified within the project area.
Southern Willow Scrub		None	None			Dense, broadleafed, winter-deciduous riparian thickets. Loose, sandy or fine gravelly alluvium deposited near stream channels during flood flows.	Dominated by *Salix* spp., with scattered emergent *Populus fremontii* and *Platanus racemosa.*Along major rivers of coastal southern California.	**Absent:** Not identified within the project area.

Federal

FT = Federal Threatened

FE = Federal Endangered

FPT = Federal Proposed Threatened

FPE = Federal Proposed Endangered

FPD = Federal Proposed Delisting

FC = Federal Candidate

FD = Federal Delisted

State

CE = California listed as Endangered

CT = California listed as Threatened

CR = California Rare Species

SC = California Species of Special Concern

FP = California Fully Protected

Other

FSS = Forest Service Sensitive

BLMS = Bureau of Land Management Sensitive

CDFS = California Dept. of Forestry Sensitive

MSHCP = Western Riverside County MSHCP-covered Species

IUCN = International Union for Conservation of Nature and Natural Resources

CR: Critically Endangered

DD: Data Deficient

EN: Endangered

LC: Least Concern

NT: Near Threatened

VU: Vulnerable

WBWG = Western Bat Working Group

H: High Priority

MH: Medium-High Priority

M: Medium Priority

LM: Low-Medium Priority

USBC = The United States Bird Conservation Watch List

ABC = The American Bird Conservancy Green List

Audubon = WatchList

Xerces = Xerces Society

CI: Critically Imperiled

DD: Data Deficient

IM: Imperiled

VU: Vulnerable

CNPS

List 1B = Plants rare or endangered in California and elsewhere

List 2 = Rare, threatened, or endangered in California, but more common elsewhere.

List 3 = We need more information about this plant (Review List).

0.1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 = Fairly endangered in California (20-80% occurrences threatened)

0.3 = Not very endangered in California (<20% of occurrences threatened)

CA-Endemic = Plant's native range is confined to California

APPENDIX 6.3-C

OBSERVED / EXPECTED SPECIES LIST

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Plants					
Crystalline Iceplant*	*Mesembryanthemum crystallinum*	Aizoaceae	Observed	RERC	Arnold and Tuma 2004
New Zealand Spinach*	*Tetragonia tetragonioides*	Aizoaceae	Observed	RERC	Arnold and Tuma 2004
Tumbling pigweed*	*Amaranthus albus*	Amaranthaceae	Observed	Toro Company Property	LSA 2007
Lemonadeberry	*Rhus integrifolia*	Anacardiaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Sugarbush	*Rhus ovata*	Anacardiaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Peruvian pepper tree*	*Schinus molle*	Anacardiaceae	Observed	Toro Company Property	LSA 2007
Mexican Fan Palm*	*Washingtonia robusta*	Arecaceae	Observed	RERC, adjacent uplands	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2004-2007; current survey
Narrow-leaved milkweed	*Asclepias fascicualris*	Asclepidaceae	Observed/Planted	RERC BuOw Mitigation Area, Wilderness Property, Toro Company Property	Tuma and Cummins 2007; M. Tuma, personal observation, 2006-2007; LSA 2007
Annual bursage*	*Ambrosia acanthicarpa*	Asteraceae	Observed	RERC, Wilderness Property, Toro Company Property	LSA 2007; M. Tuma, personal observation, 2007; current survey
Western Ragweed	*Ambrosia psilostachya*	Asteraceae	Observed	RERC	Tuma and Cummins 2007; current survey
Tarragon	*Artemesia dracunculus*	Asteraceae	Observed	Toro Company Property, Wilderness Property, upland adjacent to RERC; Santa Ana River riparian corridor	LSA 2007; M. Tuma, personal observation, 2007; current survey
California sagebrush	*Artemesia californica*	Asteraceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Emory's baccharis	*Baccharis emoryi*	Asteraceae	Observed	Toro Company Property	LSA 2007
Mulefat	*Baccharis salicifolia*	Asteraceae	Observed	RERC, Toro Company Property	Arnold and Tuma 2004; LSA 2007; current survey
Common beggar's tick*	*Bidens pilosa*	Asteraceae	Observed	Toro Company Property	LSA 2007
Tocalote*	*Centaurea meletensis*	Asteraceae	Observed	uplands adjacent to RERC, Toro Company Property	LSA 2007; current survey

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Canadian horseweed*	*Conyza canadensis*	Asteraceae	Observed	RERC, Toro Company Property	M. Tuma, personal observation, 2004-2007; LSA 2007; current survey
African daisy*	*Dimorphotheca aurantiaca*	Asteraceae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
California encelia	*Encelia californica*	Asteraceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Brittlebush	*Encelia farinosa*	Asteraceae	Observed	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
California Everlasting	*Gnaphalium californicum*	Asteraceae	Observed	RERC	Arnold and Tuma 2004; current survey
Sunflower	*Helianthus sp.*	Asteraceae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
Fascicled tarweed	*Hemizonia fasciculata*	Asteraceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Telegraph weed	*Heterotheca grandiflora*	Asteraceae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; current survey
Prickly lettuce*	*Lactuca seriola*	Asteraceae	Observed	RERC, Wilderness Property	Tuma and Cummins 2007; M. Tuma, personal observation, 2004-2007
Dwarf goldfields	*Lasthenia californica*	Asteraceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Tidy tips	*Layia platyglossa*	Asteraceae	Observed	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
California aster	*Lessingia filaginifolia*	Asteraceae	Observed	RERC BuOw Mitigation Area, Wilderness Property	Tuma and Cummins 2007; M. Tuma, personal observation, 2007
Prickly sow thistle*	*Sonchus asper*	Asteraceae	Observed	RERC, adjacent uplands, Wilderness Property	M. Tuma, personal observation 2004-2007
Common sow thistle*	*Sonchus oleraceus*	Asteraceae	Observed	RERC, Toro Company Property	LSA 2007; current survey
Virgate Wreath-plant	*Stephanomeria virgata*	Asteraceae	Observed	RERC	Arnold and Tuma 2004
Golden crownbeard*	*Verbesina encelioides*	Asteraceae	Observed	Toro Company Property	LSA 2007
Common fiddleneck	*Amsinckia menziesii var. intermedia*	Boraginaceae	Observed	RERC, RERC BuOw Mitigation Area	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey
Black mustard*	*Brassica nigra*	Brassicaceae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Field Mustard*	*Hirschfeldia incana*	Brassicaceae	Observed	RERC, Toro Company Property	Arnold and Tuma 2004; M. Tuma, personal observation 2004-2007; LSA 2007
London Rocket*	*Sisymbrium irio*	Brassicaceae	Observed	RERC	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2004-2007; current survey
Snake Cholla	*Opuntia californica var. californica*	Cactaceae	Observed/Planted	RERC BuOw Mitigation Area	Planted by SWCA in 2008; current survey
Coast prickly pear	*Opuntia littoralis*	Cactaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Mexican elderberry	*Sambucus mexicana*	Caprifolicaeae	Observed/Planted	RERC BuOw Mitigation Area, Wilderness Property, Toro Company Property	Tuma and Cummins 2007; M. Tuma, personal observation, 2007; LSA 2007; current survey
Russian thistle*	*Salsola tragus*	Chenopodiaceae	Observed	RERC and adjacent uplands, Wilderness Property, Toro Company Property	Arnold and Tuma 2004, Tuma and Cummins 2007; M. Tuma, personal observation 2004-2007; LSA 2007; current survey
Field bindweed*	*Concolvulus arvense*	Convolvulaceae	Observed	RERC, Wilderness Property	M. Tuma, personal observation, 2004-2007
Spotted spurge*	*Chamaesyce maculata*	Euphorbiaceae	Observed	Toro Company Property	LSA 2007
Spurge*	*Chamaesyce sp.*	Euphorbiaceae	Observed	RERC, Wilderness Property	Tuma and Cummins, 2007; M. Tuma, personal observation, 2004-2007; current survey
Castor bean*	*Ricinus communis*	Euphorbiaceae	Observed	Wilderness Property, Toro Company Property	M. Tuma, personal observation, 2007; LSA 2007
Deerweed	*Lotus scoparius*	Fabaceae	Observed/Planted	RERC, RERC BuOw Mitigation Area, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2007; LSA 2007; current survey
Arroyo lupine	*Lupinus succulentus*	Fabaceae	Observed/Planted	RERC, RERC BuOw Mitigation Area	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey
Mexican Palo Verde*	*Parkinsonia aculeata*	Fabaceae	Observed	RERC	Arnold and Tuma 2004
Pinpoint clover	*Trifolium gracilentum*	Fabaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Coast live oak	*Quercus agrifolia*	Fagaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Red-stem Filaree*	*Erodium cicutarium*	Geraniaceae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2007; current survey
Common phacelia/Wild heliotrope (G)	*Phacelia distans*	Hydrophyllaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Blue-eyed grass	*Sisyrinchium bellum*	Iridaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Horehound*	*Marrubium vulgare*	Lamiaceae	Observed	RERC and adjacent uplands, RERC BuOw Mitigation Area, Toro Company Property	Tuma and Cummins 2007; M. Tuma, personal observation 2004-2007; LSA 2007; current survey
White sage	*Salvia apiana*	Lamiaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Black sage	*Salvia mellifera*	Lamiaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Common goldenstar	*Bloomeria crocea*	Liliaceae	Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Blue dicks	*Dichelostemma capitatum*	Liliaceae	Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Cheeseweed*	*Malva parviflora*	Malvaceae	Observed	RERC	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; current survey
Mulberry*	*Morus rubra*	Moraceae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
California poppy	*Eschscholzia californica*	Papaveraceae	Observed/Planted	RERC, RERC BuOw Mitigation Area	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey
Western sycamore	*Platanus racemosa*	Platanaceae	Observed	Santa Ana River riparian corridor	M. Tuma, personal observation, 2004-2007; current survey
Giant reedgrass*	*Arundo donax*	Poaceae	Observed	Santa Ana River riparian corridor	M. Tuma, personal observation, 2004-2007; current survey
Wild Oat*	*Avena fatua*	Poaceae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2007; current survey
Ripgut Grass*	*Bromus diandrus*	Poaceae	Observed	RERC	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey
Foxtail chess*	*Bromus madritensis ssp. madritensis*	Poaceae	Observed	RERC, Toro Company Property	Arnold and Tuma 2004; Tuma and Cummins 2007; LSA 2007; current survey

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Bermuda Grass*	*Cynodon dactylon*	Poaceae	Observed	RERC and adjacent uplands	Arnold and Tuma 2004; Tuma and Cummins 2007; current survey
Saltgrass	*Distichlis spicata*	Poaceae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
June grass (G)	*Koeleria macrantha*	Poaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Foothill needlegrass (G)	*Nassella lepida*	Poaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Purple needlegrass	*Nassella pulchra*	Poaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Sandberg bluegrass	*Poa secunda*	Poaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Mediterranean Grass*	*Schismus barbatus*	Poaceae	Observed	RERC prior to Units 1 and 2	Tuma and Cummins 2007; current survey
Three-week fescue	*Vulpia microstachys*	Poaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
California buckwheat	*Eriogonum fasciculatum*	Polygonaceae	Observed	RERC, RERC BuOw Mitigation Area, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2007; LSA 2007; current survey
Common purslane*	*Portulaca oleraceae*	Portulacaceae	Observed	Toro Company Property	LSA 2007
San Bernardino larkspur (G)	*Delphinium parryi*	Ranunculaceae	Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Toyon	*Heteromeles arbutifolia*	Rosaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Peach*	*Prunus persica*	Rosaceae	Observed	Toro Company Property	LSA 2007
Gooding's willow	*Salix goodingii*	Salicaceae	Observed	Toro Company Property	LSA 2007
Arroyo willow	*Salix lasiolepis*	Salicaceae	Observed	Santa Ana River riparian corridor; Wilderness Property	M. Tuma, personal observation, 2004-2007; current survey
Fremont cottonwood	*Populus fremontii*	Salicaceae	Observed	Santa Ana River riparian corridor	M. Tuma, personal observation, 2004-2007; current survey
Owl's clover	*Castilleja exserta*	Scrophulariaceae	Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007
Chinese houses (G)	*Collinsia heterophylla*	Scrophulariaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey
Yellow bush penstemon	*Keckiella antirrhinoides*	Scrophulariaceae	Observed/Planted	RERC BuOw Mitigation Area	Tuma and Cummins 2007; current survey

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Tree Tobacco*	*Nicotiana glauca*	Solanaceae	Observed	RERC, Toro Company Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2005-2007; LSA 2007; current survey
Tamarisk*	*Tamarix sp.*	Tamaracaceae	Observed	RERC , Santa Ana River riparian corridor	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; current survey
Puncture vine*	*Tribulus terrestris*	Zygophyllaceae	Observed	RERC, Wilderness Property	Tuma and Cummins 2007; M. Tuma, personal observation, 2007; current survey
Invertebrates					
Green fruit beetle	*Cotinus mutabilis*	Cetonidae	Observed	Toro Company Property	LSA 2007
White-lined sphinx moth	*Hyles lineata*	Sphingidae	Observed	Toro Company Property	LSA 2007
Monarch butterfly	*Danaus plexippus*	Nymphalidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
White cabbage butterfly*	*Pieris rapae*	Pieridae	Observed	RERC, Wilderness Property	M. Tuma, personal observation, 2004-2007
Fish					
Santa Ana sucker	*Catostomus santaanae*	Catostomidae	Expected	Santa Ana River	CNDDB 2008
Arroyo chub	*Gila orcuttii*	Cyprinidae	Expected	Santa Ana River	CNDDB 2008
Santa Ana speckled dace	*Rhinichthys osculus ssp.*	Cyprinidae	Expected	Santa Ana River	CNDDB 2008
Amphibians					
California toad	*Bufo boreas halophilus*	Bufonidae	Expected	Santa Ana River riparian corridor	Stebbins 2003
California chorus frog	*Pseudacris cadaverina*	Hylidae	Expected	Santa Ana River riparian corridor	Stebbins 2003
Pacific chorus frog	*Pseudacris regilla*	Hylidae	Observed	RERC, Santa Ana River riparian corridor	Tuma and Cummins 2007; M. Tuma, personal observation, 2004-2007
American bullfrog*	*Rana catesbeiana*	Ranidae	Expected	Santa Ana River riparian corridor	Stebbins 2003
Reptiles					
Western painted turtle*	*Chrysemys picta bellii*	Emydidae	Expected	Santa Ana River riparian corridor	Stebbins 2003
Red-eared slider*	*Trachemys scripta elegans*	Emydidae	Expected	Santa Ana River riparian corridor	Stebbins 2003

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
San Diego alligator lizard	*Elgaria multicarinata webbii*	Anguidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
Western fence lizard	*Sceloporus occidentalis*	Phrynosomatidae	Observed	RERC, Toro Company Property	Arnold and Tuma 2004; LSA 2007
Side-blotched lizard	*Uta stansburiana*	Phrynosomatidae	Observed	RERC, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2007; LSA 2007
Skilton's skink	*Eumeces skiltonianus skiltonianus*	Scincidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
Western yellow-bellied racer	*Coluber constrictor mormon*	Colubridae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
California kingsnake	*Lampropeltis getula californiae*	Colubridae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
San Diego gophersnake	*Pituophis catenifer annectens*	Colubridae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
Southern Pacific rattlesnake	*Crotalus oreganus helleri*	Viperidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Stebbins 2003
Birds					
American white pelican	*Pelecanus erythrorhynchos*	Pelecanidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Great egret	*Ardea ardea*	Ardeidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Snowy egret	*Egretta thula*	Ardeidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Mallard	*Anas platyrhynchos*	Anatidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Turkey vulture	*Cathartes aura*	Cathartidae	Observed	RERC and adjacent uplands, RERC BuOw Mitigation Area, Wilderness Property	M. Tuma, personal observation, 2004-2007
Red-tailed hawk	*Buteo jamaicensis*	Accipitridae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation 2005-2007; current survey
Ferruginous hawk	*Buteo regalis*	Accipitridae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
American kestrel	*Falco sparverius*	Falconidae	Observed	RERC, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; LSA 2007
Killdeer	*Charadrius vociferus*	Charadriidae	Observed	RERC and adjacent uplands	Arnold and Tuma 2004, M. Tuma, personal observation, 2004-2007

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Western gull	*Larus occidentalis*	Laridae	Observed	RERC	M. Tuma, personal observation, 2004-2007
Rock dove*	*Columba livia*	Columbidae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation 2004-2007; current survey
Mourning dove	*Zenaida macroura*	Columbidae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; current survey
Great-horned owl	*Bubo virginianus*	Strigidae	Observed	Wilderness Property	Tuma, personal observation, 2007
Burrowing owl	*Athene cunicularia*	Strigidae	Observed	RERC, RERC BuOw Mitigation Area	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2007
Anna's hummingbird	*Calypte anna*	Trochilidae	Observed	RERC, Wilderness Property, Toro Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2007; LSA 2007
Downy woodpecker	*Picoids pubescens*	Picidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Ash-throated flycatcher	*Myiarchus cinerascens*	Tyrannidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
Western kingbird	*Tyrannus verticalis*	Tyrannidae	Observed	RERC, Wilderness Property	M. Tuma, personal observation, 2004-2007
Black pheobe	*Sayornis nigricans*	Tyrannidae	Observed	RERC, Wilderness Property, Toro Property	M. Tuma, personal observation, 2004-2007; LSA 2007
Say's phoebe	*Sayornis saya*	Tyrannidae	Observed	RERC	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007
Least Bell's vireo	*Vireo bellii pusillus*	Vireonidae	Expected	Santa Ana River riparian corridor, within one mile	CNDDB 2008
American crow	*Corvus brachyrhynchos*	Corvidae	Observed	RERC and adjacent uplands, Wilderness Property	M. Tuma, personal observation, 2004-2007; current survey
Common raven	*Corvus corax*	Corvidae	Observed	RERC and adjacent uplands, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; LSA 2007
Barn swallow	*Hirundo rustica*	Hirundinidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
Bushtit	*Psaltriparus minimus*	Aegithalidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003
Bewick's wren	*Thryomanes bewickii*	Troglodytidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003
Ruby-crowned kinglet	*Regulus calendula*	Regulidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Northern mockingbird	*Mimus polyglottos*	Mimidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
European starling*	*Sturnus vulgaris*	Sturnidae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007
Yellow-rumped warbler	*Dendroica coronata*	Parulidae	Observed	RERC and adjacent uplands, Wilderness Property, Toro Company Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; LSA 2007
Yellow warbler	*Dendroica petechia*	Parulidae	Expected	Santa Ana River riparian corridor	Sibley 2003
Common yellowthroat	*Geothlypis trichas*	Parulidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003
Dark-eyed junco	*Junco hyemalis*	Emberizidae	Expected	Uplands within one mile of RERC	Sibley 2003
Song sparrow	*Melospiza melodia*	Emberizidae	Expected	Uplands within one mile of RERC	Sibley 2003
California towhee	*Pipilo crissalis*	Emberizidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003
Spotted towhee	*Pipilo maculates*	Emberizidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Sibley 2003
White-crowned sparrow	*Zonotrichia leucophrys*	Emberizidae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007
Western meadowlark	*Sturnella neglecta*	Icteridae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
House finch	*Carpodacus mexicanus*	Fringillidae	Observed	RERC, adjacent uplands, Wilderness Property, Toro Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007; LSA 2007; current survey
Lesser goldfinch	*Carduelis psaltria*	Fringillidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
House sparrow*	*Passer domesticus*	Passeridae	Observed	RERC and adjacent uplands	M. Tuma, personal observation, 2004-2007; current survey
Mammals					
Opossum*	*Didelphis virginiana*	Didelphidae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2007
Fringed myotis	*Myotis thysanodes*	Vespertilionidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Long-eared myotis	*Myotis evotis*	Vespertilionidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
California myotis	*Myotis californicus*	Vespertilionidae	Expected	Adjacent uplands	Burt 1980
Western pipistrelle	*Pipistrellus hesperus*	Vespertilionidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980

Common Name	Scientific Name	Family	Observed/Expected	Location	Reference
Big brown bat	*Eptesicus fuscus*	Vespertilionidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Red bat	*Lasiurus blossevillii*	Vespertilionidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Raccoon	*Procyon lotor*	Procyonidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
Striped skunk	*Mephitis mephitis*	Mustelidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Coyote	*Canis latrans*	Canidae	Observed	Wilderness Property	M. Tuma, personal observation, 2007
Bobcat	*Lynx rufus*	Felidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
California ground squirrel	*Spermophilus beecheyi*	Sciuridae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; Tuma and Cummins 2007; M. Tuma, personal observation, 2004-2007
Valley pocket gopher	*Thomomys bottae*	Geomyidae	Observed	RERC, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007
California pocket mouse	*Perognathus californicus*	Heteromyidae	Expected	Uplands within one mile of RERC	Burt 1980
Pacific kangaroo rat	*Dipodomys agilis*	Heteromyidae	Expected	Uplands within one mile of RERC	Burt 1980
Western harvest mouse	*Reithrodontomys megalotis*	Cricetidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
California mouse	*Peromyscus californicus*	Cricetidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Deer mouse	*Peromyscus maniculatus*	Cricetidae	Observed	RERC prior to Units 1 and 2	Arnold and Tuma 2004
Dusky-footed woodrat	*Neotoma fuscipes*	Cricetidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
California vole	*Microtus californicus*	Cricetidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980
Desert cottontail	*Sylvilagus audubonii*	Leporidae	Observed	RERC and adjacent uplands, Wilderness Property	Arnold and Tuma 2004; M. Tuma, personal observation, 2004-2007
Mule deer	*Odocoileus hemionus*	Cervidae	Expected	Santa Ana River riparian corridor and adjacent uplands	Burt 1980

APPENDIX 6.3-D

CDFG CORRESPONDENCE

Michael Tuma

From: Leslie MacNair [LMacNair@dfg.ca.gov]
Sent: Friday, January 25, 2008 10:13 AM
To: Michael Tuma
Subject: Re: RERC burrowing owl consultation

Michael
Based on the information provided and my site visit on January 3, 2008, the Department of Fish and Game (Department) believes the potential impacts to the burrowing owl mitigation site will be minimized and/or mitigated with the measures proposed.

As discussed during our pre-project consultation, protocol surveys for burrowing owls need to be conducted this spring. Also, the proposed project will still need to go through CEQA and consistency review for MSHCP, which would include the completion of any other additional surveys that may be required under the MSHCP. Please understand that this e-mail does not serve as approval of the future proposed project under CEQA or for MSHCP, but provides Department concurrence that with the proposed measures, the mitigation site for the burrowing owls will be offset and minimized.

Feel free to contact me at (949) 458-1754, if you have any questions.
Thank you,

Leslie MacNair
Staff Envronmental Scientist
Department of Fish and Game
Inland Deserts Region

>>> "Michael Tuma" <mtuma@swca.com> 1/16/2008 5:44 PM >>>
Hi Leslie,

As I mentioned in the voicemail I left earlier today, the California Energy Commission (CEC) will require documentation of any consultation with agency personnel in support of the Riverside Energy Resource Center
(RERC) project. I've also been requested by the client (Power Engineers) to provide a letter from you with your determination of the results of the consultation in an appendix of the report. So that you can more easily write the letter, here is a short description of the project:

The RERC site was constructed between 2004 and 2006 following the CEC's approval of the RERC Application for Small Power Plan Exemption (04-SPPE-1). Existing facilities at the 12-acre RERC site include Units
1 & 2, an administration building, a switchyard, a stormwater detention basin sized to accommodate a greater than 100 year storm event, paved roads, parking areas, and equipment storage areas located immediately north of Units 1 & 2. In addition, because of mitigation requirements that resulted from the construction of Units 1 & 2 and associated supporting structures, a burrowing owl mitigation area totaling approximately two acres was set aside within the RERC site. This mitigation area is located along the eastern and northern boundaries of the site. The entire RERC site perimeter is fenced with a combination of chain-link fencing and architectural block walls.

Riverside Public Utilities (RPU) proposes to build and operate Units 3 &
4 at RERC. These power units will be aero-derivative LM6000 PC SPRINT NxGen combustion turbine generators with Emission Control Modules (ECMs), and will have a nominal generation capacity of 96 megawatts (MW). Units 3 & 4 will be largely identical to Units 1 & 2 and will be constructed just the north of the first two units. In addition to Units 3 & 4, RPU proposes the addition of two more bays to the existing RERC switchyard, the addition of a second demineralized water storage tank to the existing make-up water

system, a water quality building, and a new backup dispatch and scheduling building. During construction, equipment storage areas will be located on site. Construction-related parking will be located immediately off site and to the west of the project area in an existing gravel parking lot.

The majority of the proposed project design will not impact the existing burrowing owl mitigation area. However, the proposed backup dispatch and scheduling building, consisting of a one-story building approximately 40 feet wide and 95 feet long, would be positioned adjacent to the existing burrowing owl mitigation area. Positioning the structure in close proximity of the burrowing owl mitigation area would likely render the adjacent mitigation area unusable by burrowing owls, as it could 1) provide a perching structure for diurnal raptors that prey on burrowing owls, and 2) detract from the openness that currently characterizes the space of the power plant grounds directly adjacent to the mitigation area, a feature that contributes to the site's attractiveness to burrowing owls. To overcome this issue, RPU proposes to design the building so that it 1) renders it useless as a perch for diurnal raptors, and 2) creates the "feel" of a low topographic feature, rather than a building. This would be accomplished by 1) constructing a retaining wall along the side of the building that faces the burrowing owl mitigation area, 2) filling the space between the retaining wall and the existing slope of the mitigation area with soil, then shaping the area to allow for drainage, and planting it with native plant species, and 3) replacing the artificial burrow that would be lost during this process with two additional burrows within the mitigation area, per CDFG requirements. This proposed design would maintain the acreage within the burrowing owl mitigation area, result in additional artificial burrows, discourage raptors from perching on and hunting from the roof of the proposed building, and maintain the openness in front of the mitigation area by incorporating the roof of the building as part of the open space in front of the mitigation area.

During construction of the project, equipment storage areas, laydown areas, or parking areas may be positioned in close proximity to the existing artificial burrows within the mitigation area. Two to three burrows may be affected in this manner. These burrows will be temporarily closed during the construction period (expected to last no more than two years) in order to eliminate construction-related impacts to burrowing owls or other wildlife that may inhabits the burrows. RPU will mitigate for this temporary loss of burrows by installing additional artificial burrows (two for each that are temporarily closed) within portions of the mitigation area that are outside of construction zones. Following the conclusion of construction activities, the burrows that were temporarily closed will be re-opened.

Please let me know if you need additional information on the proposed project or our consultation visit. Ideally, I'd like to get a letter from you by the end of next week (January 25th) if possible.

Thanks!

Michael

Michael W. Tuma
Natural Resources Program Manager, Southern California SWCA Environmental Consultants
625 Fair Oaks Avenue, Suite 190
South Pasadena, CA 91030
626.240.0587 (office)
626.240.0607 (fax)
310.892.6042 (mobile)

APPENDIX 6.4-A

CULTURAL RESOURCES SURVEY
CONFIDENTIAL – NOT FOR PUBLIC DISTRIBUTION

PROVIDED IN SEPARATE VOLUME

APPENDIX 6.4-B

NATIVE AMERICAN PEOPLES CONSULTATION

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

December 18, 2007

Kip Harper
SWCA Environmental Consultants
Pasadena Office
625 Fair Oaks Avenue, Suite 190

Fax #: 626-240-0607
Number of pages: 3

Re: Proposed Riverside Public Utility SPPE Application to the California Energy Commission, Riverside County.

Dear Mr. Harper:

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area. The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any 'area of potential effect (APE).'

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed are the nearest tribes that may have knowledge of cultural resources in the project area. A List of Native American contacts are attached to assist you. The Commission makes no recommendation of a single individual or group over another. It is advisable to contact the person listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area (APE).

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 5097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contact List

Native American Contacts
Riverside County
December 14, 2007

Cahuilla Band of Indians
Anthony Madrigal, Jr., Interim-Chairperson
P.O. Box 391760 Cahuilla
Anza , CA 92539
tribalcouncil@cahuilla.net
(951) 763-2631

(951) 763-2632 Fax

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resource Center
P.O. Box 1477 Luiseno
Temecula , CA 92593
(951) 308-9295 Ext 8106
(951) 676-2768
(951) 506-9491 Fax

Ramona Band of Mission Indians
Joseph Hamilton, vice chairman
P.O. Box 391670 Cahuilla
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax

San Manuel Band of Mission Indians
Henry Duro, Chairperson
26569 Community Center Drive Serrano
Highland , CA 92346
(909) 864-8933
(909) 864-3724 - FAX
(909) 864-3370 Fax

Santa Rosa Band of Mission Indians
John Marcus, Chairman
P.O. Box 609 Cahuilla
Hemet , CA 92546
srtribaloffice@aol.com
(951) 658-5311
(951) 658-6733 Fax

Morongo Band of Mission Indians
Britt W. Wilson, Cultural Resources-Project Manager
49750 Seminole Drive Cahuilla
Cabazon , CA 92230 Serrano
britt_wilson@morongo.org
(951) 755-5206
(951) 755-5200/323-0822-cell
(951) 922-8146 Fax

San Manuel Band of Mission Indians
Ann Brierty, Environmantal Department
101 Pure Water Lane Serrano
Highland , CA 92346
abrierty@sanmanuel-nsn.gov
(909) 863-5899 EXT-4321

(909) 862-5152 Fax

Soboba Band of Luiseño Indians
Bennae Calac, Cultural Resource Director
P.O. Box 487 Luiseno
San Jacinto , CA 92581
bcalac@soboba-nsn-gov
(951) 663-8332
(951) 654-4198 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed Riverside Public Utility (RPU) SPPE Application to the California Energy Commission, located in the areas of La Sierra and Jurupa ; Riverside County, California for which a Sacred Lands File search and Native American Contacts list were Requested.

Native American Contacts
Riverside County
December 14, 2007

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 Luiseno
Temecula , CA 92593
tbrown@pechanga-nsn.gov
(951) 676-2768
(951) 695-1778 Fax

Willie Pink
48310 Pechanga Road Luiseno
Temecula , CA 92592
wjpink@hotmail.com
(909) 936-1216
Prefers e-mail contact

Soboba Band of Luiseno Indians
Harold Arres, Cultural Resources Manager
P.O. Box 487 Luiseno
San Jacinto , CA 92581
harres@soboba-nsn.gov
(951) 654-2765
FAX: (951) 654-4198

Cahuilla Band of Indians
Maurice Chacon, Cultural Resources
P.O. Box 391760 Cahuilla
Anza , CA 92539
cbandodian@aol.com
(951) 763-2631

(951) 763-2632 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed Riverside Public Utility (RPU) SPPE Application to the California Energy Commission, located in the areas of La Sierra and Jurupa ; Riverside County, California for which a Sacred Lands File search and Native American Contacts list were Requested.

Kip Harper

From: Britt Wilson [britt_wilson@morongo.org]
Sent: Wednesday, December 26, 2007 12:25 PM
To: Kip Harper
Cc: Britt Wilson
Subject: Riverside Energy Resource Center Units 3 & 4, City of Riverside

Thank you for contacting the Morongo Band of Mission Indians concerning cultural resource information relative to the above referenced project(s). Due to the high number of information requests the Tribe has been receiving, we are only able to respond via email.

The project(s) is outside of the Tribe's current reservation boundaries but within an area that may be considered a traditional use area or one is which the Tribe has cultural ties (e.g. Cahuilla/Serrano territory). The Tribe, however, has no specific information regarding cultural resources within the site area but would like to offer the following comments/desired conditions:

- If Native American cultural resources (other than isolates) are found on the project site, or the site is in a medium to high-probability area for those resources, the Tribe recommends a cultural resources survey and archaeological site monitoring –preferably utilizing at least one Native American monitor;
- The project should try to incorporate any features into the project design (e.g. creating open space around milling features or moving them to an area of open space within the development rather than merely recording and destroying the features);
- In accordance with state law, the County coroner should be contacted if any human remains are found during earthmoving activities;
- If Native American cultural resources are uncovered during earthmoving activities, work in the immediate vicinity of the find shall cease and an archaeologist meeting Secretary of Interior standards shall be retained to assess the find. If the find is significant enough to require a Treatment Plan, the project archaeologist should contact the Morongo Band of Mission Indians for further consultation.

Thank you for the opportunity to comment on the project.

Sincerely,

Britt W. Wilson
Project Manager - Cultural Resources
Morongo Band of Mission Indians
Casino Morongo Building
49750 Seminole Drive
Cabazon, CA 92230-2200
Office: (951) 755-5200 Direct: (951) 755-5206
Mobile: (951) 323-0822
Fax: (951) 922-8146 E-mail: Britt_wilson@morongo.org

Wayta' Yawa' (always believe)

PECHANGA CULTURAL RESOURCES
Temecula Band of Luiseño Mission Indians

Post Office. Box 2183 • Temecula, CA 92593
Telephone (951) 308-9295 • Fax (951) 506-9491

Chairperson:
Germaine Arenas

Vice Chairperson:
Mary Bear Magee

Committee Members:
Evie Gerber
Darlene Miranda
Bridgett Barcello Maxwell

Director:
Gary DuBois

Coordinator:
Paul Macarro

Cultural Analyst:
Anna Hoover

Monitor Supervisor:
Aurelia Marruffo

January 3, 2008

VIA E-Mail and USPS

RE: Request for Information for the Riverside Energy Resource Center Units 3 & 4 (SWCA)

Dear Kip Harper:

The Tribe appreciates your request for information regarding the above referenced project. After reviewing the provided maps, we have determined that the project area is not within reservation lands and it is immediately outside the northernmost portion of our ancestral territory. At this time, we are not interested in commenting on this project.

However, the Tribe requests the following:

1) Copies of all project related archaeological reports and site records; and

2) In the event that subsurface cultural resources are identified, the Tribe requests consultation with the project proponent and Lead Agency regarding the treatment and disposition of all artifacts.

As a sovereign governmental entity, the Tribe is entitled to appropriate and adequate government-to-government consultation regarding the proposed project. We would like you and your client to know that the Tribe does not consider initial inquiry letters from project consultants to constitute appropriate government-to-government consultation, but rather tools to obtain further information about the project area. Therefore, the Tribe reserves its rights to participate in the formal environmental review process, including government-to-government consultation with the Lead Agency, and requests to be included in all correspondence regarding this project.

Please note that we are interested in participating in surveys within Luiseño ancestral territory. Prior to conducting any surveys, please contact the Cultural Department to schedule specifics. If you have any additional questions or comments, please contact me at ahoover@pechanga-nsn.gov or 951-308-9295.

Sincerely,

Anna M. Hoover
Cultural Analyst

Mission:

Educate and communicate the rich heritage of Soboba peoples; Lead and assist individuals, organizations and communities in understanding the needs and concerns of Native American monitoring of traditional sites; Advocate Native American participation in state agencies and boards; Advocate legislation and enforcement of laws affecting Native American peoples and protecting historical and archaeological resources.

January 2, 2008

Attn: Caprice D. Harper
SWCA
625 Fair Oaks Avenue, Suite 190
South Pasadena, CA 91030

Re: Riverside Energy Resource Center Units 3 & 4

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your project. The information provided on said project(s) has been assessed through our Cultural Resource Department, where it was concluded that although this site is outside the existing reservation, the project area does fall within the bounds of our Tribal Traditional Use Areas.

At this time the Soboba Band does see a direct need for Native American **Monitoring** and **Consultation**. The Tribe requests a Native American Monitor be present during any and all ground disturbing activities. Soboba requests this, until deemed unnecessary by both Archaeological and Native American Monitors. Also the Tribe requests to be involved in any and all consultation throughout the project. If you have any questions or concerns, please do not hesitate to contact the Cultural Resource Department.

[SPECIAL NOTE (for projects other than cell towers): *If* this project is associated with a city or county specific plan or general plan action it is subject to the provisions of SB18-Tradtional Tribal Cultural Places (law became effective January 1, 2005) and will require the city or county to participate in **formal, government-to-government** consultation with the Tribe. If the city or county are your client, you may wish to make them aware of this requirement. By law, they are required to contact the Tribe.]

Sincerely,

Darren Hill
Soboba Cultural Resource Department
Cell (951) 663-5279
Phone (951) 487-8268
dhill@soboba-nsn.gov

APPENDIX 6.4-C

DPR FORM
RIVERSIDE REGIONAL WATER QUALITY CONTROL PLANT

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** 33-13252 (update) **HRI #** **Trinomial** **NRHP Status Code**
Other Listings **Review Code** **Reviewer** **Date**	

 ***Resource Name or #:** Riverside Water Quality Control Plant

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Riverside

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** Riverside West **Date:** 1967 (photorevised 1980) **T** 4S; **R** 2W; SE ¼ **of** SE ¼ **of Sec** 25**;** S.B. **B.M.**

c. Address: 5950 Acorn Street

City: Riverside Zip: 92504

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

See original primary record for description.

***P3b. Resource Attributes:** (List attributes and codes) HP11 (Engineering Structure); HP14 (Government Building)

***P4. Resources Present:** ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) Original Riverside Water Quality Control Plant Building facing northwest showing mature landscaping and pink paint. Garage at right and waste water fields beyond.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric
☐ Both
1942

***P7. Owner and Address:**
City of Riverside
5950 Acorn Street
Riverside, CA 92504

***P8. Recorded by:** (Name, affiliation, and address)
James Steely
SWCA Environmental Consultants
625 Fair Oaks Avenue, Suite 190
South Pasadena, CA 91030

***P9. Date Recorded:** 01/09/08

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Harper, C., J. Steely, and E. Knell
2008 *Cultural Resources Survey for the Riverside Energy Center Units 3 & 4, City of Riverside, Riverside County, California* prepared by SWCA Environmental Consultants.

***Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code

*Resource Name or # (Assigned by recorder) Riverside Water Quality Control Plant

B1. Historic Name: Riverside Water Quality Control Plant
B2. Common Name: Riverside Waste Water Treatment Plant
B3. Original Use: water treatment facility B4. Present Use: water treatment facility
*B5. **Architectural Style:** Spanish Revival
*B6. **Construction History:** (Construction date, alterations, and date of alterations)
Constructed in 1942

*B7. **Moved?** ☒No ☐Yes ☐Unknown **Date:** **Original Location:**
*B8. **Related Features:** garage and treatment fields

B9a. Architect: Unknown b. Builder: Unknown
*B10. **Significance: Theme:** New Deal **Area:** Riverside
Period of Significance: 1933-1943 **Property Type:** Infrastructure **Applicable Criteria:** A/1 and C/3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The 1942 Riverside Water Quality Control Plant which meets the criteria for the CRHR and the NRHP under 1/A for association with significant events (federal New Deal planning and infrastructure development in cooperation with state and local governments) and 3/C for significance of architectural design and engineering (wastewater infrastructure designed as a modern "Ranch Style" house with landscaped grounds). The buildings and associated structures of the facility were examined in 2004 and again in 2008 to confirm their integrity and verify their significance.

The Riverside Water Quality Control Plant is a significant surviving complex from the New Deal era (1933-1943) at the local level. During the Great Depression in the 1930s and continuing through the beginning of World War II private and public construction declined to a fraction of its former activity in the 1920s national economic boom. To rectify the situation, President Franklin Roosevelt, beginning with his inauguration in 1933, developed his "New Deal" of economic and environmental programs to provide employment for as many as a third of the American workforce. The New Deal's Work Projects Administration (WPA) found particular popularity with local governments needing to update their water and wastewater systems in an era also marked by great advances in sanitation and conservation.

In the early 1940s Riverside experienced economic recovery from the Depression. With the promise of residential growth the City of Riverside opened its new wastewater treatment plant—likely built with WPA assistance—just as World War II enveloped the United States and again halted most private construction. The treatment plant allowed Riverside to address the mid-1940s strain on infrastructure brought by several wartime facilities in the area, then accommodated the city's role in California's postwar boom in housing and commercial development (Leighninger 2007).

The treatment plant's original main "Ranch House" office and mechanical building with associated garage, landscaping, and treatment fields are remarkably intact.

B11. Additional Resource Attributes: (List attributes and codes) None
*B12. **References:**

Leighninger, Robert D. Jr.
2007 Long-Range Public Investment *The Forgotten Legacy of the New Deal*. University of South Carolina, Columbia, S.C.

B13. Remarks: The buildings and associated structures of the facility were examined in 2004 and again in 2008 to confirm their integrity and verify their significance.

*B14. **Evaluator:** James Steely, SWCA Environmental Consultants

*Date of Evaluation: January 9, 2008

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

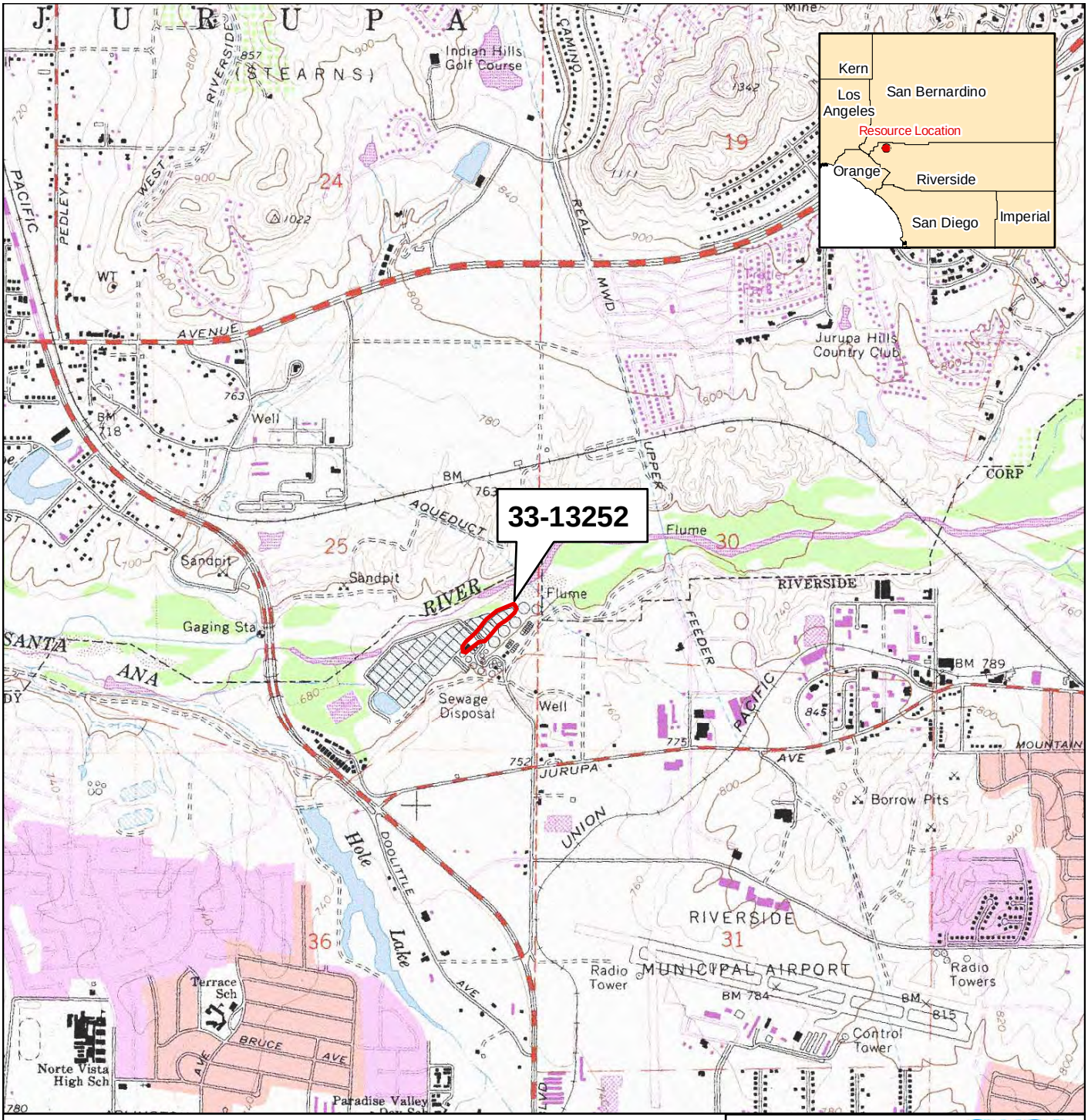
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 33-13252 (Updated)
HRI#
Trinomial

Page 3 **of** 3 ***Resource Name or #:** Riverside Water Quality Control Plant

***Map Name:** Riverside West, CA ***Scale:** 1:24,000 ***Date of Map:** 1967 (Photorevised 1980)



Cultural Resource

0 250 500 Meters
0 1,000 2,000 Feet

USGS 7.5' Quadrangle
Riverside West, CA 1967 (Photorevised 1980)

1:24,000

SWCA ENVIRONMENTAL CONSULTANTS

33-13252

Riverside Water Quality Control Plant

DPR 523J (1/95) ***Required information**

APPENDIX 6.7-A

NOISE MEASUREMENTS

LT-1 Hourly Long-Term Noise Data

LT-1, rear yard of 6495 Thunder Bay Terrace, north of plant
Microphone at 1st floor elevation (5' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/15/04	15:00:00	63.5	56.3	44.4	41.5
3/15/04	16:00:00	57.9	54.8	44.7	41.5
3/15/04	17:00:00	59.1	56.4	47.1	43.4
3/15/04	18:00:00	61.5	50.1	43.9	41.1
3/15/04	19:00:00	56.4	51.0	44.1	40.8
3/15/04	20:00:00	61.5	57.5	42.6	40.0
3/15/04	21:00:00	56.7	45.4	40.9	39.0
3/15/04	22:00:00	62.8	58.6	43.0	40.1
3/15/04	23:00:00	60.6	46.7	41.8	39.6
3/16/04	0:00:00	41.6	42.7	40.5	39.0
3/16/04	1:00:00	58.7	48.7	41.2	38.8
3/16/04	2:00:00	59.4	42.6	39.7	37.7
3/16/04	3:00:00	40.9	41.9	40.3	38.6
3/16/04	4:00:00	64.3	53.4	44.0	42.0
3/16/04	5:00:00	61.4	52.4	46.7	43.3
3/16/04	6:00:00	58.7	53.4	47.9	46.0
3/16/04	7:00:00	62.9	53.6	48.0	46.3
3/16/04	8:00:00	58.4	57.7	48.0	45.1
3/16/04	9:00:00	61.9	50.8	44.8	41.5
3/16/04	10:00:00	59.9	51.1	44.3	40.8
3/16/04	11:00:00	55.0	51.9	46.9	42.6
3/16/04	12:00:00	63.4	63.2	47.7	43.4
3/16/04	13:00:00	61.2	52.6	43.4	39.3
3/16/04	14:00:00	50.7	50.7	42.2	38.0
3/16/04	15:00:00	61.2	50.6	40.7	37.5

LT-1 Hourly Long-Term Noise Data

LT-1, rear yard of 6495 Thunder Bay Terrace, north of plant
Microphone at 2nd floor elevation (15' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/15/04	15:00:00	71.4	58.4	48.7	46.3
3/15/04	16:00:00	64.6	56.9	48.8	46.3
3/15/04	17:00:00	65.8	59.8	51.5	48.3
3/15/04	18:00:00	69.1	55.9	50.4	46.9
3/15/04	19:00:00	65.4	56.1	50.7	46.8
3/15/04	20:00:00	67.9	66.1	47.9	45.3
3/15/04	21:00:00	64.9	51.2	46.9	44.6
3/15/04	22:00:00	69.9	67.7	50.0	46.2
3/15/04	23:00:00	70.5	53.8	48.0	44.6
3/16/04	0:00:00	46.1	47.8	45.1	43.3
3/16/04	1:00:00	67.3	54.8	45.5	43.1
3/16/04	2:00:00	66.7	47.7	43.9	41.6
3/16/04	3:00:00	45.0	45.8	44.3	42.6
3/16/04	4:00:00	72.0	58.1	47.8	46.1
3/16/04	5:00:00	71.2	54.8	50.4	47.0
3/16/04	6:00:00	67.9	56.6	52.1	50.2
3/16/04	7:00:00	68.6	56.0	52.1	50.3
3/16/04	8:00:00	64.2	61.2	52.0	49.8
3/16/04	9:00:00	68.9	53.4	48.8	45.7
3/16/04	10:00:00	67.1	54.0	48.5	45.3
3/16/04	11:00:00	64.1	54.6	50.4	47.1
3/16/04	12:00:00	71.2	71.2	50.7	47.2
3/16/04	13:00:00	70.1	57.2	47.2	43.6
3/16/04	14:00:00	57.3	52.6	45.9	42.7
3/16/04	15:00:00	70.2	52.8	44.3	41.5

LT-2 Hourly Long-Term Noise Data

LT-2, rear yard of 8838 Alabama Street, west of plant
Microphone at 1st floor elevation (5' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/16/04	18:00:00	51.5	53.8	47.2	43.4
3/16/04	19:00:00	55.6	54.7	44.9	42.3
3/16/04	20:00:00	51.7	51.7	45.3	43.3
3/16/04	21:00:00	50.0	50.8	47.3	44.8
3/16/04	22:00:00	53.2	48.5	46.2	44.5
3/16/04	23:00:00	46.2	46.7	44.7	43.3
3/17/04	0:00:00	44.7	46.5	44.3	41.4
3/17/04	1:00:00	45.2	47.0	43.6	41.5
3/17/04	2:00:00	45.8	48.1	43.8	41.4
3/17/04	3:00:00	47.4	49.9	46.3	43.7
3/17/04	4:00:00	50.9	52.9	50.1	47.1
3/17/04	5:00:00	55.2	57.0	53.5	49.5
3/17/04	6:00:00	55.6	56.9	53.9	51.6
3/17/04	7:00:00	58.6	62.7	54.8	50.8
3/17/04	8:00:00	54.4	58.2	50.5	46.2
3/17/04	9:00:00	57.1	61.0	52.7	43.8
3/17/04	10:00:00	55.8	59.6	48.0	40.1
3/17/04	11:00:00	54.3	56.9	44.7	39.4
3/17/04	12:00:00	50.2	50.6	45.1	40.5
3/17/04	13:00:00	48.9	51.0	43.3	38.6
3/17/04	14:00:00	54.9	53.8	42.9	37.1
3/17/04	15:00:00	57.6	57.1	49.9	44.1
3/17/04	16:00:00	48.5	51.7	45.2	42.4
3/17/04	17:00:00	59.4	55.3	47.4	43.6
3/17/04	18:00:00	53.2	53.3	45.2	42.7

LT-2 Hourly Long-Term Noise Data

LT-2, rear yard of 8838 Alabama Street, west of plant
Microphone at 2nd floor elevation (15' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/16/04	18:00:00	56.1	58.4	51.5	46.4
3/16/04	19:00:00	56.8	57.5	48.5	45.9
3/16/04	20:00:00	53.8	54.4	49.0	46.3
3/16/04	21:00:00	52.8	54.4	50.8	48.1
3/16/04	22:00:00	58.7	52.3	49.9	48.3
3/16/04	23:00:00	50.2	50.0	48.2	46.8
3/17/04	0:00:00	48.3	49.6	47.4	44.2
3/17/04	1:00:00	48.0	49.9	46.2	43.8
3/17/04	2:00:00	49.2	50.3	46.3	44.2
3/17/04	3:00:00	49.7	52.0	48.8	46.3
3/17/04	4:00:00	53.8	55.6	52.5	49.3
3/17/04	5:00:00	56.6	57.8	55.2	52.0
3/17/04	6:00:00	57.8	59.3	56.3	54.2
3/17/04	7:00:00	59.8	63.2	56.5	53.3
3/17/04	8:00:00	55.4	58.7	52.7	49.4
3/17/04	9:00:00	57.2	60.9	53.1	47.0
3/17/04	10:00:00	55.3	59.4	48.9	43.5
3/17/04	11:00:00	54.3	57.4	47.2	42.7
3/17/04	12:00:00	52.8	52.8	46.1	42.2
3/17/04	13:00:00	50.2	52.1	44.6	40.8
3/17/04	14:00:00	55.6	55.4	45.3	39.8
3/17/04	15:00:00	59.5	59.8	51.1	46.5
3/17/04	16:00:00	51.4	53.9	47.6	44.9
3/17/04	17:00:00	65.5	57.2	49.8	46.2
3/17/04	18:00:00	57.8	57.6	48.8	45.7

LT-3 Hourly Long-Term Noise Data

LT-3, rear yard of 6401 Vickers Drive, southeast of plant
Microphone at 1st floor elevation (5' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/18/04	9:00:00	48.0	49.3	44.2	42.4
3/18/04	10:00:00	54.2	50.7	45.2	42.7
3/18/04	11:00:00	50.8	51.0	44.6	42.2
3/18/04	12:00:00	49.3	50.3	45.0	42.2
3/18/04	13:00:00	49.3	51.2	47.0	44.6
3/18/04	14:00:00	49.8	52.6	47.9	45.6
3/18/04	15:00:00	50.0	52.0	48.5	46.2
3/18/04	16:00:00	52.1	52.9	48.2	45.7
3/18/04	17:00:00	49.9	51.9	47.2	45.4
3/18/04	18:00:00	52.7	51.4	46.7	43.8
3/18/04	19:00:00	45.1	46.9	43.8	42.1
3/18/04	20:00:00	45.0	46.8	43.8	42.2
3/18/04	21:00:00	50.4	53.1	46.4	43.8
3/18/04	22:00:00	43.8	45.6	42.9	40.5
3/18/04	23:00:00	39.6	41.5	38.6	35.6
3/19/04	0:00:00	37.6	38.5	34.0	32.3
3/19/04	1:00:00	34.1	34.8	32.2	30.8
3/19/04	2:00:00	31.2	32.8	30.8	28.5
3/19/04	3:00:00	36.3	34.2	31.2	29.8
3/19/04	4:00:00	36.6	38.1	33.8	32.1
3/19/04	5:00:00	39.4	42.1	37.0	34.2
3/19/04	6:00:00	42.0	44.7	40.4	37.2
3/19/04	7:00:00	42.6	44.8	39.7	37.0
3/19/04	8:00:00	45.5	48.3	43.5	40.1
3/19/04	9:00:00	47.7	49.8	45.4	43.6

LT-3 Hourly Long-Term Noise Data

LT-3, rear yard of 6401 Vickers Drive, southeast of plant
Microphone at 2nd floor elevation (15' above ground)

Date	Time	Measured 1-Hour Noise Levels, dB(A)			
		Leq	L10	L50	L90
3/18/04	9:00:00	52.1	53.5	49.5	47.7
3/18/04	10:00:00	55.5	53.8	49.4	47.1
3/18/04	11:00:00	52.5	53.9	49.1	45.9
3/18/04	12:00:00	52.5	53.9	48.8	46.4
3/18/04	13:00:00	53.5	56.5	51.4	48.2
3/18/04	14:00:00	53.4	56.1	52.1	49.3
3/18/04	15:00:00	53.5	56.1	52.0	49.3
3/18/04	16:00:00	54.5	56.4	52.0	48.5
3/18/04	17:00:00	52.4	54.9	50.3	48.0
3/18/04	18:00:00	54.6	54.3	49.5	46.4
3/18/04	19:00:00	48.0	50.2	46.6	44.8
3/18/04	20:00:00	47.6	49.4	46.3	44.6
3/18/04	21:00:00	52.7	55.6	49.0	46.2
3/18/04	22:00:00	47.5	48.7	45.3	43.1
3/18/04	23:00:00	44.2	45.4	42.4	41.0
3/19/04	0:00:00	43.4	43.2	36.6	35.1
3/19/04	1:00:00	39.5	39.0	35.6	33.7
3/19/04	2:00:00	35.3	37.7	34.5	31.8
3/19/04	3:00:00	41.9	37.6	34.3	33.0
3/19/04	4:00:00	41.7	42.8	37.2	34.9
3/19/04	5:00:00	43.6	46.5	40.6	37.5
3/19/04	6:00:00	48.2	51.7	45.7	41.2
3/19/04	7:00:00	48.2	51.5	44.5	41.6
3/19/04	8:00:00	50.0	53.1	48.0	44.1
3/19/04	9:00:00	52.0	53.7	49.7	47.4

Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: LT-1: rear yard of 6495 Thunder Bay Trail, 12' behind block wall adjacent to RR track

Date: March 15-16, 2004 (25-hour measurement)

Noise Source: Trains, industry, aircraft

SLM Height: 5' and 15'

LD 820 S/N: 0997 at 5', 0996 at 15'

LD CAL200 Calibrator S/N: 2916

Temperature: 72 F

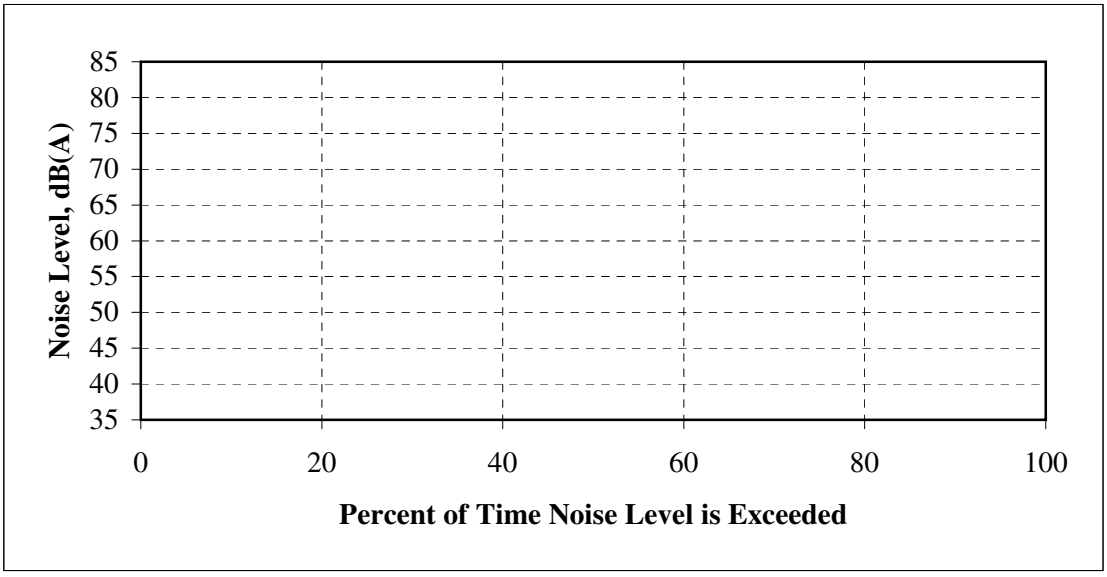
Wind Speed: 3 mph

Wind Direction: West

Humidity: 45%

Operator: Cynthia M. Bordash

	3:00 PM to 3:00 PM
L10	
L50	
L90	
Leq	
Lmax	
Lmin	



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: LT-2: rear yard of 8838 Alabama Street, 11' behind block wall

Date: March 16-17, 2004 (25-hour measurement)

Noise Source: Traffic, aircraft, park activities

SLM Height: 5' and 15'

LD 820 S/N: 0996 at 5', 0997 at 15'

LD CAL200 Calibrator S/N: 2916

Temperature: 91 F

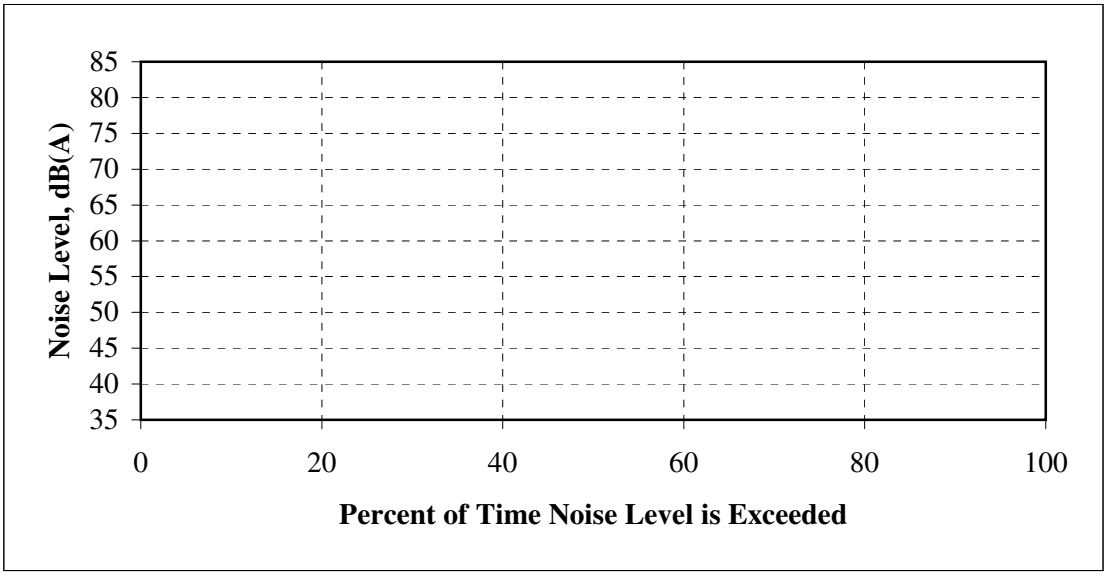
Wind Speed: Calm

Wind Direction: N/A

Humidity: 60%

Operator: Cynthia M. Bordash

	6:00 PM to 6:00 PM
L10	
L50	
L90	
Leq	
Lmax	
Lmin	



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: LT-3: rear yard of 6401 Vickers Drive,
26' behind block wall

Date: March 18-19, 2004 (25-hour measurement)

Noise Source: Traffic, aircraft

SLM Height: 5' and 15'

LD 820 S/N: 0996 at 5', 0997 at 15'

LD CAL200
Calibrator S/N: 2916

Temperature: 48 F

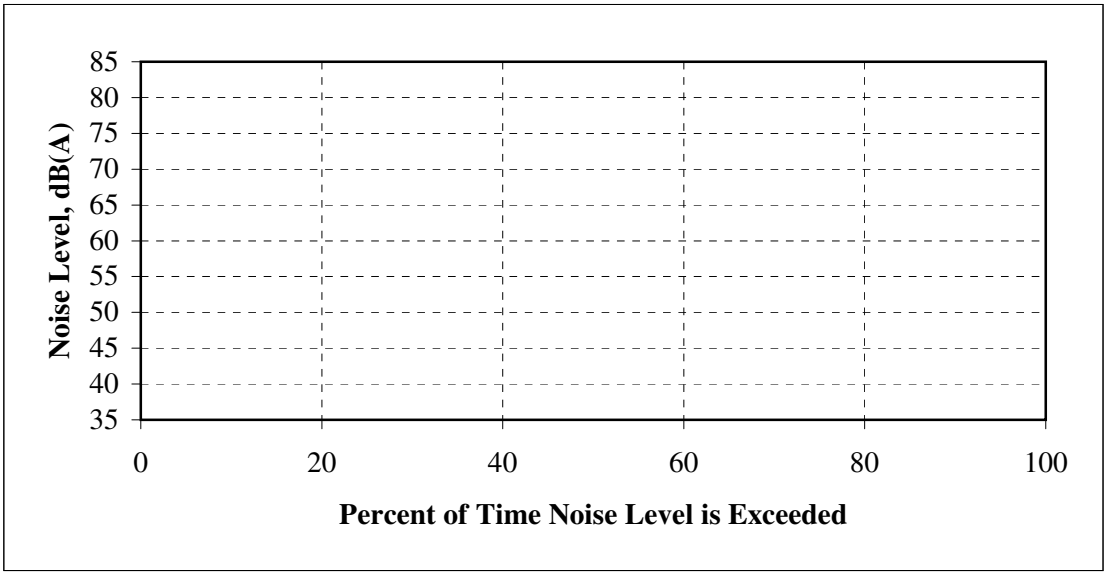
Wind Speed: Calm

Wind Direction: N/A

Humidity: 55%

Operator: Cynthia M. Bordash

	9:00 AM to 9:00 AM
L10	
L50	
L90	
Leq	
Lmax	
Lmin	



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-1, Clay Park, 117' from Carlyle Drive, 200' from Easton

Date: March 16, 2004

Noise Source: Traffic, aircraft, trains, dogs, birds

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 54 F

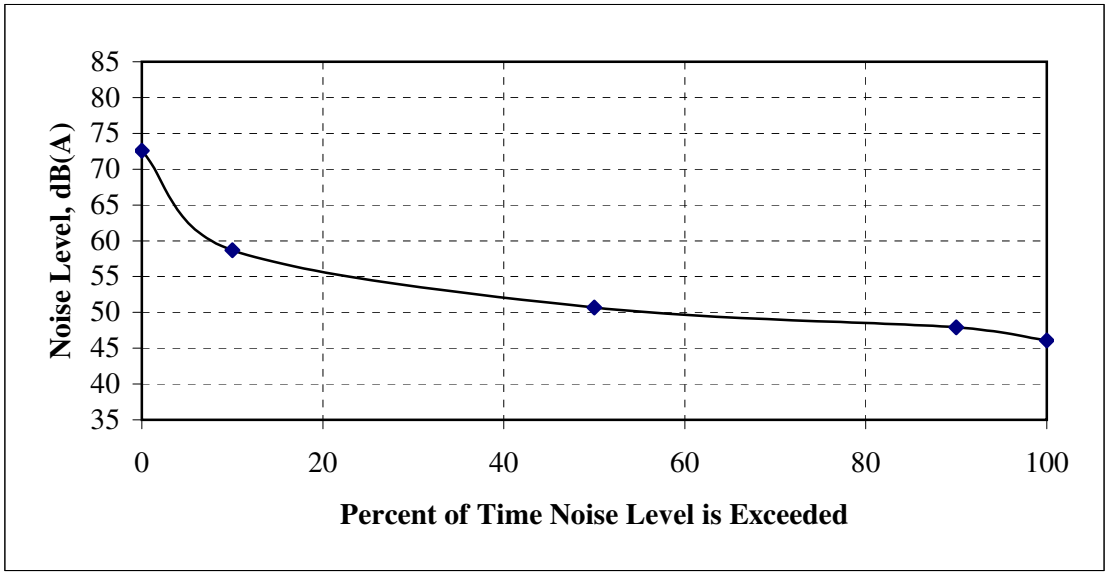
Wind Speed: 6 mph

Wind Direction: West

Humidity: 32%

Operator: Cynthia M. Bordash

	10:22 AM to 10:43 AM
L10	58.7
L50	50.7
L90	47.9
Leq	55.6
Lmax	72.6
Lmin	46.1



WIELAND ASSOCIATES, INC.

Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-2, Indian Hill School, 4' from High Prairie Tr., 208' from Grand Valley

Date: March 17, 2004

Noise Source: Traffic, children

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 56 F

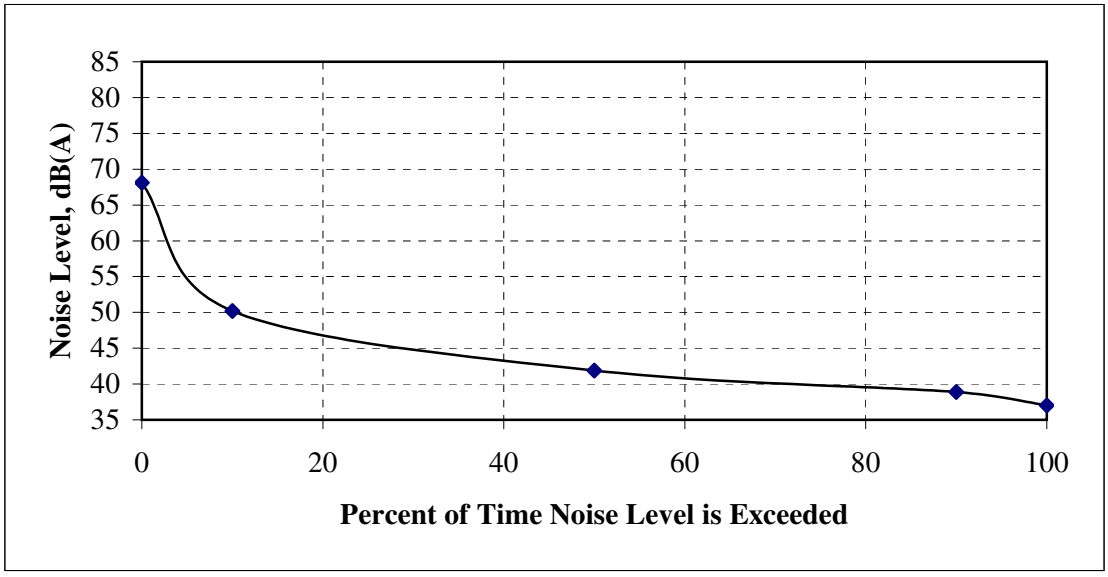
Wind Speed: Calm

Wind Direction: N/A

Humidity: 32%

Operator: Cynthia M. Bordash

	10:15 AM to 10:37 AM
L10	50.2
L50	41.9
L90	38.9
Leq	48.3
Lmax	68.1
Lmin	37.0



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-3, front yard at 7982 Claudette, 7' from curb

Date: March 16, 2004

Noise Source: Traffic, aircraft, trains, industry, birds

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 51 F

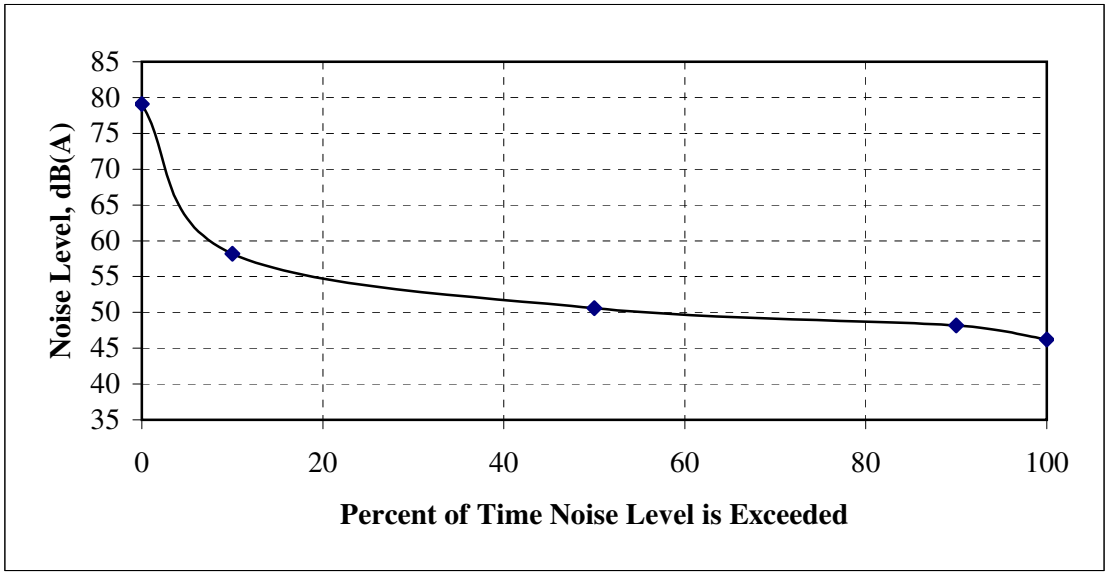
Wind Speed: 9 mph

Wind Direction: West

Humidity: 42%

Operator: Cynthia M. Bordash

	9:01 AM to 9:22 AM
L10	58.2
L50	50.6
L90	48.2
Leq	60.8
Lmax	79.1
Lmin	46.2



WIELAND ASSOCIATES, INC.

Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-4, at 6465 Avenue Juan Diaz, 70 yards from the house

Date: March 17, 2004

Noise Source: Traffic, aircraft, trains, birds, dogs

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 90 F

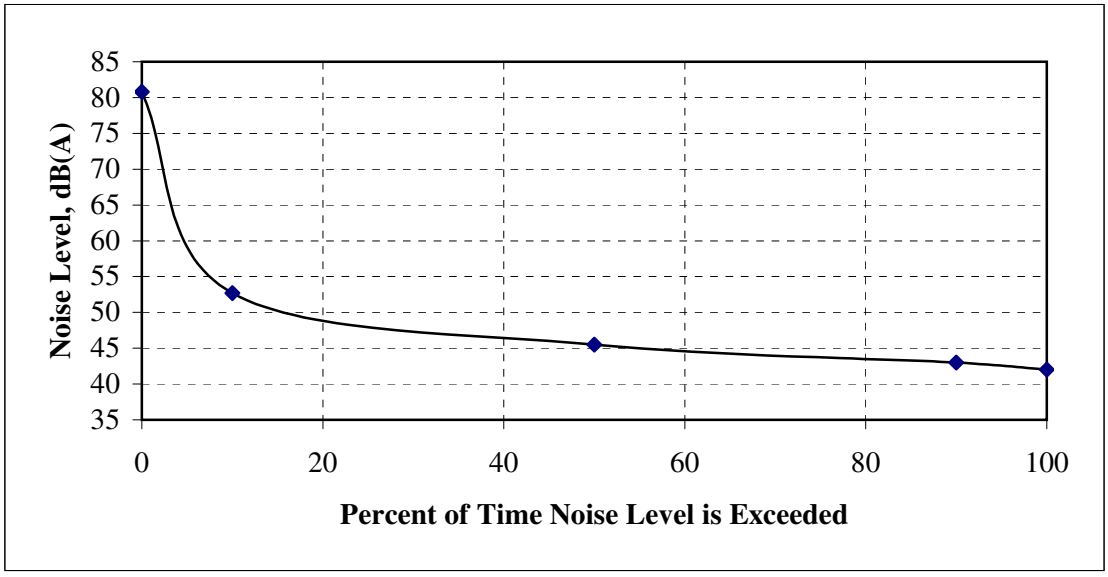
Wind Speed: Calm

Wind Direction: N/A

Humidity: 60%

Operator: Cynthia M. Bordash

	6:06 PM to 6:26 PM
L10	52.7
L50	45.5
L90	43.0
Leq	56.8
Lmax	80.8
Lmin	42.0



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-5, on recreational trail north of project site

Date: March 17, 2004

Noise Source: Traffic, aircraft, trains, birds, industry

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 87 F

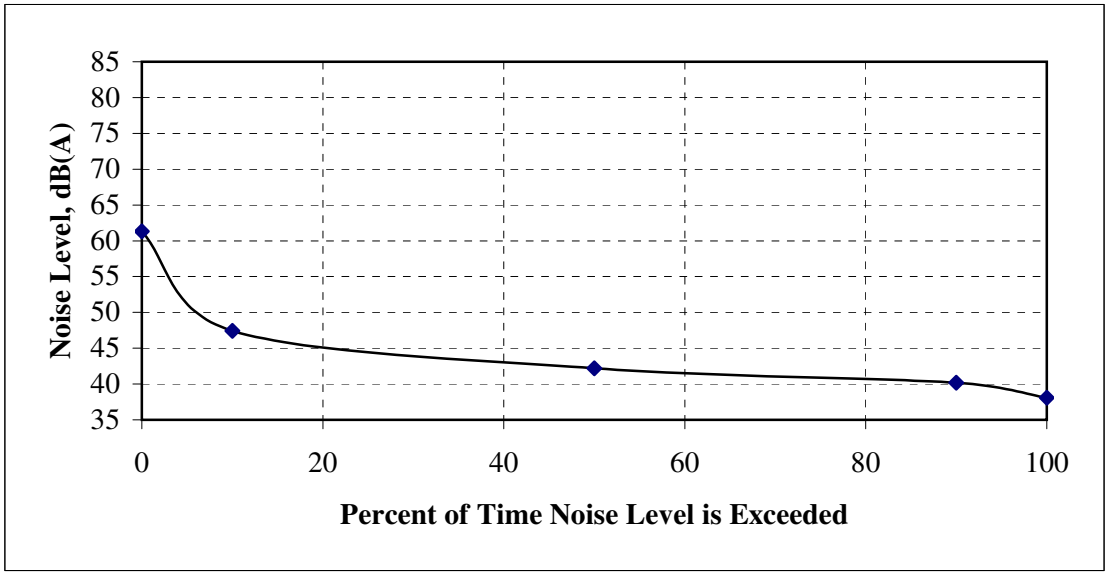
Wind Speed: Calm

Wind Direction: N/A

Humidity: 27%

Operator: Cynthia M. Bordash

	2:12 PM to 2:32 PM
L10	47.4
L50	42.2
L90	40.2
Leq	45.5
Lmax	61.3
Lmin	38.1



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-6, at administrative offices of wastewater treatment plant

Date: March 16, 2004

Noise Source: Industry, train, cars in parking lot

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 74 F

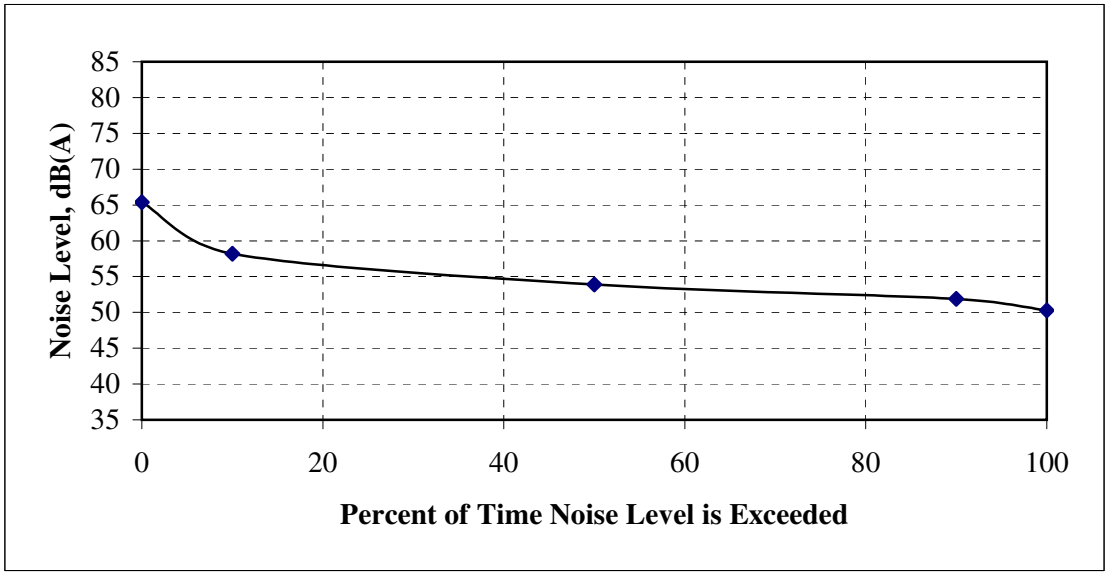
Wind Speed: 6 mph

Wind Direction: East

Humidity: 26%

Operator: Cynthia M. Bordash

	12:17 PM to 12:37 PM
L10	58.2
L50	53.9
L90	51.9
Leq	55.4
Lmax	65.4
Lmin	50.3



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-7, at the Maaco facility, 5925 Payton Ave., 30' from property line fence

Date: March 16, 2004

Noise Source: Industry, train, cars in parking lot

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 86 F

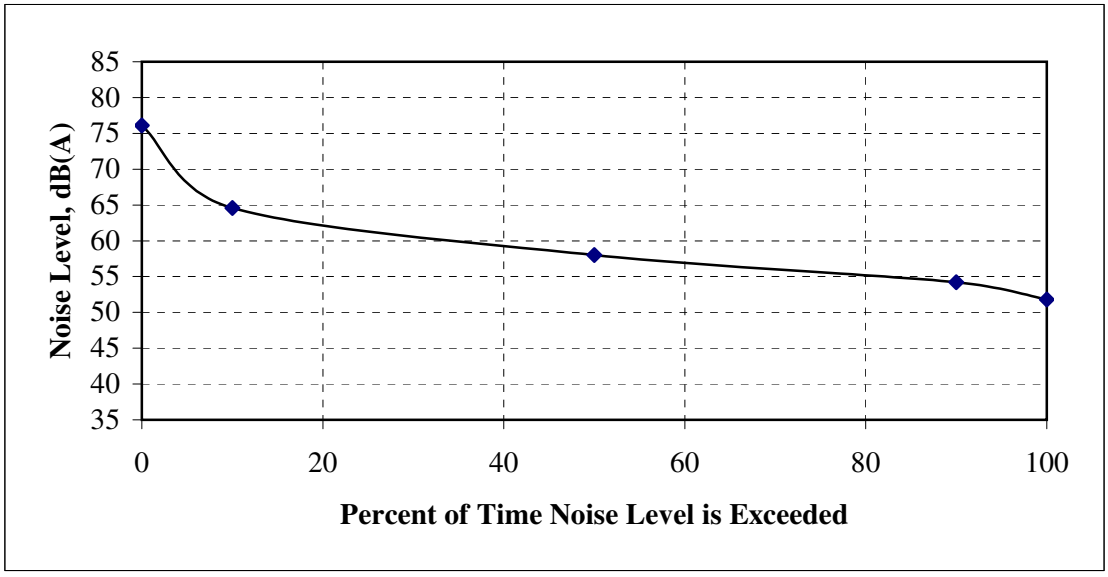
Wind Speed: 9 mph

Wind Direction: South

Humidity: 26%

Operator: Cynthia M. Bordash

	1:04 PM to 1:24 PM
L10	64.6
L50	58.0
L90	54.2
Leq	61.1
Lmax	76.1
Lmin	51.8



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-8, industrial facility at 7171 Jurupa Ave., Unit 30

Date: March 16, 2004

Noise Source: Industry, aircraft, dogs, traffic

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 86 F

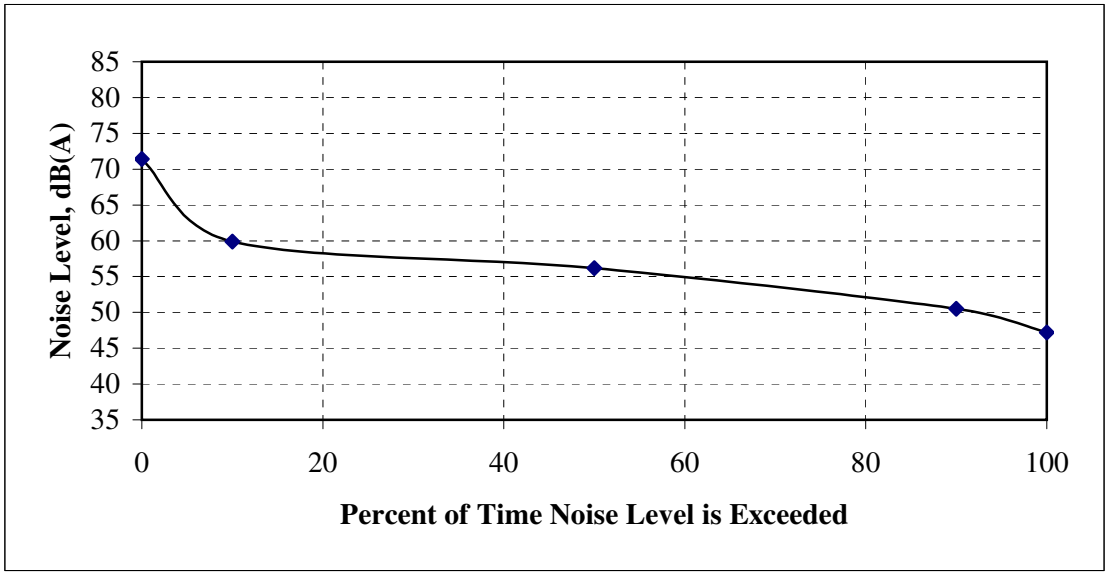
Wind Speed: 8 mph

Wind Direction: South

Humidity: 28%

Operator: Cynthia M. Bordash

	1:38 PM to 1:59 PM
L10	59.9
L50	56.2
L90	50.5
Leq	57.8
Lmax	71.4
Lmin	47.2



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-9, at church building in industrial park, 7110 Jurupa Ave., Unit 5

Date: March 16, 2004

Noise Source: Industry, aircraft, traffic

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 87 F

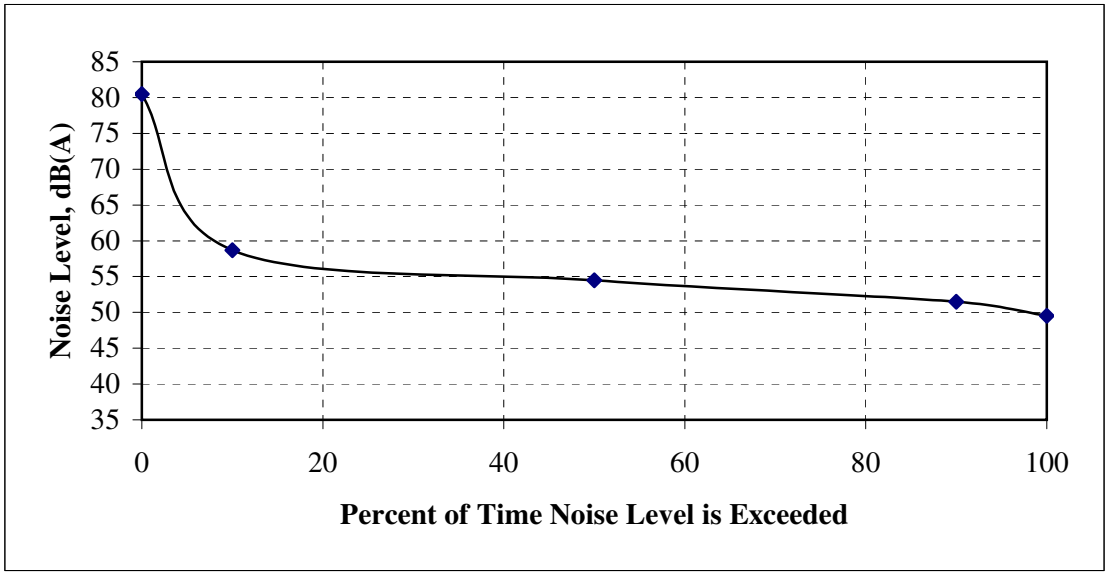
Wind Speed: 6 mph

Wind Direction: West

Humidity: 25%

Operator: Cynthia M. Bordash

	2:19 PM to 2:39 PM
L10	58.7
L50	54.5
L90	51.5
Leq	59.0
Lmax	80.5
Lmin	49.5



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-10, residence at 6344 Jurupa Ave., 33' from street

Date: March 17, 2004

Noise Source: Traffic

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 91 F

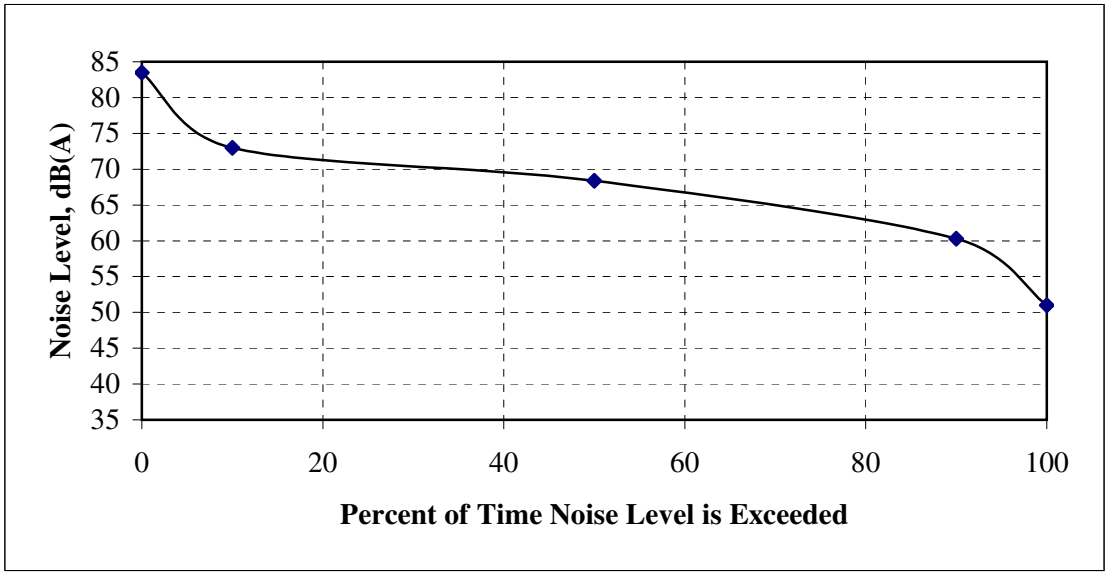
Wind Speed: Calm

Wind Direction: N/A

Humidity: 44%

Operator: Cynthia M. Bordash

	5:02 PM to 5:22 PM
L10	73.0
L50	68.4
L90	60.3
Leq	69.9
Lmax	83.5
Lmin	51.0



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-11, residence at 6896 Palos Dr., 104' from street

Date: March 17, 2004

Noise Source: Traffic, aircraft

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 65 F

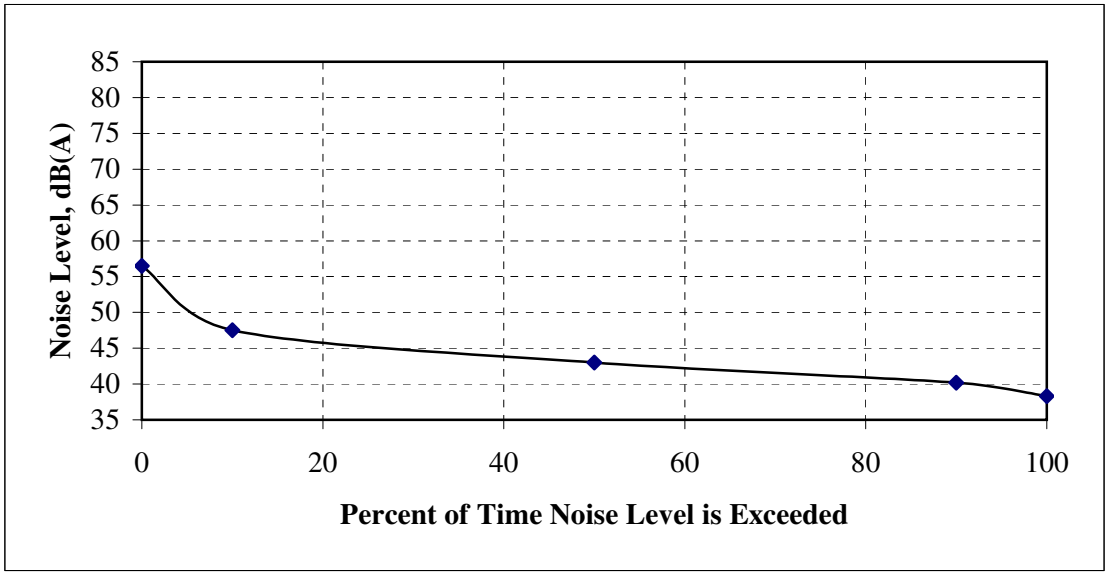
Wind Speed: Calm

Wind Direction: N/A

Humidity: 29%

Operator: Cynthia M. Bordash

	11:14 AM to 11:34 AM
L10	47.5
L50	43.0
L90	40.2
Leq	44.9
Lmax	56.5
Lmin	38.3



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-12, residence at 6711 Doolittle Ave., 52 yards from street

Date: March 17, 2004

Noise Source: Traffic, aircraft

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200 Calibrator S/N: 2916

Temperature: 88 F

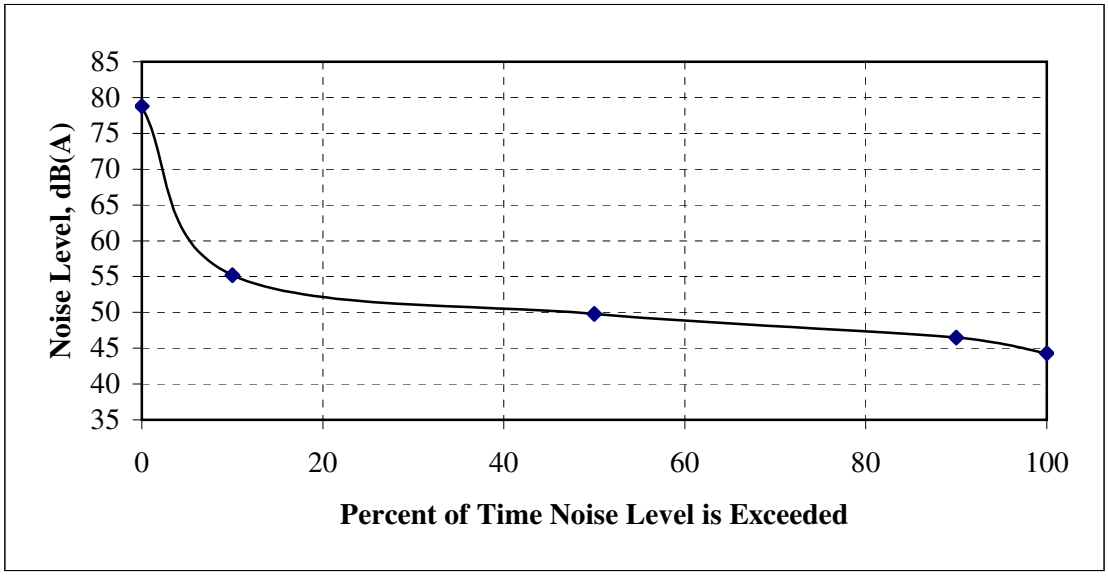
Wind Speed: Calm

Wind Direction: N/A

Humidity: 26%

Operator: Cynthia M. Bordash

	3:01 PM to 3:17 PM
L10	55.2
L50	49.8
L90	46.5
Leq	58.5
Lmax	78.8
Lmin	44.3



Noise Survey Sheet

Project: Riverside Energy Resource Center

Position: ST-13, Hidden Valley Kennel/residence,
15 feet from Acorn St.

Date: March 17, 2004

Noise Source: Traffic, dogs barking

SLM Height: 5'

LD 712 S/N: 0555

LD CAL200
Calibrator S/N: 2916

Temperature: 84 F

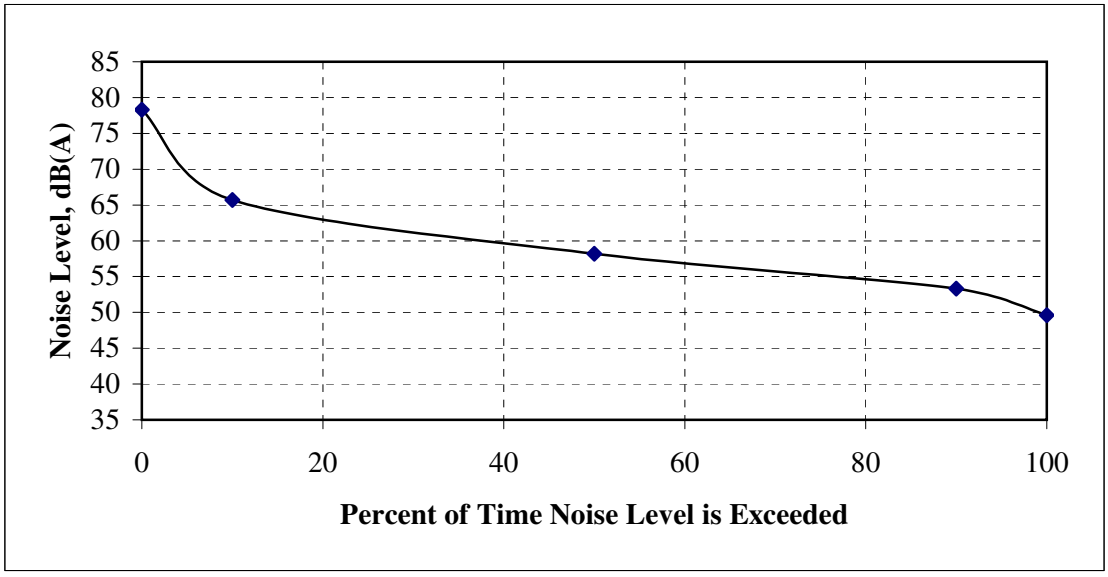
Wind Speed: 6 mph

Wind Direction: ENE

Humidity: 27%

Operator: Cynthia M. Bordash

	1:15 PM to 1:35 PM
L10	65.7
L50	58.2
L90	53.3
Leq	62.7
Lmax	78.3
Lmin	49.6



Riverside Energy Resource Center
Guaranteed Noise Level Inquiry

Equipment Name: LM6 NXGN package/SCR CO stack **Equip. List No.** _____

Manufacturer: GE Energy

Mfrs. Model No. LM6000 NXGN

Notes: LM6000 NXGN package/SCR CO Exhaust System - Sound Power Levels

Contact Name: Eric Watson (GE Energy) **Contact Phone:** 281-864-2999

The City of Riverside is considering selecting your equipment for the Riverside Energy Resource Center in the City of Riverside, California. Please provide the guaranteed noise levels of the equipment you are providing as requested below:

Please provide measured or estimated octave-band sound power levels:

Octave-Band Sound Power Level (Un-Weighted), dB (re: ~~20 micropascals~~ 10^{-12} Watt, rms)									
31 Hz	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	**16 kHz**
126	121	114	108	100	95	92	94	92	Not Avail.

Measured ☐ Estimated ☒

Describe sound attenuation packages required to achieve these sound power levels:

The above octave band Sound Power Levels assume one (1) LM6000-NXGN gas turbine generator set, with all of the associated noise improvements, including: 1) extra-length inlet air silencer with both Combustion Air and Vent Air silenced; 2) Centaxial generator vent fan design; 3) standard centaxial turbine vent fan with D2 (double-length) turbine vent fan silencer installed; 4) enhanced enclosure wall panel with 11-gauge outer wall panel thickness; 5) SCR system casing and exhaust stack performance as specified in PWL's per proposal #3213-GE, File 3213-GE-01 for ATS, with noise as quoted by STI (Sound Technologies, Inc.). Results will be based on Octave Bands ranging 31.5 Hz through 8K Hz; noise data for 16K Hz octave band is not readily available on most equipment items, and is typically insignificant at both near-field and far-field locations outside the package.

(See Comments, Next Page.)

Comments:

NOTE 1: The above octave bands ONLY represent one (1) LM6000 main unit, and one (1) SCR system casing and exhaust noise. The figures do not include noise contributions from turbine package ancillary skids, as it is assumed that turbine ancillary skids will be enclosed inside of a utility building for easy access & maintenance, and to render these sources as insignificant contributors to outdoor noise levels. Other BOP items, such as gas compressors, gas coolers, cooling towers, chillers, water pumps, air compressors, transformers, ammonia skids, or other SCR fans are not provided here, as full details on these items have not been clearly identified, and may still be under negotiation; therefore, their contributions are not included in the above Sound Power Level Octave Band Sum-Total.

NOTE 2: These octave band figures represent Expected values, not Guaranteed values, by octaves, as quantities may change when additional information on the scope of main unit items, as well as other equipment becomes available. If a Guarantee is required to include all ancillary equipment, then all ancillary equipment must be identified, as well as how the equipment will be enclosed, or weather-protected, along with Sound Power Level information covering the entire scope of all ancillary equipment components that are significant noise producers.

NOTE 3: We prefer to Guarantee Overall A-wt Sound Power Levels, as this requires a less conservative estimate per each octave band, because it requires less allowance for contingencies to cover sound power level variations in specific equipment octave-band sound power levels.

Riverside Energy Resource Center
Estimated Noise Level Inquiry

Equipment Name: Fuel Gas Compressor **Equip. List No.** _____

Manufacturer: Gas Packagers, Inc.

Mfrs. Model No. 3 – Cooper RAM52 600HP on one skid – Base Bid

Notes: Levels are estimated from similar equipment and not guaranteed.

Contact Name: G. Keith Kern **Contact Phone:** 303-297-8100

The City of Riverside is considering selecting your equipment for the Riverside Energy Resource Center in the City of Riverside, California. Please provide the noise levels of the equipment you are providing as requested below:

Please provide measured or estimated octave-band sound power levels:

Octave-Band Sound Power Level (Un-Weighted), dB (re: 20 micropascals)									
31 Hz	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	**16 kHz**
112.9	112.6	107.1	107.2	105.4	103.8	105.9	105.1	103.5	

Measured ☐ Estimated ✓

Describe sound attenuation packages required to achieve these sound power levels:

The noise date given is without sound attenuation. We are proposing 12 foot high sound panels installed four feet from the equipment perimeter. The sound panels proposed have a STC rating of 42 and a NRC rating of 1.10.

Comments:

_____

_____

_____

_____

_____

_____

_____

GE Aero Energy Products
A GE Power Systems Business
16415 Jacintoport Blvd.
Houston, TX 77015

Customer: City of RIVERSIDE, CA
Description: LM6000 (2) New Generation Units
Project: Two (2) LM6000's for City of RIVERSIDE, CA
Date: 23 February 2004

LM6000 Main Unit Noise, Ancillaries, and SCR / CO Catalyst System Noise
NOTE: This is for a SINGLE SYSTEM -- For two systems, add +3 dB.
NOTE: for Chiller system, there is ONLY ONE REQUIRED per turbine unit.

Octave Band Center Frequency (Hz)

	Item Description	31.5	63	125	250	500	1K	2K	4K	8K	Lin.	A-Wt.
		Sound Power Levels (PWL's) in dB (ref 10^{-12} W)										
		Sound Pressure Levels (SPL's) in dB (ref 20 Micropascals)										
	LM6000 NXGN Unit, PLUS SCR / CO SYSTEM COMBINED:											
	LM6000 NXGN Filter House PWL's:											
1.)	PWL: Combustion Air Filter Face, BOTH SIDES (no add'l face sil)		106	100	91	70	65	64	74	87	106.9	89.6
	PWL: Ventilation Air Filter Face, BOTH SIDES (no add'l face sil)		88	80	81	62	57	76	90	86	93.4	92.0
	PWL: Filter House Shell Surfaces:	99	96	92	98	86	80	79	79	74	103.1	91.5
	A-Weighted Octave Bands:		61	61	71	68	62	60	60	47		
	A-Wt to Linear Corrections:		26	16	9	3	0	-1	-1	1		
	PWL: Linear Octave Bands (ref Fouress spec)		87	77	80	71	62	59	59	48	87.9	74.1
	A-Weighted Octave Bands:		75	78	81	80	79	76	71	62		
	A-Wt to Linear Corrections:		26	16	9	3	0	-1	-1	1		
	PWL: Linear Octave Bands (ref Fouress spec)		101	94	90	83	79	75	70	63	102.4	86.8
	PWL: Inlet Silencer Shell Surfaces (Fouress spec)		101	94	91	84	79	75	71	63	102.5	87.0
	PWL. Combined Filter House: Faces, Silencer & House Sl	***99***	***107***	***102***	***100***	***88***	***83***	***82***	***90***	***90***	***109.5***	***96.4***
2.)	**Turbine-Generator Enclosure & Basebeam:**											
	PWL: Turbine Enclosure & Basebeam (combined)	101	97	101	100	97	89	87	87	83	106.8	97.9
	PWL: Generator Enclsoure & Basebeam (combined)	100	100	107	100	94	88	85	88	76	109.3	97.6
	PWL. Combined Turbine & Generator Enclosure & Baseb	***104***	***102***	***108***	***103***	***98***	***92***	***89***	***91***	***83***	***111.3***	***100.7***
3.)	**Generator Vent Fan Shell & Motor plus Damper Radiated Noise:**											
	PWL: Gen Vent Fan Motor & Shell Radiated noise-Centaxial		102	102	91	78	73	71	68	65	105.5	88.6
	PWL: Gen Vent Fan Damper (est.)		104	104	93	80	75	73	70	67	107.5	90.6
	PWL. Combined Generator Vent Fan & Damper		***106***	***106***	***95***	***82***	***78***	***75***	***72***	***69***	***109.6***	***92.7***
4.)	**Generator Exhaust Silencer & Damper Surfaces:**											
	PWL: Generator Exh. Exit:	106	90	97	87	77	78	76	73	68	106.5	85.6
	PWL: Generator Exh Sil Casing Surfaces	88	81	105	94	70	70	66	63	48	105.0	90.2
	Damper: (IBERDROLA)											
	INT: Lt half side	91	91	97	92	77	76	79	70	61	99.9	87.0
	INT Rt half side	92	92	99	93	76	77	80	72	63	101.2	88.0
	COR: Area Correction:	20.2	Sq.Ft.		2.7	dB	INT -> PWL area Correction					
	PWL: Total Damper:	97	97	104	98	82	82	85	76	68	106.4	93.3
	PWL. Combined Generator Exhaust Sil Surfaces & Exit:	***106***	***98***	***108***	***100***	***84***	***84***	***86***	***78***	***71***	***110.8***	***95.5***
5.)	**Turb Vent Exhaust Fan Motor & Shell Surfaces, & Exit:**											
	PWL: Turb Vent Fan Shell & Motor & Silencer Shell Surfaces	101	98	99	99	91	89	84	85	80	105.8	95.7
	PWL: Turb Vent Fan Exit -- No Directivity Included:	120	106	99	96	85	85	85	83	75	119.8	93.3
	90-Deg Directivity:	0	-1	-2	-5	-7	-10	-12	-15	-17		
	PWL: Turb Vent Fan Exit -- 90-Degree Directivity Included:	120	105	97	91	78	75	73	68	58	119.7	87.7
	PWL. COMBINED: Turbine Vent Fan Surfaces & Exit:	***120***	***106***	***101***	***100***	***92***	***90***	***84***	***85***	***80***	***119.9***	***96.3***
	PWL LM6000 Next-Gen Package Noise Total:	***120***	***112***	***113***	***107***	***100***	***95***	***92***	***94***	***91***	***121.5***	***104.1***

GE Aero Energy Products
A GE Power Systems Business
16415 Jacintoport Blvd.
Houston, TX 77015

Customer: City of RIVERSIDE, CA
Description: LM6000 (2) New Generation Units
Project: Two (2) LM6000's for City of RIVERSIDE, CA
Date: 23 February 2004

LM6000 Main Unit Noise, Ancillaries, and SCR / CO Catalyst System Noise
NOTE: This is for a SINGLE SYSTEM -- For two systems, add +3 dB.
NOTE: for Chiller system, there is ONLY ONE REQUIRED per turbine unit.

Item Description	Octave Band Center Frequency (Hz) 31.5	63	125	250	500	1K	2K	4K	8K	Lin.	A-Wt.
	Sound Power Levels (PWL's) in dB (ref 10^{-12} W) Sound Pressure Levels (SPL's) in dB (ref 20 Micropascals)										
COMBUSTION EXHAUST SYSTEM -- SCR w/ CO Catalyst System:											
Expansion Joint:											
PWL: Exhaust Exp Joint (Typical BRADEN, Integrated to stac	105	102	94	88	81	78	75	77	80	107.1	86.9
PWL: SCR / CO Catalyst System casing (per STI Quote)	118	111	104	101	91	77	73	71	60	119.0	95.2
PWL: Stack Exit (Includes Stack Horizontal Directivity)	123	120	107	96	85	80	77	77	79	124.8	97.0
PWL COMBINED - Stack Exit, SCR, and Exh Exp .	***124***	***121***	***109***	***102***	***92***	***83***	***80***	***81***	***83***	***125.9***	***99.4***
---> PWL Main Unit Plus Combustion Exhaust SCR / C	***126***	***121***	***114***	***108***	***100***	***95***	***92***	***94***	***92***	***127.2***	***105.4 <---***

NOTE: OTHER ITEMS NOT INCLUDED (DETAILS NOT FINALIZED):

Item Description	Octave Band Center Frequency (Hz) 31.5	63	125	250	500	1K	2K	4K	8K	Lin.	A-Wt.
	Sound Power Levels (PWL's) in dB (ref 10^{-12} W)										
LM6000 Ancillary Skids:											
Steady-State Operating Skids:											
PWL: Sprint Skid (Unenclosed)	82	82	85	87	89	90	88	83	76	95.6	94.0
PWL: Water Injection Skid (Unenclosed)	86	99	102	102	106	104	104	100	97	111.6	109.8
PWL: Gas Filter Skid (Unenclosed)			56	64	67	65	60	54	48	70.9	68.8
PWL: Combined Ancillaries, Steady-State (Unenclosed)	87	99	102	102	106	104	104	100	97	111.7	109.9
RECOMMEND: Either add the drop-over enclosures, or put all inside of utility building.											
Intermittent (Startup & Shutdown) Skids:											
PWL: Auxiliary (Start) Skid (Unenclosed)	87	90	95	108	110	107	104	108	87	114.9	113.4
NOTE: This is an INTERMITTENT source, only occurs during startup, to start turbine, and also after shutdown, to rotate shafts while cooling.											
ALSO NOTE: This is UNENCLOSED, therefore, RECOMMEND either add the drop-over enclosure (full-weather enclosure) or put inside utility building.											
BOP Equipment Skids:											
PWL: Chiller Skid, Enclosed (Typical)		90	89	95	95	96	100	99	85	104.8	104.6
PWL: Gas Compressor Skid (Unenclosed, Typical 3-50%er's)	101	109	105	110	105	102	103	96	91	114.7	108.7
(Based on compressor skid @ Western Farmers, in Anadarko, OK)											
PWL: Gas Cooler, Fin-Fan (Typical)	109	104	101	99	94	90	92	90	89	111.2	98.7
(Based on compressor fin-fan cooler @ Palm Springs, CA)											
PWL: Cooling Tower, 3 Fans Operating per one pair turbines		111	112	110	104	96	92	90	89	116.2	105.7

NOTE: There are numerous other BOP equipment items, some of which may be significant noise sources, esp. fans and skids assoc. w/ SCR System.
All things that are not included here, are omitted because I do not have sound power level data for those items.

Riverside Energy Resource Center
Guaranteed Noise Level Inquiry

Equipment Name: SCR/CO ERU **Equip. List No.** N/A

Manufacturer: ATS/Express LLC

Mfrs. Model No. CHICAGO BLOWER

Notes: NOISE FOR TEMPERING AIR FANS

Contact Name: JIM ALFRED **Contact Phone:** 918-622-1420

The City of Riverside is considering selecting your equipment for the Riverside Energy Resource Center in the City of Riverside, California. Please provide the guaranteed noise levels of the equipment you are providing as requested below:

Please provide measured or estimated octave-band sound power levels:

Octave-Band Sound Power Level (Un-Weighted), dB (re: ~~20 micropascals~~) 1 PICOWAT									
31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
	104	102	98	94	93	85	81	81	

Measured ☐ Estimated ☒

Describe sound attenuation packages required to achieve these sound power levels:

VAW SYSTEMS INLET SILENCERS

Comments:
SEE FOLLOWING SHEETS 2, 3, 4 FROM SOUND TECHNOLOGIES.

2/4

Jim Alfred

From: Bob Fatt [rd_fatt@soundtech.us]
Sent: Thursday, March 25, 2004 4:57 PM
To: Jim Alfred
Subject: GE Riverside Temp Air Fan PWL STI No. 3272 3-25-04

Dear Jim,
Tempering Air Fan Total Sound Power Levels (dB, re: one picowatt)
Final line item of attached pdf file.
Shoudl questions arise, please don't hesitate to call

Best regards,
SOUND TECHNOLOGIES INC.
Bob Fatt
Office: 219-879-2600 Ext. 109
Fax: 219-879-2611
Cell: 219-477-7619
310 Commerce Square
Michigan City, IN 46360

3/4

SOUND TECHNOLOGIES INC.

CORPORATE OFFICE & MANUFACTURING: 310 Commerce Sq. Michigan City, Indiana 46360
Telephone (219) 879-2600 Fax: (219) 879-2611

STI's GAS TURBINE BYPASS AND/OR COMBINED CYCLE (HRSG) NOISE CONTROL EVALUATION PROGRAM

FILENAME	3272-CBC	REV	0	SECTION	C
PROPOSAL NO.	3272			PAGE	1
CLIENT	ATS EXPRESS				
PROJECT	GE RIVERSIDE				
DATE	03/25/04				

		WITH INLET DUCT SILEN(	NO
		WITH EX DUCT SILENCEF	NO
DESCRIPTION	DETERMINATION OF CASING RADIATED PWL's	WITH STACK SILENCER	NO
NUMBER OF UNITS	1		

		OCTAVE BAND CENTER FREQUENCY								
	LENGTH	31.5	63	125	250	500	1000	2000	4000	80000
FAN TOTAL PWL's		N/A	112	114	115	114	110	103	99	96
EXHAUST PWL's		N/A	109	111	112	111	107	100	96	93
INLET PWL's		N/A	109	111	112	111	107	100	96	93
INLET SILENCER I.L.		N/A	6	10	17	24	34	25	23	14
PANEL IL	NONE	0	0	0	0	0	0	0	0	0
CORRECTED TO DIFFUSE FIELD		N								
USE NUMBER OF	TOPS	2								
USE NUMBER OF	SIDES	2								

	DESIGNATION	PANELS	(W) INLET	(H) INLET	(W) OUT	(H) OUT	(L)	SqFt	TOP SqFt	SIDE SqFt	TOTAL SqFt
EXHAUST BOOT SIDE	0.25	N	1.0	2.2	1.0	2.2	0.7	2	1	1	3
EXHAUST BOOT TOP	0.25	N	1.0	2.2	1.0	2.2	0.7	2	1	1	1
TRANS 1 SIDE	0.25	N	1.0	2.2	1.5	2.5	2.6	3	3	6	12
TRANS 1 TOP	0.25	N	1.0	2.2	1.5	2.5	2.6	3	3	6	6
DAMPERS SIDE	0.25	N	1.5	2.5	1.5	2.5	3.7	4	6	9	18
DAMPERS TOP	0.25	N	1.5	2.5	1.5	2.5	3.7	4	6	9	11
TRANS 2 SIDE	0.25	N	1.5	2.5	2.7	2.5	3.2	5	7	8	16
TRANS 2 TOP	0.25	N	1.5	2.5	2.7	2.5	3.2	5	7	8	13

SOUND TECHNOLOGIES INC's computer generated "NOISE EVALUATION PROGRAM," as well as all data generated therefrom, is the result of proprietary algorithms and/or "R&D." Therefore, programs and resultant information remain the property of SOUND TECHNOLOGIES INC., and are on loan for your use.
Any reproduction, dissemination, or display of this information, to Others, not party to its initial intent, is strictly prohibited without the express written consent of STI.

SOUND TECHNOLOGIES INC.

CORPORATE OFFICE & MANUFACTURING: 310 Commerce Sq. Michigan City, Indiana 46360
Telephone (219) 879-2600 Fax: (219) 879-2611

STI's GAS TURBINE BYPASS AND/OR COMBINED CYCLE (HRSG) NOISE CONTROL EVALUATION PROGRAM

FILENAME	3272-CBC	REV	0	SECTION	C
PROPOSAL NO.	3272			PAGE	2
CLIENT	ATS EXPRESS				
PROJECT	GE RIVERSIDE				
DATE	03/25/04				

DETERMINATION OF SOUND POWER LEVELS

COMPONENT	OCTAVE BAND CENTER FREQUENCY (Hz) 31.5	63	125	250	500	1000	2000	4000	8000	RESULTS dBA	dBC
FAN TOTAL PWL's	N/A	112	114	115	114	110	103	99	96		
CASING T.L.	N/A	11	15	20	21	18	18	19	20		
FAN CASING RADIATED PWL's =		101	99	95	93	92	85	80	76	96	
FAN INLET PWL's	N/A	109	111	112	111	107	100	96	93		
SILENCER INSERTION LOSS	N/A	6	10	17	24	34	25	23	14		
END REFLECTION	N/A	10	5	2	0	0	0	0	0		
FAN INLET PWL's =		93	96	93	87	73	75	73	79	89	
EXHAUST DUCT PWL's											
EXHAUST BOOT SIDE	N/A	88	84	79	72	62	49	45	42		
EXHAUST BOOT TOP	N/A	84	80	75	68	58	45	41	38		
TRANS 1 SIDE	N/A	92	89	84	76	66	53	49	46		
TRANS 1 TOP	N/A	90	86	81	74	84	51	47	44		
DAMPERS SIDE	N/A	93	89	84	77	67	54	50	47		
DAMPERS TOP	N/A	91	87	82	75	65	52	48	45		
TRANS 2 SIDE	N/A	91	87	82	75	65	52	48	45		
TRANS 2 TOP	N/A	90	86	81	74	64	51	47	44		
T2 SIDES	N/A	0	0	0	0	0	0	0	0		
T2 TOP	N/A	0	0	0	0	0	0	0	0		
EXHAUST DUCT PWL's =		100	96	91	84	85	61	57	54	88	
TOTAL FAN PWL's =		**104**	**102**	**98**	**94**	**93**	**85**	**81**	**81**	**97**	

SOUND TECHNOLOGIES INC's computer generated "NOISE EVALUATION PROGRAM," as well as all data generated therefrom, is the result of proprietary algorithms and/or "R&D." Therefore, programs and resultant information remain the property of SOUND TECHNOLOGIES INC., and are on loan for your use.
Any reproduction, dissemination, or display of this information, to Others, not party to its initial intent, is strictly prohibited without the express written consent of STI.

Riverside Energy Resource Center

Sound Level Calculation

Nearest Residential Property: 2,820 Feet North of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	2,820		65	60	53	49	43	37	32	16	-7
		45	26	34	37	40	40	37	33	17	-8
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	2,820	40	65	59	51	44	34	26	17	4	-18
Ammonia Evaporation Skid	2,820	35	44	43	42	39	33	25	13	-6	-31
Chiller Package	2,820	29	26	25	23	28	26	24	22	6	-28
Auxiliary Cooling Tower	2,820	38	47	46	46	43	35	24	14	-3	-24
Fuel Gas Compressor Skid	2,820	41	51	51	44	43	40	35	31	15	-7
Tempering Air Fans	2,820	31	45	42	39	34	28	24	10	-9	-29
Distance to acoustic center	**2,820**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	2,820										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**40**	**65**	**59**	**51**	**44**	**34**	**26**	**17**	**4**	**-18**
Ammonia Evaporation Skid	2,820										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**35**	**44**	**43**	**42**	**39**	**33**	**25**	**13**	**-6**	**-31**
Chiller Package	2,820										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**29**	**26**	**25**	**23**	**28**	**26**	**24**	**22**	**6**	**-28**

Auxiliary Cooling Tower	2,820										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**38**	**47**	**46**	**46**	**43**	**35**	**24**	**14**	**-3**	**-24**
Fuel Gas Compressor Skid	2,820										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**41**	**51**	**51**	**44**	**43**	**40**	**35**	**31**	**15**	**-7**
Tempering Air Fans	2,820										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			67	67	67	67	67	67	67	67	67
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	5	8	15	30	50
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**31**	**45**	**42**	**39**	**34**	**28**	**24**	**10**	**-9**	**-29**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Residential Property: 3,950 Feet Southwest of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	3,950		62	56	50	45	38	30	23	1	-29
		41	22	30	33	36	35	30	24	2	-31
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,950	36	61	56	47	40	29	20	8	-11	-41
Ammonia Evaporation Skid	3,950	30	40	40	38	35	28	19	4	-21	-54
Chiller Package	3,950	23	22	22	19	24	21	18	13	-9	-51
Auxiliary Cooling Tower	3,950	33	43	43	42	39	30	18	5	-18	-47
Fuel Gas Compressor Skid	3,950	36	48	47	40	39	35	28	22	0	-30
Tempering Air Fans	3,950	26	41	39	35	30	23	18	1	-24	-52
Distance to acoustic center	**3,950**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,950										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**36**	**61**	**56**	**47**	**40**	**29**	**20**	**8**	**-11**	**-41**
Ammonia Evaporation Skid	3,950										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**30**	**40**	**40**	**38**	**35**	**28**	**19**	**4**	**-21**	**-54**
Chiller Package	3,950										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**23**	**22**	**22**	**19**	**24**	**21**	**18**	**13**	**-9**	**-51**

Auxiliary Cooling Tower	3,950										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**33**	**43**	**43**	**42**	**39**	**30**	**18**	**5**	**-18**	**-47**
Fuel Gas Compressor Skid	3,950										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**36**	**48**	**47**	**40**	**39**	**35**	**28**	**22**	**0**	**-30**
Tempering Air Fans	3,950										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	20	42	70
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**26**	**41**	**39**	**35**	**30**	**23**	**18**	**1**	**-24**	**-52**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Residential Property: 4,290 Feet Southeast of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	4,290		61	56	49	44	36	28	20	-4	-36
		39	21	29	32	35	33	28	21	-3	-37
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	4,290	35	60	55	46	39	28	18	6	-16	-48
Ammonia Evaporation Skid	4,290	29	39	39	37	34	27	17	2	-26	-61
Chiller Package	4,290	21	21	21	18	23	20	16	11	-14	-58
Auxiliary Cooling Tower	4,290	32	42	42	41	38	29	16	3	-23	-54
Fuel Gas Compressor Skid	4,290	34	47	46	39	38	33	27	19	-5	-37
Tempering Air Fans	4,290	25	40	38	34	29	22	16	-1	-29	-59
Distance to acoustic center	**4,290**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	4,290										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**35**	**60**	**55**	**46**	**39**	**28**	**18**	**6**	**-16**	**-48**
Ammonia Evaporation Skid	4,290										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**29**	**39**	**39**	**37**	**34**	**27**	**17**	**2**	**-26**	**-61**
Chiller Package	4,290										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**21**	**21**	**21**	**18**	**23**	**20**	**16**	**11**	**-14**	**-58**

Auxiliary Cooling Tower	4,290										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**32**	**42**	**42**	**41**	**38**	**29**	**16**	**3**	**-23**	**-54**
Fuel Gas Compressor Skid	4,290										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**34**	**47**	**46**	**39**	**38**	**33**	**27**	**19**	**-5**	**-37**
Tempering Air Fans	4,290										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	4	5	8	13	22	45	76
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**25**	**40**	**38**	**34**	**29**	**22**	**16**	**-1**	**-29**	**-59**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Residential Property: 4,000 Feet South of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	4,000		62	56	49	44	38	30	22	0	-30
		40	22	30	33	36	34	30	24	1	-32
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	4,000	36	61	55	47	40	29	19	8	-12	-42
Ammonia Evaporation Skid	4,000	30	40	39	38	35	28	18	4	-22	-55
Chiller Package	4,000	22	22	21	19	24	21	17	13	-10	-52
Auxiliary Cooling Tower	4,000	33	43	42	42	39	30	17	5	-19	-48
Fuel Gas Compressor Skid	4,000	36	48	47	40	39	35	28	22	-1	-31
Tempering Air Fans	4,000	26	41	38	35	30	23	17	1	-25	-53
Distance to acoustic center	**4,000**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	4,000										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**36**	**61**	**55**	**47**	**40**	**29**	**19**	**8**	**-12**	**-42**
Ammonia Evaporation Skid	4,000										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**30**	**40**	**39**	**38**	**35**	**28**	**18**	**4**	**-22**	**-55**
Chiller Package	4,000										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**22**	**22**	**21**	**19**	**24**	**21**	**17**	**13**	**-10**	**-52**

Auxiliary Cooling Tower	4,000										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**33**	**43**	**42**	**42**	**39**	**30**	**17**	**5**	**-19**	**-48**
Fuel Gas Compressor Skid	4,000										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**36**	**48**	**47**	**40**	**39**	**35**	**28**	**22**	**-1**	**-31**
Tempering Air Fans	4,000										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			70	70	70	70	70	70	70	70	70
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	5	7	12	21	42	71
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**26**	**41**	**38**	**35**	**30**	**23**	**17**	**1**	**-25**	**-53**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Residential Property: 5,730 Feet Southeast of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	5,730		58	52	45	39	31	22	10	-21	-64
		35	18	26	29	31	28	22	12	-20	-65
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	5,730	31	58	51	43	34	23	11	-4	-33	-76
Ammonia Evaporation Skid	5,730	24	37	35	34	29	22	10	-8	-43	-89
Chiller Package	5,730	15	19	17	15	18	15	9	1	-31	-86
Auxiliary Cooling Tower	5,730	28	40	38	38	33	24	9	-7	-40	-82
Fuel Gas Compressor Skid	5,730	30	44	43	36	34	28	20	9	-22	-65
Tempering Air Fans	5,730	20	38	34	31	24	17	9	-11	-46	-87
Distance to acoustic center	**5,730**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	5,730										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**31**	**58**	**51**	**43**	**34**	**23**	**11**	**-4**	**-33**	**-76**
Ammonia Evaporation Skid	5,730										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**24**	**37**	**35**	**34**	**29**	**22**	**10**	**-8**	**-43**	**-89**
Chiller Package	5,730										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**15**	**19**	**17**	**15**	**18**	**15**	**9**	**1**	**-31**	**-86**

Auxiliary Cooling Tower	5,730										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**28**	**40**	**38**	**38**	**33**	**24**	**9**	**-7**	**-40**	**-82**
Fuel Gas Compressor Skid	5,730										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**30**	**44**	**43**	**36**	**34**	**28**	**20**	**9**	**-22**	**-65**
Tempering Air Fans	5,730										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			73	73	73	73	73	73	73	73	73
Atmospheric Absorption (59 deg F, 70% RH)			2	3	5	7	10	17	30	61	101
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**20**	**38**	**34**	**31**	**24**	**17**	**9**	**-11**	**-46**	**-87**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Park Property: 3,150 Feet North of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	3,150		59	54	47	42	34	25	17	-4	-31
		37	19	28	31	33	30	25	18	-3	-32
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,150	33	58	53	45	37	26	15	3	-14	-41
Ammonia Evaporation Skid	3,150	26	37	37	35	31	24	13	-2	-26	-56
Chiller Package	3,150	19	19	19	17	21	18	13	8	-12	-51
Auxiliary Cooling Tower	3,150	31	40	40	40	37	29	17	6	-13	-36
Fuel Gas Compressor Skid	3,150	31	45	45	37	35	29	22	15	-6	-33
Tempering Air Fans	3,150	22	38	36	32	26	19	12	-5	-29	-54
Distance to acoustic center	**3,150**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,150										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	5	6	7	9	11	13	16
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**33**	**58**	**53**	**45**	**37**	**26**	**15**	**3**	**-14**	**-41**
Ammonia Evaporation Skid	3,150										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	6	7	8	10	12	15	18
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**26**	**37**	**37**	**35**	**31**	**24**	**13**	**-2**	**-26**	**-56**

Chiller Package	3,150										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	5	6	7	9	11	13	16
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**19**	**19**	**19**	**17**	**21**	**18**	**13**	**8**	**-12**	**-51**
Auxiliary Cooling Tower	3,150										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**31**	**40**	**40**	**40**	**37**	**29**	**17**	**6**	**-13**	**-36**
Fuel Gas Compressor Skid	3,150										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**31**	**45**	**45**	**37**	**35**	**29**	**22**	**15**	**-6**	**-33**
Tempering Air Fans	3,150										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			68	68	68	68	68	68	68	68	68
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	9	16	33	56
Barrier Attenuation			5	5	6	7	8	10	12	15	18
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**22**	**38**	**36**	**32**	**26**	**19**	**12**	**-5**	**-29**	**-54**

Barrier Calculations						
	CTG	Amm	Chiller	Cooling	Comp.	Fans
Source height, ft	740	8	14	45	14	9
Barrier height, ft	20	20	20	20	20	20
Receiver height, ft	5	5	5	5	5	5
Source elevation, ft.	0	725	726	726	718	725
Barrier elevation, ft	765	765	765	765	765	765
Receiver elevation, ft.	780	780	780	780	780	780
Distance, source to barrier, ft	2,985	2,975	3,020	3,020	2,740	2,965
Distance, barrier to receiver, ft	320	340	330	330	340	350
Path length difference, ft	0.03	0.05	0.03	0.00	0.06	0.05
Sign	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest School Property: 3,520 Feet North of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	3,520		58	53	45	40	32	22	13	-10	-39
		35	18	27	29	31	28	22	14	-9	-40
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,520	31	57	52	43	34	22	11	-2	-22	-52
Ammonia Evaporation Skid	3,520	24	36	36	34	29	21	10	-6	-32	-65
Chiller Package	3,520	16	18	18	15	18	15	10	4	-19	-61
Auxiliary Cooling Tower	3,520	30	39	39	39	35	27	15	3	-18	-44
Fuel Gas Compressor Skid	3,520	29	44	43	35	33	28	20	11	-12	-41
Tempering Air Fans	3,520	19	37	35	30	23	16	9	-10	-36	-64
Distance to acoustic center	**3,520**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	3,520										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**31**	**57**	**52**	**43**	**34**	**22**	**11**	**-2**	**-22**	**-52**
Ammonia Evaporation Skid	3,520										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**24**	**36**	**36**	**34**	**29**	**21**	**10**	**-6**	**-32**	**-65**

Chiller Package	3,520										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	6	7	8	10	12	15	18
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**16**	**18**	**18**	**15**	**18**	**15**	**10**	**4**	**-19**	**-61**
Auxiliary Cooling Tower	3,520										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**30**	**39**	**39**	**39**	**35**	**27**	**15**	**3**	**-18**	**-44**
Fuel Gas Compressor Skid	3,520										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	7	8	9	11	14	17	20
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**29**	**44**	**43**	**35**	**33**	**28**	**20**	**11**	**-12**	**-41**
Tempering Air Fans	3,520										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			69	69	69	69	69	69	69	69	69
Atmospheric Absorption (59 deg F, 70% RH)			1	2	3	4	6	11	18	37	62
Barrier Attenuation			5	5	7	8	9	11	14	17	20
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**19**	**37**	**35**	**30**	**23**	**16**	**9**	**-10**	**-36**	**-64**

Barrier Calculations						
	CTG	Amm	Chiller	Cooling	Comp.	Fans
Source height, ft	740	8	14	45	14	9
Barrier height, ft	20	20	20	20	20	20
Receiver height, ft	5	5	5	5	5	5
Source elevation, ft.	0	725	726	726	718	725
Barrier elevation, ft	765	765	765	765	765	765
Receiver elevation, ft.	780	780	780	780	780	780
Distance, source to barrier, ft	2,995	2,990	3,020	3,020	2,970	2,880
Distance, barrier to receiver, ft	600	600	600	600	620	600
Path length difference, ft	0.06	0.07	0.05	0.01	0.08	0.08
Sign	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Church Property: 1,340 Feet Southeast of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	1,340		63	56	51	47	40	31	25	17	6
		42	23	30	35	38	37	31	27	18	5
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	1,340	34	62	55	46	36	24	15	7	2	-10
Ammonia Evaporation Skid	1,340	25	40	38	35	30	22	13	3	-8	-23
Chiller Package	1,340	19	23	22	18	20	17	13	12	4	-20
Auxiliary Cooling Tower	1,340	41	48	48	49	46	39	30	23	14	3
Fuel Gas Compressor Skid	1,340	30	47	45	36	32	28	23	21	13	2
Tempering Air Fans	1,340	22	41	37	32	25	17	12	0	-11	-21
Distance to acoustic center	**1,340**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	1,340										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**34**	**62**	**55**	**46**	**36**	**24**	**15**	**7**	**2**	**-10**
Ammonia Evaporation Skid	1,340										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			10	12	15	17	20	23	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**25**	**40**	**38**	**35**	**30**	**22**	**13**	**3**	**-8**	**-23**

Chiller Package	1,340										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			9	10	13	16	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**19**	**23**	**22**	**18**	**20**	**17**	**13**	**12**	**4**	**-20**
Auxiliary Cooling Tower	1,340										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**41**	**48**	**48**	**49**	**46**	**39**	**30**	**23**	**14**	**3**
Fuel Gas Compressor Skid	1,340										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			11	13	16	19	21	23	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**30**	**47**	**45**	**36**	**32**	**28**	**23**	**21**	**13**	**2**
Tempering Air Fans	1,340										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			60	60	60	60	60	60	60	60	60
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	2	2	4	7	14	24
Barrier Attenuation			10	12	15	17	20	23	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**22**	**41**	**37**	**32**	**25**	**17**	**12**	**0**	**-11**	**-21**

Barrier Calculations						
	CTG	Amm	Chiller	Cooling	Comp.	Fans
Source height, ft	740	8	14	45	14	9
Barrier height, ft	10	10	10	10	10	10
Receiver height, ft	5	5	5	5	5	5
Source elevation, ft.	0	725	726	726	718	725
Barrier elevation, ft	760	760	760	760	760	760
Receiver elevation, ft.	760	760	760	760	760	760
Distance, source to barrier, ft	260	270	290	290	250	270
Distance, barrier to receiver, ft	880	810	860	860	1210	810
Path length difference, ft	1.44	2.03	1.26	0.00	2.51	1.93
Sign	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Industrial Property: 715 Feet South of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	Varies		68	62	55	50	43	34	30	24	16
		46	29	36	39	42	39	34	31	25	15
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #1	995	32	60	53	44	34	24	14	6	2	-7
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #2	875	33	60	54	44	36	24	15	8	4	-4
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #3	730	35	62	56	46	37	26	16	9	7	0
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #4	615	36	63	57	47	38	28	18	11	10	4
Ammonia Evaporation Skid #1	965	25	38	37	34	30	22	12	2	-7	-19
Ammonia Evaporation Skid #2	875	25	39	38	35	30	23	13	3	-6	-17
Ammonia Evaporation Skid #3	695	27	41	39	37	32	24	15	6	-2	-12
Ammonia Evaporation Skid #4	610	28	43	40	38	33	26	17	8	0	-9
Chiller Package #1	935	21	24	23	18	22	18	15	15	8	-13
Chiller Package #2	670	24	26	24	19	23	20	17	18	14	-5
Auxiliary Cooling Tower #1	935	36	48	47	45	42	33	21	11	2	-8
Auxiliary Cooling Tower #2	670	42	52	52	50	47	40	29	20	12	3
Fuel Gas Compressor Skid #1	835	32	48	46	37	34	30	23	22	16	9
Fuel Gas Compressor Skid #2	835	32	48	46	37	34	30	23	22	16	9
Fuel Gas Compressor Skid #3	780	32	48	46	38	35	30	24	22	17	10
Fuel Gas Compressor Skid #4	780	32	48	46	38	35	30	24	22	17	10
Tempering Air Fans #1	970	21	39	36	31	25	17	12	0	-11	-17
Tempering Air Fans #2	890	22	40	37	32	25	18	12	0	-9	-15
Tempering Air Fans #3	705	23	42	38	34	27	19	14	3	-5	-10
Tempering Air Fans #4	630	24	43	39	35	28	20	16	4	-3	-8
Distance to acoustic center	**Near field**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #1	995										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			58	58	58	58	58	58	58	58	58
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	11	18
Barrier Attenuation			8	10	12	15	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #1, SPL		**32**	**60**	**53**	**44**	**34**	**24**	**14**	**6**	**2**	**-7**

CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #2	875										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	9	15
Barrier Attenuation			9	10	13	15	18	21	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #2, SPL		**33**	**60**	**54**	**44**	**36**	**24**	**15**	**8**	**4**	**-4**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #3	730										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			9	10	13	15	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #3, SPL		**35**	**62**	**56**	**46**	**37**	**26**	**16**	**9**	**7**	**0**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #4	615										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			9	10	13	16	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #4, SPL		**36**	**63**	**57**	**47**	**38**	**28**	**18**	**11**	**10**	**4**
Ammonia Evaporation Skid #1	965										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			57	57	57	57	57	57	57	57	57
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	10	17
Barrier Attenuation			9	10	13	15	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #1, SPL		**25**	**38**	**37**	**34**	**30**	**22**	**12**	**2**	**-7**	**-19**
Ammonia Evaporation Skid #2	875										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	9	15
Barrier Attenuation			9	10	13	16	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #2, SPL		**25**	**39**	**38**	**35**	**30**	**23**	**13**	**3**	**-6**	**-17**

Ammonia Evaporation Skid #3	695										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	7	12
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #3, SPL		**27**	**41**	**39**	**37**	**32**	**24**	**15**	**6**	**-2**	**-12**
Ammonia Evaporation Skid #4	610										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	6	11
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #4, SPL		**28**	**43**	**40**	**38**	**33**	**26**	**17**	**8**	**0**	**-9**
Chiller Package #1	935										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			57	57	57	57	57	57	57	57	57
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	10	17
Barrier Attenuation			9	10	13	15	18	21	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #1, SPL		**21**	**24**	**23**	**18**	**22**	**18**	**15**	**15**	**8**	**-13**
Chiller Package #2	670										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	12
Barrier Attenuation			10	12	15	17	20	23	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #2, SPL		**24**	**26**	**24**	**19**	**23**	**20**	**17**	**18**	**14**	**-5**
Auxiliary Cooling Tower #1	935										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			57	57	57	57	57	57	57	57	57
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	10	17
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #1, SPL		**36**	**48**	**47**	**45**	**42**	**33**	**21**	**11**	**2**	**-8**

Auxiliary Cooling Tower #2	670										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	12
Barrier Attenuation			5	5	7	8	9	11	14	17	20
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #2, SPL		**42**	**52**	**52**	**50**	**47**	**40**	**29**	**20**	**12**	**3**
Fuel Gas Compressor Skid #1	835										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	2	4	9	15
Barrier Attenuation			9	10	13	16	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #1, SPL		**32**	**48**	**46**	**37**	**34**	**30**	**23**	**22**	**16**	**9**
Fuel Gas Compressor Skid #2	835										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	2	4	9	15
Barrier Attenuation			9	10	13	16	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #2, SPL		**32**	**48**	**46**	**37**	**34**	**30**	**23**	**22**	**16**	**9**
Fuel Gas Compressor Skid #3	780										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #3, SPL		**32**	**48**	**46**	**38**	**35**	**30**	**24**	**22**	**17**	**10**
Fuel Gas Compressor Skid #4	780										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #4, SPL		**32**	**48**	**46**	**38**	**35**	**30**	**24**	**22**	**17**	**10**

Tempering Air Fans #1	970										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			57	57	57	57	57	57	57	57	57
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	10	17
Barrier Attenuation			9	10	13	15	18	21	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #1, SPL		**21**	**39**	**36**	**31**	**25**	**17**	**12**	**0**	**-11**	**-17**
Tempering Air Fans #2	890										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			57	57	57	57	57	57	57	57	57
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	9	16
Barrier Attenuation			9	10	13	15	18	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #2, SPL		**22**	**40**	**37**	**32**	**25**	**18**	**12**	**0**	**-9**	**-15**
Tempering Air Fans #3	705										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	7	12
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #3, SPL		**23**	**42**	**38**	**34**	**27**	**19**	**14**	**3**	**-5**	**-10**
Tempering Air Fans #4	630										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			9	11	13	16	19	22	24	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #4, SPL		**24**	**43**	**39**	**35**	**28**	**20**	**16**	**4**	**-3**	**-8**

Barrier Calculations										
	CTG1	CTG2	CTG3	CTG4	Amm1	Amm2	Amm3	Amm4	Chill1	Chill2
Source height, ft	743	741	739	739	8	8	8	8	14	14
Barrier height, ft	0	0	0	0	0	0	0	0	0	10
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	0	0	0	0	728	726	724	724	728	725
Barrier elevation, ft	755	755	755	755	755	755	755	755	755	755
Receiver elevation, ft.	730	730	730	730	730	730	730	730	730	730
Distance, source to barrier, ft	770	650	505	390	740	650	470	385	715	450
Distance, barrier to receiver, ft	225	225	225	225	225	225	225	225	220	220
Path length difference, ft	0.95	1.02	1.14	1.22	1.13	1.23	1.46	1.59	1.00	2.80
Sign	+	+	+	+	+	+	+	+	+	+

Barrier Calculations										
	Cool1	Cool2	Comp1	Comp2	Comp3	Comp4	Fans1	Fans2	Fans3	Fans4
Source height, ft	45	45	14	14	14	14	9	9	9	9
Barrier height, ft	0	0	0	0	0	0	0	0	0	0
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	728	725	718	718	718	718	728	728	725	725
Barrier elevation, ft	755	755	755	755	755	755	755	755	755	755
Receiver elevation, ft.	730	730	730	730	730	730	730	730	730	730
Distance, source to barrier, ft	715	450	600	600	545	545	750	670	485	410
Distance, barrier to receiver, ft	220	220	235	235	235	235	220	220	220	220
Path length difference, ft	0.36	0.25	1.28	1.28	1.33	1.33	1.12	1.15	1.38	1.46
Sign	+	+	+	+	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Industrial Property: 715 Feet South of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	Varies		71	65	58	51	43	36	32	27	19
		48	32	39	42	43	40	36	33	28	18
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #1	440	41	67	61	52	43	33	24	17	16	10
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #2	560	39	65	59	50	41	30	22	15	13	6
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #3	720	36	63	57	48	38	28	19	12	9	1
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #4	865	35	61	55	46	38	26	17	9	6	-4
Ammonia Evaporation Skid #1	455	33	46	44	42	38	30	22	12	4	-4
Ammonia Evaporation Skid #2	540	31	45	42	40	36	29	20	10	2	-7
Ammonia Evaporation Skid #3	745	28	42	40	37	33	26	17	6	-3	-13
Ammonia Evaporation Skid #4	830	28	41	40	37	32	26	17	6	-4	-16
Chiller Package #1	480	30	31	30	26	29	27	24	24	20	1
Chiller Package #2	770	25	26	25	22	26	22	19	19	13	-8
Auxiliary Cooling Tower #1	480	41	53	52	50	46	37	26	17	11	5
Auxiliary Cooling Tower #2	770	36	48	47	46	42	32	20	12	4	-4
Fuel Gas Compressor Skid #1	710	35	50	48	40	38	32	27	25	19	12
Fuel Gas Compressor Skid #2	710	35	50	48	40	38	32	27	25	19	12
Fuel Gas Compressor Skid #3	815	34	49	47	40	36	32	27	24	18	9
Fuel Gas Compressor Skid #4	815	34	49	47	40	36	32	27	24	18	9
Tempering Air Fans #1	460	29	47	43	39	33	25	21	9	1	-2
Tempering Air Fans #2	540	27	46	41	37	31	24	19	7	-1	-5
Tempering Air Fans #3	745	25	43	40	35	28	22	17	4	-5	-11
Tempering Air Fans #4	820	24	42	39	34	27	21	16	3	-7	-13
Distance to acoustic center	**Near field**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #1	440										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			50	50	50	50	50	50	50	50	50
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	1	2	5	8
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #1, SPL		**41**	**67**	**61**	**52**	**43**	**33**	**24**	**17**	**16**	**10**

CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #2	560										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #2, SPL		**39**	**65**	**59**	**50**	**41**	**30**	**22**	**15**	**13**	**6**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #3	720										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #3, SPL		**36**	**63**	**57**	**48**	**38**	**28**	**19**	**12**	**9**	**1**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #4	865										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			8	9	11	13	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #4, SPL		**35**	**61**	**55**	**46**	**38**	**26**	**17**	**9**	**6**	**-4**
Ammonia Evaporation Skid #1	455										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			51	51	51	51	51	51	51	51	51
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	1	2	5	8
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #1, SPL		**33**	**46**	**44**	**42**	**38**	**30**	**22**	**12**	**4**	**-4**
Ammonia Evaporation Skid #2	540										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			52	52	52	52	52	52	52	52	52
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #2, SPL		**31**	**45**	**42**	**40**	**36**	**29**	**20**	**10**	**2**	**-7**

Ammonia Evaporation Skid #3	745										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #3, SPL		**28**	**42**	**40**	**37**	**33**	**26**	**17**	**6**	**-3**	**-13**
Ammonia Evaporation Skid #4	830										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	15
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #4, SPL		**28**	**41**	**40**	**37**	**32**	**26**	**17**	**6**	**-4**	**-16**
Chiller Package #1	480										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			51	51	51	51	51	51	51	51	51
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	1	2	5	8
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #1, SPL		**30**	**31**	**30**	**26**	**29**	**27**	**24**	**24**	**20**	**1**
Chiller Package #2	770										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			8	9	11	13	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #2, SPL		**25**	**26**	**25**	**22**	**26**	**22**	**19**	**19**	**13**	**-8**
Auxiliary Cooling Tower #1	480										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			51	51	51	51	51	51	51	51	51
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	1	2	5	8
Barrier Attenuation			7	8	10	12	15	17	21	23	24
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #1, SPL		**41**	**53**	**52**	**50**	**46**	**37**	**26**	**17**	**11**	**5**

Auxiliary Cooling Tower #2	770										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			7	8	10	12	15	18	21	23	24
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #2, SPL		**36**	**48**	**47**	**46**	**42**	**32**	**20**	**12**	**4**	**-4**
Fuel Gas Compressor Skid #1	710										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #1, SPL		**35**	**50**	**48**	**40**	**38**	**32**	**27**	**25**	**19**	**12**
Fuel Gas Compressor Skid #2	710										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #2, SPL		**35**	**50**	**48**	**40**	**38**	**32**	**27**	**25**	**19**	**12**
Fuel Gas Compressor Skid #3	815										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	14
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #3, SPL		**34**	**49**	**47**	**40**	**36**	**32**	**27**	**24**	**18**	**9**
Fuel Gas Compressor Skid #4	815										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	14
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #4, SPL		**34**	**49**	**47**	**40**	**36**	**32**	**27**	**24**	**18**	**9**

Tempering Air Fans #1	460										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			51	51	51	51	51	51	51	51	51
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	1	2	5	8
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #1, SPL		**29**	**47**	**43**	**39**	**33**	**25**	**21**	**9**	**1**	**-2**
Tempering Air Fans #2	540										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			52	52	52	52	52	52	52	52	52
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
Barrier Attenuation			8	10	12	14	17	20	23	24	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #2, SPL		**27**	**46**	**41**	**37**	**31**	**24**	**19**	**7**	**-1**	**-5**
Tempering Air Fans #3	745										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #3, SPL		**25**	**43**	**40**	**35**	**28**	**22**	**17**	**4**	**-5**	**-11**
Tempering Air Fans #4	820										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	14
Barrier Attenuation			8	9	11	14	16	19	22	23	24
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #4, SPL		**24**	**42**	**39**	**34**	**27**	**21**	**16**	**3**	**-7**	**-13**

Barrier Calculations										
	CTG1	CTG2	CTG3	CTG4	Amm1	Amm2	Amm3	Amm4	Chill1	Chill2
Source height, ft	743	741	739	739	8	8	8	8	14	14
Barrier height, ft	10	10	10	10	10	10	10	10	10	10
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	0	0	0	0	728	726	724	724	728	725
Barrier elevation, ft	750	750	750	750	750	750	750	750	750	750
Receiver elevation, ft.	750	750	750	750	750	750	750	750	750	750
Distance, source to barrier, ft	440	565	710	840	475	560	740	825	500	760
Distance, barrier to receiver, ft	20	20	20	20	20	20	20	20	20	20
Path length difference, ft	0.79	0.77	0.75	0.73	0.86	0.84	0.80	0.78	0.78	0.74
Sign	+	+	+	+	+	+	+	+	+	+

Barrier Calculations										
	Cool1	Cool2	Comp1	Comp2	Comp3	Comp4	Fans1	Fans2	Fans3	Fans4
Source height, ft	45	45	14	14	14	14	9	9	9	9
Barrier height, ft	10	10	10	10	10	10	10	10	10	10
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	728	725	718	718	718	718	728	728	725	725
Barrier elevation, ft	750	750	750	750	750	750	750	750	750	750
Receiver elevation, ft.	750	750	750	750	750	750	750	750	750	750
Distance, source to barrier, ft	500	780	735	735	805	805	460	540	735	815
Distance, barrier to receiver, ft	20	20	20	20	20	20	20	20	20	20
Path length difference, ft	0.47	0.54	0.80	0.80	0.78	0.78	0.85	0.82	0.79	0.77
Sign	+	+	+	+	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Industrial Property: 915 Feet East of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	Varies		72	68	63	60	53	46	42	35	27
		55	33	42	47	51	50	46	43	36	26
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #1	670	44	67	62	54	48	39	32	26	23	14
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #2	720	43	66	61	54	46	37	29	23	19	9
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #3	780	41	65	60	52	45	34	26	20	14	4
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #4	865	40	64	59	51	44	33	25	18	13	1
Ammonia Evaporation Skid #1	630	35	45	45	43	40	33	26	14	4	-9
Ammonia Evaporation Skid #2	650	35	45	45	43	39	33	25	14	3	-9
Ammonia Evaporation Skid #3	745	32	44	43	40	37	31	22	10	0	-12
Ammonia Evaporation Skid #4	805	32	43	42	40	36	30	21	9	-1	-14
Chiller Package #1	620	36	31	31	29	34	31	30	30	23	2
Chiller Package #2	760	32	30	28	26	31	28	27	26	18	-5
Auxiliary Cooling Tower #1	620	51	57	57	58	56	49	41	35	30	25
Auxiliary Cooling Tower #2	760	49	56	55	56	54	47	39	33	27	20
Fuel Gas Compressor Skid #1	1,000	41	50	50	44	42	39	35	33	25	13
Fuel Gas Compressor Skid #2	1,000	41	50	50	44	42	39	35	33	25	13
Fuel Gas Compressor Skid #3	1,040	41	50	49	43	42	39	35	33	24	12
Fuel Gas Compressor Skid #4	1,040	41	50	49	43	42	39	35	33	24	12
Tempering Air Fans #1	680	31	46	43	39	34	28	24	10	0	-8
Tempering Air Fans #2	710	32	46	44	41	36	29	25	14	3	-5
Tempering Air Fans #3	790	29	44	42	38	33	26	22	8	-3	-12
Tempering Air Fans #4	840	28	44	42	37	32	25	21	8	-4	-13
Distance to acoustic center	**Near field**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #1	670										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	12
Barrier Attenuation			5	5	5	5	6	7	8	10	12
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #1, SPL		**44**	**67**	**62**	**54**	**48**	**39**	**32**	**26**	**23**	**14**

CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #2	720										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			5	5	5	6	7	9	11	13	16
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #2, SPL		**43**	**66**	**61**	**54**	**46**	**37**	**29**	**23**	**19**	**9**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #3	780										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #3, SPL		**41**	**65**	**60**	**52**	**45**	**34**	**26**	**20**	**14**	**4**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #4	865										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #4, SPL		**40**	**64**	**59**	**51**	**44**	**33**	**25**	**18**	**13**	**1**
Ammonia Evaporation Skid #1	630										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			6	6	8	9	11	13	17	20	23
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #1, SPL		**35**	**45**	**45**	**43**	**40**	**33**	**26**	**14**	**4**	**-9**
Ammonia Evaporation Skid #2	650										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			6	6	8	9	11	13	17	20	23
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #2, SPL		**35**	**45**	**45**	**43**	**39**	**33**	**25**	**14**	**3**	**-9**

Ammonia Evaporation Skid #3	745										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #3, SPL		**32**	**44**	**43**	**40**	**37**	**31**	**22**	**10**	**0**	**-12**
Ammonia Evaporation Skid #4	805										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	14
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #4, SPL		**32**	**43**	**42**	**40**	**36**	**30**	**21**	**9**	**-1**	**-14**
Chiller Package #1	620										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #1, SPL		**36**	**31**	**31**	**29**	**34**	**31**	**30**	**30**	**23**	**2**
Chiller Package #2	760										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			5	6	7	8	10	12	15	18	21
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #2, SPL		**32**	**30**	**28**	**26**	**31**	**28**	**27**	**26**	**18**	**-5**
Auxiliary Cooling Tower #1	620										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	3	7	11
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #1, SPL		**51**	**57**	**57**	**58**	**56**	**49**	**41**	**35**	**30**	**25**

Auxiliary Cooling Tower #2	760										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #2, SPL		**49**	**56**	**55**	**56**	**54**	**47**	**39**	**33**	**27**	**20**
Fuel Gas Compressor Skid #1	1,000										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			58	58	58	58	58	58	58	58	58
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	11	18
Barrier Attenuation			5	5	5	6	7	8	10	12	15
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #1, SPL		**41**	**50**	**50**	**44**	**42**	**39**	**35**	**33**	**25**	**13**
Fuel Gas Compressor Skid #2	1,000										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			58	58	58	58	58	58	58	58	58
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	5	11	18
Barrier Attenuation			5	5	5	6	7	8	10	12	15
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #2, SPL		**41**	**50**	**50**	**44**	**42**	**39**	**35**	**33**	**25**	**13**
Fuel Gas Compressor Skid #3	1,040										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			58	58	58	58	58	58	58	58	58
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	3	5	11	18
Barrier Attenuation			5	5	5	6	7	8	10	12	15
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #3, SPL		**41**	**50**	**49**	**43**	**42**	**39**	**35**	**33**	**24**	**12**
Fuel Gas Compressor Skid #4	1,040										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			58	58	58	58	58	58	58	58	58
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	3	5	11	18
Barrier Attenuation			5	5	5	6	7	8	10	12	15
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #4, SPL		**41**	**50**	**49**	**43**	**42**	**39**	**35**	**33**	**24**	**12**

Tempering Air Fans #1	680										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			54	54	54	54	54	54	54	54	54
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	7	12
Barrier Attenuation			6	6	8	9	11	13	17	20	23
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #1, SPL		**31**	**46**	**43**	**39**	**34**	**28**	**24**	**10**	**0**	**-8**
Tempering Air Fans #2	710										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			5	5	6	7	9	11	13	16	19
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #2, SPL		**32**	**46**	**44**	**41**	**36**	**29**	**25**	**14**	**3**	**-5**
Tempering Air Fans #3	790										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			6	6	8	9	11	13	17	20	23
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #3, SPL		**29**	**44**	**42**	**38**	**33**	**26**	**22**	**8**	**-3**	**-12**
Tempering Air Fans #4	840										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			6	6	8	9	11	13	17	20	23
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #4, SPL		**28**	**44**	**42**	**37**	**32**	**25**	**21**	**8**	**-4**	**-13**

Barrier Calculations										
	CTG1	CTG2	CTG3	CTG4	Amm1	Amm2	Amm3	Amm4	Chill1	Chill2
Source height, ft	743	741	739	739	8	8	8	8	14	14
Barrier height, ft	0	0	0	0	0	0	0	0	0	0
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	0	0	0	0	728	726	724	724	728	725
Barrier elevation, ft	755	755	755	755	755	755	755	755	755	755
Receiver elevation, ft.	760	760	760	760	760	760	760	760	760	760
Distance, source to barrier, ft	300	320	325	365	250	270	265	290	260	270
Distance, barrier to receiver, ft	370	390	445	485	390	410	470	500	430	475
Path length difference, ft	0.01	0.03	0.07	0.06	0.19	0.23	0.38	0.33	0.06	0.13
Sign	+	+	+	+	+	+	+	+	+	+

Barrier Calculations										
	Cool1	Cool2	Comp1	Comp2	Comp3	Comp4	Fans1	Fans2	Fans3	Fans4
Source height, ft	45	45	14	14	14	14	9	9	9	9
Barrier height, ft	0	0	0	0	0	0	0	0	0	0
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	728	725	718	718	718	718	728	728	725	725
Barrier elevation, ft	755	755	755	755	755	755	755	755	755	755
Receiver elevation, ft.	760	760	760	760	760	760	760	760	760	760
Distance, source to barrier, ft	260	270	610	610	615	615	250	340	325	345
Distance, barrier to receiver, ft	430	475	410	410	425	425	380	400	450	480
Path length difference, ft	0.69	0.49	0.02	0.02	0.02	0.02	0.16	0.07	0.18	0.17
Sign	-	-	+	+	+	+	+	+	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Office Property: 625 Feet West of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	Varies		77	72	66	62	57	53	52	48	42
		60	37	46	50	53	53	53	54	49	41
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #1	760	48	71	65	58	52	43	38	33	31	23
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #2	750	48	71	66	58	52	44	38	33	31	24
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #3	770	48	70	65	58	52	43	37	33	31	23
CTG, CTG Auxiliary Skid, SCR, Exhaust Stk #4	825	47	70	65	57	51	43	37	32	29	21
Ammonia Evaporation Skid #1	800	43	49	49	49	46	42	36	28	20	9
Ammonia Evaporation Skid #2	800	43	49	49	49	46	42	36	28	20	9
Ammonia Evaporation Skid #3	830	43	49	49	48	46	42	36	28	19	8
Ammonia Evaporation Skid #4	865	42	48	48	48	46	41	35	27	19	7
Chiller Package #1	830	44	34	34	32	38	38	38	40	34	14
Chiller Package #2	845	44	34	33	32	38	37	37	39	34	14
Auxiliary Cooling Tower #1	830	48	55	55	55	53	47	38	32	25	18
Auxiliary Cooling Tower #2	845	48	55	54	55	53	46	37	31	25	18
Fuel Gas Compressor Skid #1	540	52	55	55	49	49	47	45	46	42	37
Fuel Gas Compressor Skid #2	540	52	55	55	49	49	47	45	46	42	37
Fuel Gas Compressor Skid #3	590	51	55	54	49	48	46	44	45	41	35
Fuel Gas Compressor Skid #4	590	51	55	54	49	48	46	44	45	41	35
Tempering Air Fans #1	760	40	51	48	46	42	37	36	26	18	12
Tempering Air Fans #2	760	40	51	48	46	42	37	36	26	18	12
Tempering Air Fans #3	785	40	50	48	46	42	37	35	25	17	12
Tempering Air Fans #4	820	39	50	48	45	41	37	35	25	16	11
Distance to acoustic center	**Near field**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #1	760										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #1, SPL		**48**	**71**	**65**	**58**	**52**	**43**	**38**	**33**	**31**	**23**

CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #2	750										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #2, SPL		**48**	**71**	**66**	**58**	**52**	**44**	**38**	**33**	**31**	**24**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #3	770										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #3, SPL		**48**	**70**	**65**	**58**	**52**	**43**	**37**	**33**	**31**	**23**
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack #4	825										
Standard Lw			126	121	114	108	100	95	92	94	92
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
CTG Unit #4, SPL		**47**	**70**	**65**	**57**	**51**	**43**	**37**	**32**	**29**	**21**
Ammonia Evaporation Skid #1	800										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #1, SPL		**43**	**49**	**49**	**49**	**46**	**42**	**36**	**28**	**20**	**9**
Ammonia Evaporation Skid #2	800										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #2, SPL		**43**	**49**	**49**	**49**	**46**	**42**	**36**	**28**	**20**	**9**

Ammonia Evaporation Skid #3	830										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #3, SPL		**43**	**49**	**49**	**48**	**46**	**42**	**36**	**28**	**19**	**8**
Ammonia Evaporation Skid #4	865										
Standard Lw			105	105	105	103	99	94	88	84	79
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid #4, SPL		**42**	**48**	**48**	**48**	**46**	**41**	**35**	**27**	**19**	**7**
Chiller Package #1	830										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #1, SPL		**44**	**34**	**34**	**32**	**38**	**38**	**38**	**40**	**34**	**14**
Chiller Package #2	845										
Standard Lw			90	90	89	95	95	96	100	99	85
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package #2, SPL		**44**	**34**	**33**	**32**	**38**	**37**	**37**	**39**	**34**	**14**
Auxiliary Cooling Tower #1	830										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #1, SPL		**48**	**55**	**55**	**55**	**53**	**47**	**38**	**32**	**25**	**18**

Auxiliary Cooling Tower #2	845										
Standard Lw			111	111	112	110	104	96	92	90	89
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	2	3	4	9	15
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower #2, SPL		**48**	**55**	**54**	**55**	**53**	**46**	**37**	**31**	**25**	**18**
Fuel Gas Compressor Skid #1	540										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			52	52	52	52	52	52	52	52	52
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
14' Sound-Absorptive Barrier			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #1, SPL		**52**	**55**	**55**	**49**	**49**	**47**	**45**	**46**	**42**	**37**
Fuel Gas Compressor Skid #2	540										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			52	52	52	52	52	52	52	52	52
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
14' Sound-Absorptive Barrier			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #2, SPL		**52**	**55**	**55**	**49**	**49**	**47**	**45**	**46**	**42**	**37**
Fuel Gas Compressor Skid #3	590										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
14' Sound-Absorptive Barrier			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #3, SPL		**51**	**55**	**54**	**49**	**48**	**46**	**44**	**45**	**41**	**35**
Fuel Gas Compressor Skid #4	590										
Standard Lw			113	113	107	107	105	104	106	105	104
Distance Correction			53	53	53	53	53	53	53	53	53
Atmospheric Absorption (59 deg F, 70% RH)			0	0	0	1	1	2	3	6	10
14' Sound-Absorptive Barrier			5	5	5	5	5	5	5	5	5
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid #4, SPL		**51**	**55**	**54**	**49**	**48**	**46**	**44**	**45**	**41**	**35**

Tempering Air Fans #1	760										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #1, SPL		**40**	**51**	**48**	**46**	**42**	**37**	**36**	**26**	**18**	**12**
Tempering Air Fans #2	760										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	13
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #2, SPL		**40**	**51**	**48**	**46**	**42**	**37**	**36**	**26**	**18**	**12**
Tempering Air Fans #3	785										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			55	55	55	55	55	55	55	55	55
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	8	14
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #3, SPL		**40**	**50**	**48**	**46**	**42**	**37**	**35**	**25**	**17**	**12**
Tempering Air Fans #4	820										
Standard Lw			106	104	102	98	94	93	85	81	81
Distance Correction			56	56	56	56	56	56	56	56	56
Atmospheric Absorption (59 deg F, 70% RH)			0	0	1	1	1	2	4	9	14
Barrier Attenuation			0	0	0	0	0	0	0	0	0
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans #4, SPL		**39**	**50**	**48**	**45**	**41**	**37**	**35**	**25**	**16**	**11**

Barrier Calculations										
	CTG1	CTG2	CTG3	CTG4	Amm1	Amm2	Amm3	Amm4	Chill1	Chill2
Source height, ft	743	741	739	739	8	8	8	8	14	14
Barrier height, ft	10	10	10	10	10	10	10	10	10	10
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	0	0	0	0	728	726	724	724	728	725
Barrier elevation, ft	720	720	720	720	720	720	720	720	720	720
Receiver elevation, ft.	720	720	720	720	720	720	720	720	720	720
Distance, source to barrier, ft	310	300	355	380	360	370	410	430	380	425
Distance, barrier to receiver, ft	440	440	415	440	440	430	415	430	440	415
Path length difference, ft	0.08	0.06	0.01	0.01	0.00	0.00	0.01	0.01	0.04	0.01
Sign	-	-	-	-	-	+	+	+	-	-

Barrier Calculations										
	Cool1	Cool2	Comp1	Comp2	Comp3	Comp4	Fans1	Fans2	Fans3	Fans4
Source height, ft	45	45	14	14	14	14	9	9	9	9
Barrier height, ft	10	10	14	14	14	14	10	10	10	10
Receiver height, ft	5	5	5	5	5	5	5	5	5	5
Source elevation, ft.	728	725	718	718	718	718	728	728	725	725
Barrier elevation, ft	720	720	718	718	718	718	720	720	720	720
Receiver elevation, ft.	720	720	720	720	720	720	720	720	720	720
Distance, source to barrier, ft	380	425	10	10	10	10	300	330	360	375
Distance, barrier to receiver, ft	440	415	430	430	430	430	440	430	420	435
Path length difference, ft	1.05	0.69	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Sign	-	-	+	+	+	+	-	-	+	+

Riverside Energy Resource Center

Sound Level Calculation

Nearest Industrial Property: 2,200 Feet North of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	2,200		67	62	56	52	46	41	37	24	7
		49	28	36	40	43	43	41	38	25	6
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	2,200	43	67	61	54	47	38	30	22	12	-5
Ammonia Evaporation Skid	2,200	38	46	45	45	42	37	29	18	2	-18
Chiller Package	2,200	33	28	27	26	31	30	28	27	14	-15
Auxiliary Cooling Tower	2,200	41	49	48	49	46	39	28	19	5	-11
Fuel Gas Compressor Skid	2,200	45	54	53	47	46	43	39	36	23	6
Tempering Air Fans	2,200	34	47	44	42	37	32	28	15	-1	-16
Distance to acoustic center	**2,200**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	2,200										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**43**	**67**	**61**	**54**	**47**	**38**	**30**	**22**	**12**	**-5**
Ammonia Evaporation Skid	2,200										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**38**	**46**	**45**	**45**	**42**	**37**	**29**	**18**	**2**	**-18**
Chiller Package	2,200										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**33**	**28**	**27**	**26**	**31**	**30**	**28**	**27**	**14**	**-15**

Auxiliary Cooling Tower	2,200										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**41**	**49**	**48**	**49**	**46**	**39**	**28**	**19**	**5**	**-11**
Fuel Gas Compressor Skid	2,200										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**45**	**54**	**53**	**47**	**46**	**43**	**39**	**36**	**23**	**6**
Tempering Air Fans	2,200										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			64	64	64	64	64	64	64	64	64
Atmospheric Absorption (59 deg F, 70% RH)			1	1	2	3	4	7	11	23	39
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**34**	**47**	**44**	**42**	**37**	**32**	**28**	**15**	**-1**	**-16**

Riverside Energy Resource Center

Sound Level Calculation

Nearest Kennel/Residential Property: 1,200 Feet South of Nominal Acoustic Center

	Distance (feet)	dBA	OCTAVE BAND CENTER FREQUENCY (Hz)								
			31.5	63	125	250	500	1000	2000	4000	8000
Receptor Location	1,200		67	61	54	49	42	34	29	19	7
		45	27	35	38	40	39	34	30	20	6
Summary											
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	1,200	40	66	60	52	43	33	23	15	7	-5
Ammonia Evaporation Skid	1,200	34	45	44	42	38	32	22	10	-3	-18
Chiller Package	1,200	27	27	26	24	27	25	21	20	9	-15
Auxiliary Cooling Tower	1,200	39	49	49	48	44	37	25	16	4	-8
Fuel Gas Compressor Skid	1,200	40	53	52	44	43	38	32	28	18	6
Tempering Air Fans	1,200	30	46	43	39	33	27	21	7	-6	-16
Distance to acoustic center	**1,200**										
CTG, CTG Auxiliary Skid, SCR, Exhaust Stack	1,200										
Standard Lw			132	127	120	114	106	101	98	100	98
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			6	7	8	10	12	15	18	21	23
Directivity			0	0	0	0	0	0	0	0	0
CTG, SPL		**40**	**66**	**60**	**52**	**43**	**33**	**23**	**15**	**7**	**-5**
Ammonia Evaporation Skid	1,200										
Standard Lw			111	111	111	109	105	100	94	90	85
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Ammonia Evaporation Skid, SPL		**34**	**45**	**44**	**42**	**38**	**32**	**22**	**10**	**-3**	**-18**

Chiller Package	1,200										
Standard Lw			93	93	92	98	98	99	103	102	88
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			6	7	8	10	12	15	18	21	23
Directivity			0	0	0	0	0	0	0	0	0
Chiller Package, SPL		**27**	**27**	**26**	**24**	**27**	**25**	**21**	**20**	**9**	**-15**
Auxiliary Cooling Tower	1,200										
Standard Lw			114	114	115	113	107	99	95	93	92
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			5	5	7	8	9	11	14	17	20
Directivity			0	0	0	0	0	0	0	0	0
Auxiliary Cooling Tower, SPL		**39**	**49**	**49**	**48**	**44**	**37**	**25**	**16**	**4**	**-8**
Fuel Gas Compressor Skid	1,200										
Standard Lw			119	119	113	113	111	110	112	111	110
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Fuel Gas Compressor Skid, SPL		**40**	**53**	**52**	**44**	**43**	**38**	**32**	**28**	**18**	**6**
Tempering Air Fans	1,200										
Standard Lw			112	110	108	104	100	99	91	87	87
Distance Correction			59	59	59	59	59	59	59	59	59
Atmospheric Absorption (59 deg F, 70% RH)			0	1	1	1	2	4	6	13	21
Barrier Attenuation			6	7	9	10	12	15	19	21	23
Directivity			0	0	0	0	0	0	0	0	0
Tempering Air Fans, SPL		**30**	**46**	**43**	**39**	**33**	**27**	**21**	**7**	**-6**	**-16**

Barrier Calculations						
	CTG	Amm	Chiller	Cooling	Comp.	Fans
Source height, ft	740	8	14	45	14	9
Barrier height, ft	10	10	10	10	10	10
Receiver height, ft	5	5	5	5	5	5
Source elevation, ft.	0	725	726	726	718	725
Barrier elevation, ft	752	752	752	752	752	752
Receiver elevation, ft.	752	752	752	752	752	752
Distance, source to barrier, ft	1,050	1,110	1,050	1,050	1,160	1,055
Distance, barrier to receiver, ft	100	100	100	100	100	100
Path length difference, ft	0.23	0.26	0.23	0.08	0.26	0.27
Sign	+	+	+	+	+	+

APPENDIX 6.7-B

CONSTRUCTION NOISE

Table Const-1. Analysis of Estimated Overall Construction Noise Level in November

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	0	0.16	85					
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	0	0.16	85					
Bulldozer D10R	1	1	4	0.4	88	0	-9	-7	-4	68
Excavator - Trencher (CAT320)	2	6	0	0.4	85					
Excavator - Earth Scraper CAT 623	1	4	10	0.4	89	0	-3	-3	-4	79
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	0	0.4	83					
Excavator - loader	2	4	10	0.4	79	3	-3	-3	-4	72
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	5	0.4	87	0	-3	-6	-4	74
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	0	0.4	87					
Dump Truck	1	1	10	0.4	87	0	-9	-3	-4	71
Service Truck - 1 ton	2	0.5	0	0.4	87					
Truck - Fuel/Lube	2	2	10	0.4	87	3	-6	-3	-4	77
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	5	0.4	87	0	-4	-6	-4	72
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	12	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	0	0.4	76					
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	0	1	78					
									Estimated Combined Leq @ 50':	85

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-2. Analysis of Estimated Overall Construction Noise Level in December

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	0	0.16	85					
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	10	0.4	85	3	-1	-3	-4	79
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	8	0.08	86	0	-3	-4	-11	68
Excavator - Backhoe/loader* Days per unit	3	4	22	0.4	83	5	-3	0	-4	81
Excavator - loader	2	4	10	0.4	79	3	-3	-3	-4	72
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	12	0.4	87	0	-3	-3	-4	77
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	22	0.4	87	0	-9	0	-4	74
Service Truck - 1 ton	2	0.5	22	0.4	87	3	-12	0	-4	74
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	5	0.4	82	3	-1	-6	-4	73
Tractor Truck 5th Wheel	1	3	22	0.4	87	0	-4	0	-4	79
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	22	0.4	87	3	-12	0	-4	74
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	10	0.4	76	0	-4	-3	-4	64
Portable Compaction - Vibratory Ram	1	3	10	0.4	76	0	-4	-3	-4	64
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	5	0.4	76	0	-6	-6	-4	60
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	91

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-3. Analysis of Estimated Overall Construction Noise Level in January

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	10	0.16	85	0	-2	-3	-8	72
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	5	0.16	85	3	-3	-6	-8	71
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	10	0.4	85	3	-1	-3	-4	79
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	8	0.08	86	0	-3	-4	-11	68
Excavator - Backhoe/loader* Days per unit	3	4	15	0.4	83	5	-3	-2	-4	79
Excavator - loader	2	4	10	0.4	79	3	-3	-3	-4	72
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	5	0.4	87	0	-3	-6	-4	74
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	22	0.4	87	7	-2	0	-4	88
Dump Truck	1	1	22	0.4	87	0	-9	0	-4	74
Service Truck - 1 ton	2	0.5	22	0.4	87	3	-12	0	-4	74
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	5	0.4	82	3	-1	-6	-4	73
Tractor Truck 5th Wheel	1	3	5	0.4	87	0	-4	-6	-4	72
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	22	0.4	87	5	-3	0	-4	85
Light Plants	4	3	10	1	73	6	-4	-3	0	71
Portable Compaction - Vibratory Plate	1	3	10	0.4	76	0	-4	-3	-4	64
Portable Compaction - Vibratory Ram	1	3	10	0.4	76	0	-4	-3	-4	64
Articulating Boom Platform	6	4	22	0.4	83	8	-3	0	-4	84
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	5	0.4	76	0	-6	-6	-4	60
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	93

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-4. Analysis of Estimated Overall Construction Noise Level in February

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	15	0.16	85	0	-2	-2	-8	73
Truck Crane - Greater than 200 ton	1	6	8	0.16	85	0	-1	-4	-8	71
Crane - Mobile 65 ton	2	4	20	0.16	85	3	-3	0	-8	77
Cranes - Mobile 45 ton	1	4	5	0.16	85	0	-3	-6	-8	68
Cranes - Mobile 35 ton	3	4	10	0.16	85	5	-3	-3	-8	75
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	10	0.4	85	3	-1	-3	-4	79
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	15	0.4	83	5	-3	-2	-4	79
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	22	0.4	87	7	-2	0	-4	88
Dump Truck	1	1	5	0.4	87	0	-9	-6	-4	68
Service Truck - 1 ton	2	0.5	22	0.4	87	3	-12	0	-4	74
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	3	0.4	82	3	-1	-9	-4	71
Tractor Truck 5th Wheel	1	3	10	0.4	87	0	-4	-3	-4	75
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	22	0.4	87	5	-3	0	-4	85
Light Plants	4	3	10	1	73	6	-4	-3	0	71
Portable Compaction - Vibratory Plate	1	3	5	0.4	76	0	-4	-6	-4	61
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	22	0.4	83	8	-3	0	-4	84
Air Compressor 185 CFM	1	6	22	1	81	0	-1	0	0	80
Concrete Trowel Machine	1	2	3	0.4	76	0	-6	-9	-4	57
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	94

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-5. Analysis of Estimated Overall Construction Noise Level in March

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	10	0.16	85	0	-2	-3	-8	72
Truck Crane - Greater than 200 ton	1	6	15	0.16	85	0	-1	-2	-8	74
Crane - Mobile 65 ton	2	4	15	0.16	85	3	-3	-2	-8	75
Cranes - Mobile 45 ton	1	4	5	0.16	85	0	-3	-6	-8	68
Cranes - Mobile 35 ton	3	4	10	0.16	85	5	-3	-3	-8	75
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	10	0.4	83	5	-3	-3	-4	77
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	22	0.4	87	7	-2	0	-4	88
Dump Truck	1	1	5	0.4	87	0	-9	-6	-4	68
Service Truck - 1 ton	2	0.5	10	0.4	87	3	-12	-3	-4	71
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	10	0.4	87	0	-4	-3	-4	75
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	22	0.4	87	5	-3	0	-4	85
Light Plants	4	3	5	1	73	6	-4	-6	0	68
Portable Compaction - Vibratory Plate	1	3	5	0.4	76	0	-4	-6	-4	61
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	22	0.4	83	8	-3	0	-4	84
Air Compressor 185 CFM	1	6	15	1	81	0	-1	-2	0	78
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	93

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-6. Analysis of Estimated Overall Construction Noise Level in April

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	5	0.16	85	0	-2	-6	-8	69
Truck Crane - Greater than 200 ton	1	6	15	0.16	85	0	-1	-2	-8	74
Crane - Mobile 65 ton	2	4	10	0.16	85	3	-3	-3	-8	74
Cranes - Mobile 45 ton	1	4	5	0.16	85	0	-3	-6	-8	68
Cranes - Mobile 35 ton	3	4	10	0.16	85	5	-3	-3	-8	75
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	10	0.4	83	5	-3	-3	-4	77
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	22	0.4	87	7	-2	0	-4	88
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	10	0.4	87	3	-12	-3	-4	71
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	10	0.4	87	0	-4	-3	-4	75
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	0	0.4	87					
Diesel Powered Welder	3	4	22	0.4	87	5	-3	0	-4	85
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	5	0.4	76	0	-4	-6	-4	61
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	15	1	81	0	-1	-2	0	78
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	93

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-7. Analysis of Estimated Overall Construction Noise Level in May

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	5	0.16	85	0	-1	-6	-8	69
Crane - Mobile 65 ton	2	4	5	0.16	85	3	-3	-6	-8	71
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	10	0.16	85	5	-3	-3	-8	75
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	10	0.08	86	0	-3	-3	-11	69
Excavator - Backhoe/loader* Days per unit	3	4	5	0.4	83	5	-3	-6	-4	74
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	10	0.4	87	0	-3	-3	-4	77
Truck - Water	2	5	22	0.4	87	3	-2	0	-4	84
Forklift	5	5	22	0.4	87	7	-2	0	-4	88
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	0	0.4	87					
Truck - Fuel/Lube	2	2	22	0.4	87	3	-6	0	-4	80
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	22	0.4	87	8	-12	0	-4	79
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	10	0.4	76	0	-4	-3	-4	64
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	15	1	81	0	-1	-2	0	78
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	22	1	78	5	0	0	0	83
									Estimated Combined Leq @ 50':	92

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-8. Analysis of Estimated Overall Construction Noise Level in June

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	5	0.16	85	3	-3	-6	-8	71
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	5	0.4	83	5	-3	-6	-4	74
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	10	0.4	87	0	-3	-3	-4	77
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	0	0.4	87					
Truck - Fuel/Lube	2	2	0	0.4	87					
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	10	0.4	76	0	-4	-3	-4	64
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	10	1	78	5	0	-3	0	79
									Estimated Combined Leq @ 50':	88

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-9. Analysis of Estimated Overall Construction Noise Level in July

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	5	0.16	85	3	-3	-6	-8	71
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	5	0.4	83	5	-3	-6	-4	74
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	5	0.4	87	0	-9	-6	-4	68
Service Truck - 1 ton	2	0.5	0	0.4	87					
Truck - Fuel/Lube	2	2	0	0.4	87					
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	10	0.4	87	3	-12	-3	-4	71
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	0	0.4	76					
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	10	1	78	5	0	-3	0	79
									Estimated Combined Leq @ 50':	88

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-10. Analysis of Estimated Overall Construction Noise Level in August

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	0	0.16	85					
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	5	0.4	85	3	-1	-6	-4	76
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit	3	4	5	0.4	83	5	-3	-6	-4	74
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	4	0.4	87	3	-12	-7	-4	67
Truck - Fuel/Lube	2	2	4	0.4	87	3	-6	-7	-4	73
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	5	0.4	87	3	-12	-6	-4	68
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	0	0.4	76					
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	10	1	78	5	0	-3	0	79
									Estimated Combined Leq @ 50':	88

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-11. Analysis of Estimated Overall Construction Noise Level in September

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	0	0.16	85					
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	0	0.4	85					
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	0	0.08	86					
Excavator - Backhoe/loader* Days per unit (	3	4	0	0.4	83					
Excavator - loader	2	4	0	0.4	79					
Vibratory Roller	1	4	0	4	85					
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	4	0.4	87	3	-12	-7	-4	67
Truck - Fuel/Lube	2	2	4	0.4	87	3	-6	-7	-4	73
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	5	0.4	87	3	-12	-6	-4	68
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	0	0.4	76					
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	5	1	78	5	0	-6	0	76
									Estimated Combined Leq @ 50':	87

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-12. Analysis of Estimated Overall Construction Noise Level in October

Equipment	Number of Units[1]	Hrs/Day Per Unit[1]	Number of Days of Use/ Month[1]	Usage Factor[2]	Typical Level @ 50', dBA[3]	Correction for Number of Units[4]	Correction for Hrs/Day[5]	Correction for No. of Days of Use in Month[6]	Correction for Usage Factor[7]	Estimated Leq @ 50', dBA[8]
Truck Crane - Greater than 300 ton	1	5	0	0.16	85					
Truck Crane - Greater than 200 ton	1	6	0	0.16	85					
Crane - Mobile 65 ton	2	4	0	0.16	85					
Cranes - Mobile 45 ton	1	4	0	0.16	85					
Cranes - Mobile 35 ton	3	4	5	0.16	85	5	-3	-6	-8	72
Bulldozer D10R	1	1	0	0.4	88					
Excavator - Trencher (CAT320)	2	6	0	0.4	85					
Excavator - Earth Scraper CAT 623	1	4	0	0.4	89					
Excavator - Motor Grader (CAT140H)	1	4	10	0.08	86	0	-3	-3	-11	69
Excavator - Backhoe/loader* Days per unit	3	4	0	0.4	83					
Excavator - loader	2	4	10	0.4	79	3	-3	-3	-4	72
Vibratory Roller	1	4	10	4	85	0	-3	-3	6	85
Portable Compaction Roller	1	4	0	0.4	87					
Truck - Water	2	5	10	0.4	87	3	-2	-3	-4	81
Forklift	5	5	10	0.4	87	7	-2	-3	-4	85
Dump Truck	1	1	0	0.4	87					
Service Truck - 1 ton	2	0.5	4	0.4	87	3	-12	-7	-4	67
Truck - Fuel/Lube	2	2	4	0.4	87	3	-6	-7	-4	73
Concrete Pumper Truck	2	6	0	0.4	82					
Tractor Truck 5th Wheel	1	3	0	0.4	87					
Trucks - Pickup 3/4 ton	6	0.5	10	0.4	87	8	-12	-3	-4	75
Trucks - 3 ton (vendors)	2	0.5	0	0.4	87					
Diesel Powered Welder	3	4	0	0.4	87					
Light Plants	4	3	0	1	73					
Portable Compaction - Vibratory Plate	1	3	0	0.4	76					
Portable Compaction - Vibratory Ram	1	3	0	0.4	76					
Articulating Boom Platform	6	4	0	0.4	83					
Air Compressor 185 CFM	1	6	0	1	81					
Concrete Trowel Machine	1	2	0	0.4	76					
Portable Power Generators	3	8	0	1	78					
									Estimated Combined Leq @ 50':	89

Notes:

1. Obtained from TIC.
2. Percentage of time equipment is operating at noisiest mode in most used phase on site. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
3. Obtained or estimated from "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances;" BBN; December 31, 1971.
4. Calculated as 10*Log(Column B).
5. Calculated as 10*Log(Column C / 8).
6. Calculated as 10*Log(Column D / 22).
7. Calculated as 10*Log(Column E).
8. Calculated as arithmetic sum of Columns F through J.

Table Const-13. Summary of Estimated Construction Noise Levels

	Nearest Residence to North	Nearest Residence to Southwest	Nearest Residence to Southeast	Nearest Residence to the South	Residence to Southeast	Nearest Park	Nearest School	Nearest Church	Trail	Nearest Industry to South	Nearest Industry to East	Nearest Offices to West	Nearest Industry to North	Kennel Residence
Estimated Leq @ 50'	94	94	94	94	94	94	94	94	94	94	94	94	94	94
Distance from center of project site	2,900	4,070	4,200	3,950	5,600	3,300	3,610	1,250	830	610	770	720	2,320	1,160
Attenuation due to distance	-35	-38	-38	-38	-41	-36	-37	-28	-24	-22	-24	-23	-33	-27
Attenuation due to air absorption[1]	-5	-7	-8	-7	-10	-6	-6	-2	-1	-1	-1	-1	-4	-2
Attenuation due to barrier effects	0	0	0	0	0	-8	-8	-13	-18	-19	-12	-7	0	-13
Estimated construction noise level	53	48	48	49	43	43	42	50	50	52	56	62	56	51
Ambient	57	50	70	59	48	56	48	59	46	61	58	55	60	63
Ambient + construction noise	58	52	70	59	49	56	49	60	51	61	60	63	61	63
Increase due to construction noise	1	2	0	0	1	0	1	1	5	0	2	8	1	0

Notes:

1. Attenuation at 500 Hz for atmosphere at 59 deg F, 70% RH. Attenuation at 500 Hz assumed to be representative of overall attenuation since most construction noise is associated with diesel engines and exhaust.

Barrier Calculations

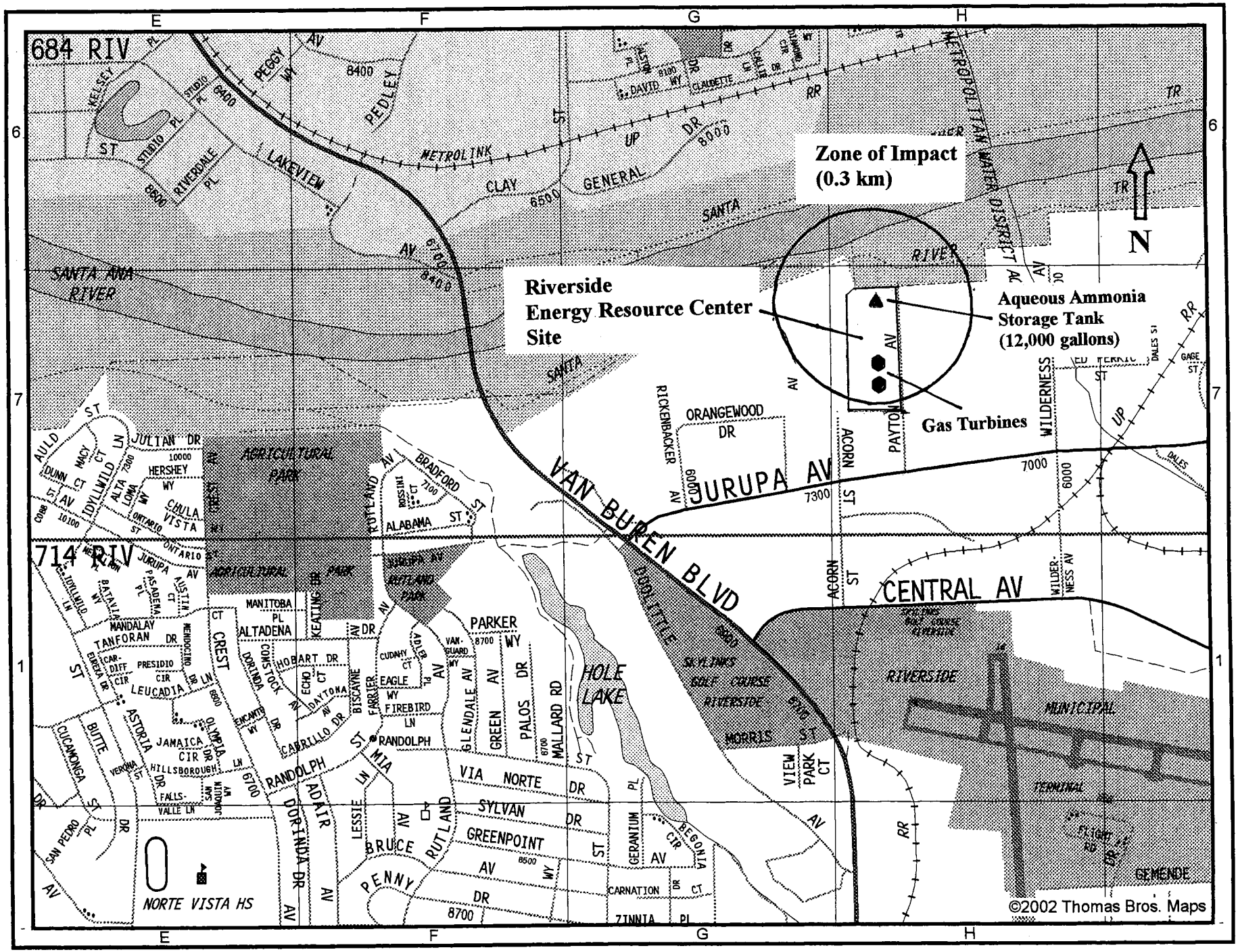
Source height, ft						8	8	8	8	8	8	8		8
Barrier height, ft						20	20	10	0	10	0	10		10
Receiver height, ft						5	5	5	5	5	5	5		5
Source elevation, ft.						728	728	728	728	728	728	728		728
Barrier elevation, ft						765	765	760	755	750	755	728		750
Receiver elevation, ft.						780	780	760	730	750	760	728		752
Distance, source to barrier, ft						2930	3030	950	560	600	290	280		630
Distance, barrier to receiver, ft						370	580	300	270	10	480	440		530
Path length difference, ft						0.05	0.06	0.31	1.06	1.36	0.18	0.03		0.28
Barrier attenuation @ 500 Hz						-8	-8	-13	-18	-19	-12	-7		-13

APPENDIX 6.8-A

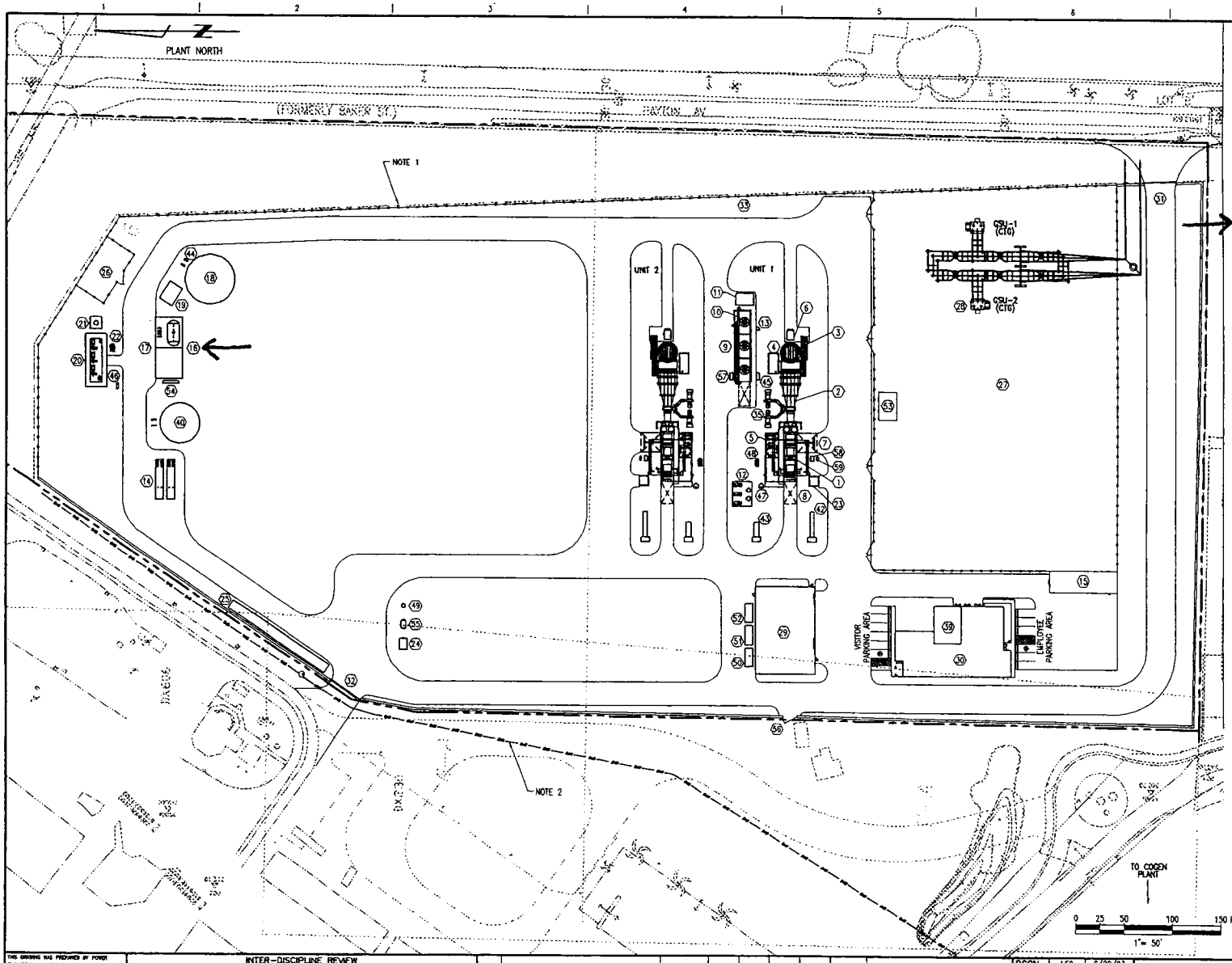
RERC 1 & 2
AQUEOUS AMMONIA HAZARD ASSESSMENT INFORMATION

Aqueous Ammonia Hazard Assessment Parameters
Riverside Energy Resource Center

Parameter	Description		Source of Information
Tank Size	12,000 Gallons		Project Owner
Ammonia	<20% Solution	CAS# 7664-41-7	Project Owner
Category	Toxic Liquid		-
Scenario	Worst-Case		SCEC
Quantity Released	12,000 Gallons		SCEC
Release Rate	15.8 lbs/minute		Calculated by RMP Comp.
Mitigation Measure	Containment Dikes		Project Owner
Topography	Rural		SCEC
Toxic Endpoint	0.14 mg/L		Calculated by RMP Comp.
Wind Speed	1.5 m/second	3.4 miles/hour	Calculated by RMP Comp.
Stability Class	F		Calculated by RMP Comp.
Air Temperature	77 F		SCEC
Model	RMP Comp (ver 1.07)		-
Distance to Toxic Endpoint	0.2 Miles	0.3 km	Calculated by RMP Comp.


Zone of Impact
(0.3 km)
Riverside
Energy Resource Center
Site
Aqueous Ammonia
Storage Tank
(12,000 gallons)
Gas Turbines
N
684 RIV
714 RIV
VAN BUREN BLVD
JURUPA AV
CENTRAL AV
METROLINK
SANTA ANA RIVER
HOLE LAKE
RIVERSIDE MUNICIPAL
AGRICULTURAL PARK
NORTE VISTA HS
©2002 Thomas Bros. Maps

1 cm = 157 m



ITEM	DESCRIPTION	NOTES
1	COMBUSTION TURBINE GENERATOR	
2	SELECTIVE CATYLST REDUCTION UNIT	
3	EXHAUST STACK	80' HIGH
4	AMMONIA EVAPORATION SKID	
5	CTG AUXILIARY SKID	
6	CEMS SHELTER	
7	TURBINE REMOVAL AREA	
8	GENERATOR REMOVAL AREA	
9	CHILLER PACKAGE	
10	AUXILIARY COOLING TOWER	
11	AUX COOLING TOWER CHEM FEED SKID	
12	AIR COMPRESSOR/DRYER SKID & RECEIVER	3 COMPRESSORS PER 2 CTG'S
13	CTG LUBE OIL COOLING WATER PUMP SKID	
14	DEMINERALIZED WATER TRAILERS	
15	SWITCHYARD CONTROL SHELTER	22' x 75'
16	AQUEOUS AMMONIA STORAGE TANK AND PUMPS (4)	10' DIA x 19'-0" (12000 gal)
17	AQUEOUS AMMONIA UNLOADING PAD	
18	RAW/FIRE WATER STORAGE TANK	(500,000 gal)
19	FIRE WATER PUMP HOUSE	
20	FUEL GAS COMPRESSOR SKID	INCLUDES SOUND ENCLOSURE
21	FUEL GAS COMPRESSOR BYPASS COOLER	
22	FUEL GAS LIQUID DRAINS TANK	
23	CTG SWITCHGEAR	
24	PROCESS WATER SUMP AND PUMPS	
25	STORM WATER RETENTION/INFILTRATION BASIN	10' x 30'
26	GAS METERING STATION	
27	SUBSTATION	
28	GSU TRANSFORMER (2)	
29	WAREHOUSE	80' x 90'
30	ADMINISTRATION/CONTROL BUILDING	72' x 118'
31	MAIN PLANT ENTRANCE	SLIDING GATE
32	EMERGENCY PLANT ENTRANCE	SLIDING GATE
33	PLANT PERIMETER FENCE (10'-0" HIGH)	
34	NOT USED	
35	TEMPERING AIR FANS	
36	NOT USED	
37	NOT USED	
38	NOT USED	
39	CONTROL ROOM	
40	DEMINERALIZED WATER TANK & PUMPS (2)	(300,000 gal)
41	NOT USED	
42	4160V MCC W/AUXILIARY TRANSFORMER	
43	480V SAS W/AUXILIARY TRANSFORMER	
44	RAW WATER PUMPS (2)	
45	480V SCR AREA MCC	
46	480V FUEL GAS COMPRESSOR AREA MCC	
47	COIL CONDENSATE TANK AND PUMP	
48	WATER WASH DRAIN TANK	
49	OILY WASTE COLLECTION SUMP & PUMPS	
50	FLAMMABLE STORAGE	8' x 20'
51	WASTE OIL STORAGE	8' x 20'
52	CHEMICAL STORAGE	8' x 20'
53	TRANSFORMER OIL SUMP	
54	480V BOP COMMON MCC	
55	OIL/WATER SEPARATOR	
56	EQUIPMENT/PERSONNEL ACCESS GATE	SLIDING GATE WITH MAN GATE
57	CHILLER REFRIGERANT DRAIN SUMP	
58	CTG FINAL FUEL FILTER SKID	
59	CTG FINAL FUEL FILTER DRAINS TANK	

LEGEND

- PROPERTY LINE
- SECURITY FENCE
- EXISTING DIGESTER GAS LINE
- SECURITY WALL

NOTES

1. APPROXIMATE TOE OF SLOPE
2. ESTIMATED LOCATION OF GAS LINE. (NOT PART OF THE SURVEY).
3. COMBINED CYCLE CONFIGURATION HAS NOT BEEN SELECTED. PROVISIONS HAVE BEEN MADE FOR A 4 x 1, 4 x 2, OR TWO 2 x 1'S.
4. TRANSITION PIECE WAS ADDED BETWEEN CTG AND SCR TO AVOID AN INTERFERENCE BETWEEN THE TEMPERING AIR BLOWERS AND THE CTG AUXILIARY SKID. THIS TRANSITION PIECE MAY NOT BE USED. CTG MANUFACTURER WILL PROVIDE A SOLUTION.
5. EQUIPMENT SHOWN ON THIS DRAWING IS BASED ON THE BEST AVAILABLE INFORMATION. THIS DRAWING WILL NEED TO BE REVISED BASED ON ACTUAL VENDOR DRAWINGS AND DETAILED DESIGN.

THIS DRAWING WAS PREPARED BY POWER ENGINEERS, INC. FOR A SPECIFIC PROJECT, TAKING INTO CONSIDERATION THE SPECIFIC AND UNIQUE REQUIREMENTS OF THE PROJECT. REUSE OF THIS DRAWING OR ANY INFORMATION CONTAINED IN THIS DRAWING FOR ANY PURPOSE IS PROHIBITED UNLESS WRITTEN PERMISSION FROM BOTH POWER AND POWER'S CLIENT IS OBTAINED.

M1-3.dwg

INTER-DISCIPLINE REVIEW

DISC	ARCH	CIVIL	ELECT	HVAC	I&C	MECH	STRUCT
DATE	1/21/04	1/21/04	1/21/04		1/21/04	1/21/04	
INIT	SD	KW	LT		MAC	PR	

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
A	ISSUED FOR BID	2/12/04	CEA	CEA	JPB	JPB
B	ISSUED FOR REVIEW	1/26/04	CEA	CEA	JPB	JPB
A	ISSUED FOR REVIEW	9/3/03	DC	LED	JPB	JPB

REFERENCE DRAWINGS

DSGN	LED	6/20/03
DRN	LED	6/20/03
CKD	JPB	6/20/03

SCALE: 1"=50'

FOR 22x34 DWG ONLY

POWER ENGINEERS

RIVERSIDE PUBLIC UTILITIES

RIVERSIDE ENERGY RESOURCE CENTER

PLANT ARRANGEMENT
2 X 0 SIMPLE CYCLE

JOB NUMBER 101414

REV C

DRAWING NUMBER M1-3

Results of Consequence Analysis

Chemical: Ammonia (water solution) 20%
CAS #: 7664-41-7
Category: Toxic Liquid
Scenario: Worst-case
Quantity Released: 12000 gallons
Liquid Temperature: 75 F

Mitigation Measures:
Diked area: 750 square feet
Dike height: 3 feet

Release Rate to Outside Air: 15.8 pounds per minute
Topography: Rural surroundings (terrain generally flat and unobstructed)
Toxic Endpoint: 0.14 mg/L; basis: ERPG-2
Estimated Distance to Toxic Endpoint: 0.2 miles (0.3 kilometers)

--------Assumptions About This Scenario---------
Wind Speed: 1.5 meters/second (3.4 miles/hour)
Stability Class: F
Air Temperature: 77 degrees F (25 degrees C)

SOLUTIA™

Applied Chemistry, Creative Solutions

Material Safety Data Sheet

Responsible Care® A Public Commitment

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: AQUA AMMONIA

MSDS Number: S00011711 Date: September 23, 1998

Chemical Family: Not applicable

Chemical Name: Aqueous Ammonia Solution

Synonyms: Ammonium hydroxide solution

SOLUTIA INC., 10300 OLIVE BOULEVARD, P.O. BOX 66760, ST. LOUIS, MO 63166-6760

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted)

For additional non-emergency information, call: 314-674-6661

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	% by weight
Ammonium hydroxide	1336-21-6	27 - 37
Water	7732-18-5	63 - 73

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance and Odor: Clear, colorless solution; pungent, suffocating odor

WARNING STATEMENTS

DANGER!
HARMFUL IF SWALLOWED
CAUSES SEVERE EYE, SKIN AND RESPIRATORY TRACT BURNS
MAY CAUSE LUNG DAMAGE
THIS SUBSTANCE IS CLASSIFIED AS A POISON UNDER THE FEDERAL CAUSTIC POISON ACT

POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation

EYE CONTACT: This product causes pain, redness, and tearing based on human experience. At high concentrations or direct contact of liquid material with eyes, it causes damage to eye tissue, and severe eye burns, leading to temporary or permanent blindness.

SKIN CONTACT: This product causes pain, redness, swelling, and blisters based on human experience.

INHALATION: This product causes shortness of breath, severe respiratory irritation and /or burns, violent coughing, chest pain, nausea and vomiting including the possibility of severe lung damage leading to death.

INGESTION: This product causes severe corrosive action to the mouth, throat and stomach.

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

IF IN EYES OR ON SKIN: immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If easy to do, remove any contact lenses. Get medical attention. Wash clothing and thoroughly clean shoes before reuse.

IF INHALED: remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Remove material from eyes, skin and clothing.

IF SWALLOWED: rinse mouth thoroughly with water. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Get medical attention. Contact a Poison Control center. Do not induce vomiting unless directed by medical personnel.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable

HAZARDOUS PRODUCTS OF COMBUSTION: Under certain conditions ammonia can dissociate to nitrogen and hydrogen. Hydrogen is flammable. Certain metals, such as nickel, accelerate decomposition at temperatures as low as 585 degrees F.

EXTINGUISHING MEDIA: In case of fire, use water spray (fog), foam, dry chemical, or CO_2.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ammonia is capable of forming flammable mixtures with air. Contact with oil, mercury, chlorine, bromine, calcium, and silver can lead to an explosion.

FIRE FIGHTING EQUIPMENT: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Ventilate area of leak or spill. Remove all sources of ignition. Clean-up personnel must wear full protective clothing and self-contained breathing apparatus. Contain and recover liquid when possible. Absorb with vermiculite, dry sand, earth or similar material. Collect and place in containers for disposal.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling:
Do not get in eyes, on skin, on clothing.
Avoid breathing vapor or mist.

Keep container closed.

Use only with adequate ventilation.
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned, or destroyed. The reuse of this material's container for non-industrial purposes is prohibited and any reuse must be in consideration of the data provided in the MSDS.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE PROTECTION: Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

SKIN PROTECTION: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult clothing/glove manufacturer to determine appropriate type clothing/glove for given application. Wear chemical safety goggles, a face shield and chemical resistant clothing when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

RESPIRATORY PROTECTION: Avoid breathing vapor and/or mist. Use NIOSH approved respiratory protection equipment when airborne exposure limits are exceeded (See below). Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR 1910.134.

VENTILATION: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). The use of local mechanical exhaust ventilation at sources of air contamination such as open process equipment is preferred.

AIRBORNE EXPOSURE LIMITS:

Product /Component: Ammonia

OSHA PEL:	35 ppm (STEL)#	ACGIH TLV:	25 ppm TWA 35 ppm (STEL)#

Short Term Exposure Limit.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colorless or liquid
Odor:	Pungent, suffocating odor
Vapor Pressure:	45.0 psi @ 30 degrees F
Boiling Point:	minus 36 degrees C

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

STABILITY: Product is stable under normal conditions of storage and handling.

MATERIALS TO AVOID: Oil, mercury, chlorine, bromine, silver, silver solder, hypochlorite (bleach) and calcium in contact with ammonia can lead to an explosion.

HAZARDOUS POLYMERIZATION: Does not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data

Solutia has not conducted toxicity studies with aqua ammonia. Information from the available scientific literature is reported below:

Based on results from single exposure (acute) studies with animals, aqua ammonia is considered to be moderately toxic orally (rat). It is severely irritating to rabbit eyes and corrosive to rabbit skin. Eye, skin and respiratory tract irritation was reported in a variety of laboratory animals following inhalation.

Adverse effects reported in several species following repeated inhalation exposures at low concentrations include liver, kidney, spleen, brain and lung damage. Eye damage, permanent blindness, respiratory difficulty, lung injury and deaths were reported at higher concentrations. Positive results were reported in standard tests designed to measure genetic changes using animals and bacterial cells.

12. ECOLOGICAL INFORMATION

Solutia has not conducted environmental toxicity or biodegradation studies with this product. Published aquatic toxicity studies indicate that this material would be toxic to very toxic to invertebrates, fish and algae. Biodegradation studies reported in the literature suggest that this material would meet the criteria for OECD classification as "readily biodegradable".

13. DISPOSAL CONSIDERATIONS

This material when discarded is a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.22, due to its characteristic of corrosivity, EPA hazardous waste number D002. Best Demonstrated Available Treatment (BDAT) as defined by RCRA is disposal by Deactivation. Waste liquid may be reclaimed or disposed of in an approved hazardous waste incinerator. Contaminated soils and solid material should be treated and residual materials disposed of in an approved hazardous waste landfill. Small quantities of this material can be diluted and treated in a municipal sewage treatment plant with prior approval from local authorities. In all cases, disposal should be in accordance with all applicable local, state and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on appropriate disposal.

This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT Classification: Ammonia solutions, 8, UN2672, III

US DOT Label: Corrosive

US DOT Reportable Quantity: Packages of 1000 lbs or more contain a 1000 lb RQ of ammonium hydroxide.

IMDG Code: Same as U.S. DOT

IATA/ICAO: Same as U.S. DOT

15. REGULATORY INFORMATION

TSCA Inventory: Listed
SARA Hazard Notification
Hazard Categories Under Title III Rules (40 CFR 370): Immediate, delayed
Section 302 Extremely Hazardous Substances: None
Section 313 Toxic Chemical(s): None

CERCLA Reportable Quantity: 1000 lb RQ of Ammonium hydroxide

Release of more than 1000 pounds of this product to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675).

California Proposition 65: Not applicable

Refer to Section 11 for OSHA Hazardous Chemical(s) and Section 13 for RCRA classification.

16. OTHER INFORMATION

Reason for revision: Conversion to Solutia 16 section format. Supersedes MSDS dated: 11/5/96.

SOLUTIA™ is a trademark of Solutia Inc.
Responsible Care® is a registered trademark of the Chemical Manufacturers Association

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Solutia Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Solutia Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Aqua-am.998

APPENDIX 6.8-B

HEALTH RISK ASSESSMENT INFORMATION
FOR
CONSTRUCTION EMISSIONS

Diesel PM Risk Calculations

Project ID: REC
Phase (construction or operation): Const.

Current DPM URF: 0.0003 ug/m3^-1
Current DPM REL: 5 ug/m3^-1

Receptor Data:

	1	2	3	4	5	6	7	8	9	10
ID #	Rec.A	Rec.B	Rec.C	Rec.D	Rec.E	Rec.F	Rec.G	Rec.H	Rec.I	
Type										
UTM Em	458175	459495	457218	456313	457054	457729	458175	458384	459653	
UTM Nm	3757633	3757698	3757123	3756649	3757485	3758772	3758885	3759097	3758986	
Annual Conc (ug/m3):	0.01196	0.00456	0.00065	0.00028	0.00074	0.00074	0.00083	0.00049	0.00037	
Lifetime Exposure Adj Factor, (2-year exposure):	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	

Predicted Risk Data

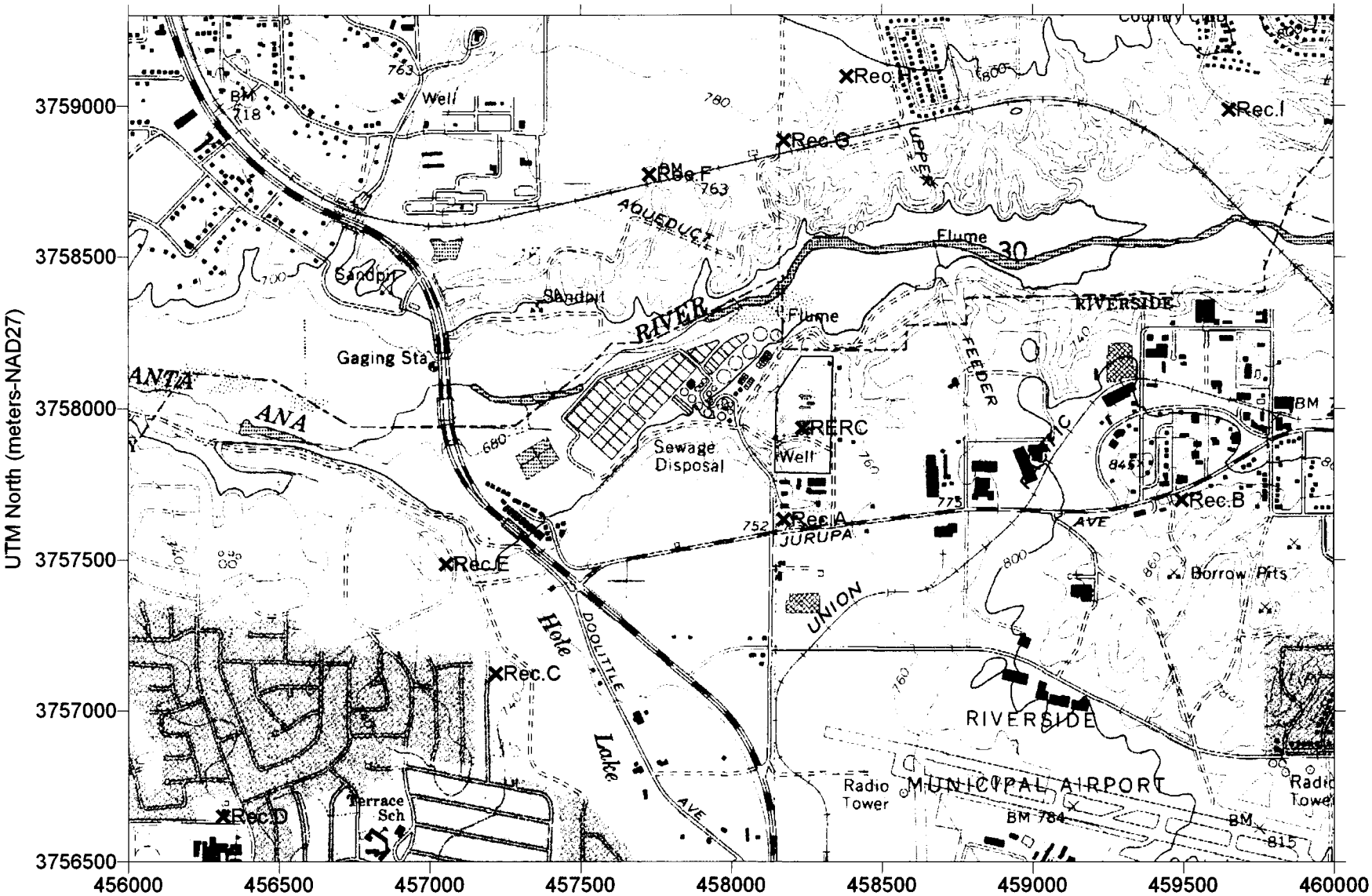
Cancer Risk per million	*0.1025143*	*0.0390857*	*0.0055714*	*0.0024*	*0.0063429*	*0.0063429*	*0.0071143*	*0.0042*	*0.0031714*	*0*
Chronic HI	*0.002392*	*0.000912*	*0.00013*	*0.000056*	*0.000148*	*0.000148*	*0.000166*	*0.000098*	*0.000074*	*0*

Ref: Health Risk Assessment Guidance for Analyzing Cancer Risks
from Mobile Source Diesel Emissions, SCAQMD, 12/2002.

Ref: HARP Users Manual, Version 1.3, Appendix K, 12/2003.

URF and REL values: CARB/OEHHA Consolidated Risk Value Table
April 2005.

Sensitive Receptors



Source: Seamless DRG Files of 1:24,000 Scale
USGS Maps for Riverside West and Fontana Quads

0 500 1000
Scale: 1" = 500 meters

APPENDIX 6.8-C

HEALTH RISK ASSESSMENT INFORMATION
FOR
FACILITY OPERATIONS

HRA METHODOLOGY

General Overview of HRA Methodology

The health risk assessment process involves a number of steps, which aim at estimating the extent of cancer and non-cancer health effects associated with toxic air emissions on both a population and specific receptor basis. The four major components of a HRA include:

- Hazard Identification
- Dose-Response Assessment
- Exposure Assessment
- Risk Characterization

Hazard identification generally involves the determination of potential health effects, which may be associated with an emitted pollutant. Dose-response assessment is the process of characterizing the relationship between the exposure to a substance or emitted pollutant and the incidence of an adverse health effect in an exposed population. These two risk assessment components are generally performed by regulatory health agencies such as California's Air Resources Board (CARB) and the Office of Environmental Health Hazard Assessment (OEHHA). These agencies provide hazard identification and dose-response assessment information to air district regulators and other government agencies, consultants and engineers, and the public.

The purpose of the exposure assessment is to estimate the extent of public exposure to a substance for which cancer risk will be quantified and non-cancer effects evaluated. This involves emissions quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed population, and estimations of short-term (acute) and long-term (chronic) exposure levels. Risk characterization, which is the final step in the risk assessment process, is the integration of the health effects and the public exposure information developed for emitted pollutants. These two risk assessment components are generally performed by experienced engineers and consultants for the purpose of a health risk assessment for a particular project, facility, or piece of equipment.

The remaining information presented will focus on the exposure assessment and risk characterization, since this comprises the scope of work for this health risk assessment project.

HRA Modeling

The HRA presented in this report reflects the use of the Hotspots Analysis and Reporting Program (HARP). HARP is distributed by the California Air Resources Board and is intended to facilitate the completion of health risk assessments for the AB2588 requirements. The HARP model is a multiple pollutant, multiple pathway health risk program that utilizes the calculation procedures set forth in CARB/CAPCOA guidelines. HARP works with a detailed facility information database, an integrated ICSTS3 air dispersion model, and a health risk assessment model. Details regarding the use of HARP can be found in the CARB HARP user guide.

Facility Information Database

The first step in the health risk assessment procedure is to accurately collect the necessary facility information that needs to be entered into the HARP model. This information includes items such as; facility and process descriptions, building and stack dimensions, exhaust characteristics, UTM coordinates of relevant facility structures, and property boundary information. The emissions information is also developed and entered into the HARP model at this time.

Air Dispersion Modeling

The Industrial Source Complex-Short Term 3 (ISCST3) air dispersion model contained in HARP was used to evaluate down-wind pollutant dispersion. The ISCST3 model is a steady-state Gaussian plume model capable of evaluating multiple sources, different source types, and complex terrain features. The ISCST3 air dispersion model is recommended by both the USEPA and the SCAQMD for stationary source air dispersion modeling projects. In addition, the HARP program also contains a self-executing version of the Building Profile Input Program (BPIP). Important air dispersion modeling parameters are discussed below.

Meteorological Data:
The meteorological data from the *Riverside Meteorological Station* was used in the ISCST modeling runs. All meteorological data used was supplied by the SCAQMD in a preprocessed format.

Building Wake Effects:
The building wake effects were evaluated in the ISCST3 and BPIP for wind direction building induced down-wash. Building dimensions were taken from project plot plan. These building features were used as inputs into the BPIP model, which writes a file comprised of building projected widths and heights in 36 wind sectors, as required by ISCST3.

Modeling Options:
The modeling options included the use of the standard regulatory default options with the exception of calm processing as required by the SCAQMD. Also, the model was run in the rural mode in accordance with the ISCST guidelines.

Stack Parameters:
The stack parameters used in the HRA were developed in consultation with Power Engineers and City of Riverside staff. These parameters were based on the current engineering designs and general arrangement drawings.

Terrain Data:
The area surrounding the facility is generally complex. As such, the model was run in the complex terrain mode with appropriate receptor elevations.

Receptor Overview:
The receptor grid that was used for this analysis consisted of a uniform Cartesian coordinate system. The grid extended approximately 4,000 meters in the north-south direction and 4,000 meters in the east-west direction with 100-meter increments. This uniform Cartesian grid was used to determine the point of maximum impact for the health risks evaluated.

Health Risk Assessment

The health risk model contained in HARP performed the actual risk assessment calculations. This model calculated cancer and non-cancer health impacts using the CARB health risk assessment guidelines at various receptor locations. The health risk model also evaluated inhalation and applicable non-inhalation exposure pathways. In addition, population-wide cancer burden was calculated using SCAQMD Rule 1401 guidelines. The health risk model also generated tabular and isopleth contour plots of the results.

HARP was run with the standard CARB options including:

- 70-year cancer analysis for sensitive and residential receptor types using the derived adjusted method.
- Cancer analysis for off-site workplace receptors using the derived (OEHHA) method.
- Chronic health risks for all receptor types using the derived (OEHHA) method.
- Acute analysis for all receptor types.

Health Risk Assessment Results Summary
Riverside Energy Resource Center Units 3 & 4
February 2008

Condition/Scenario	Results			
	Cancer Risk	Chronic Risk	Acute Risk	Cancer Burden
Normal Operations				
Point of Maximum Impact:	1.06E-07	0.002	0.085	0.00001
Point of Maximum Impact (Workplac	6.87E-09	0.002	0.085	
Nearest Residence:	7.30E-12	1.12E-07	2.02E-05	
Commissioning Operations				
Acute Point of Maximum Impact:	Not Applicable	Not Applicable	0.442	Not Applicable

Condition/Scenario	Receptor Description
Normal Operations	
Point of Maximum Impact:	Cancer, chronic, and acute points of maximum impact are located near eastern property boundary where no actual receptors currently exist.
Point of Maximum Impact (Workplac	Cancer, chronic, and acute workplace points of maximum impact are located near eastern property boundary where no actual workplace receptor currently exist.
Nearest Residence:	Cancer, chronic, and acute impacts are located approximately 1000' south at the nearest residence.
Commissioning Operations	
Acute Point of Maximum Impact:	Acute point of maximum impact is located near western property boundary where no actual receptors currently exist.

Health Risk Assessment Results Summary - Cancer Burden
Riverside Energy Resource Center Units 3 & 4
February 2008

Cancer Burden Analysis:

HRA MICR:	1.01E-07	
Receptor Type:	Point of Maximum Impact	
Distance To MICR:	< 100	meters
Area of Impact:	0.0314	km^2
Population Estimate:	4000	person/km^2
Cancer Burden:	**0.00001**	(Must Be Less Than 0.1)

Stack Parameter for the Health Risk Assessment
Riverside Energy Resource Center Units 3 & 4
February 2008

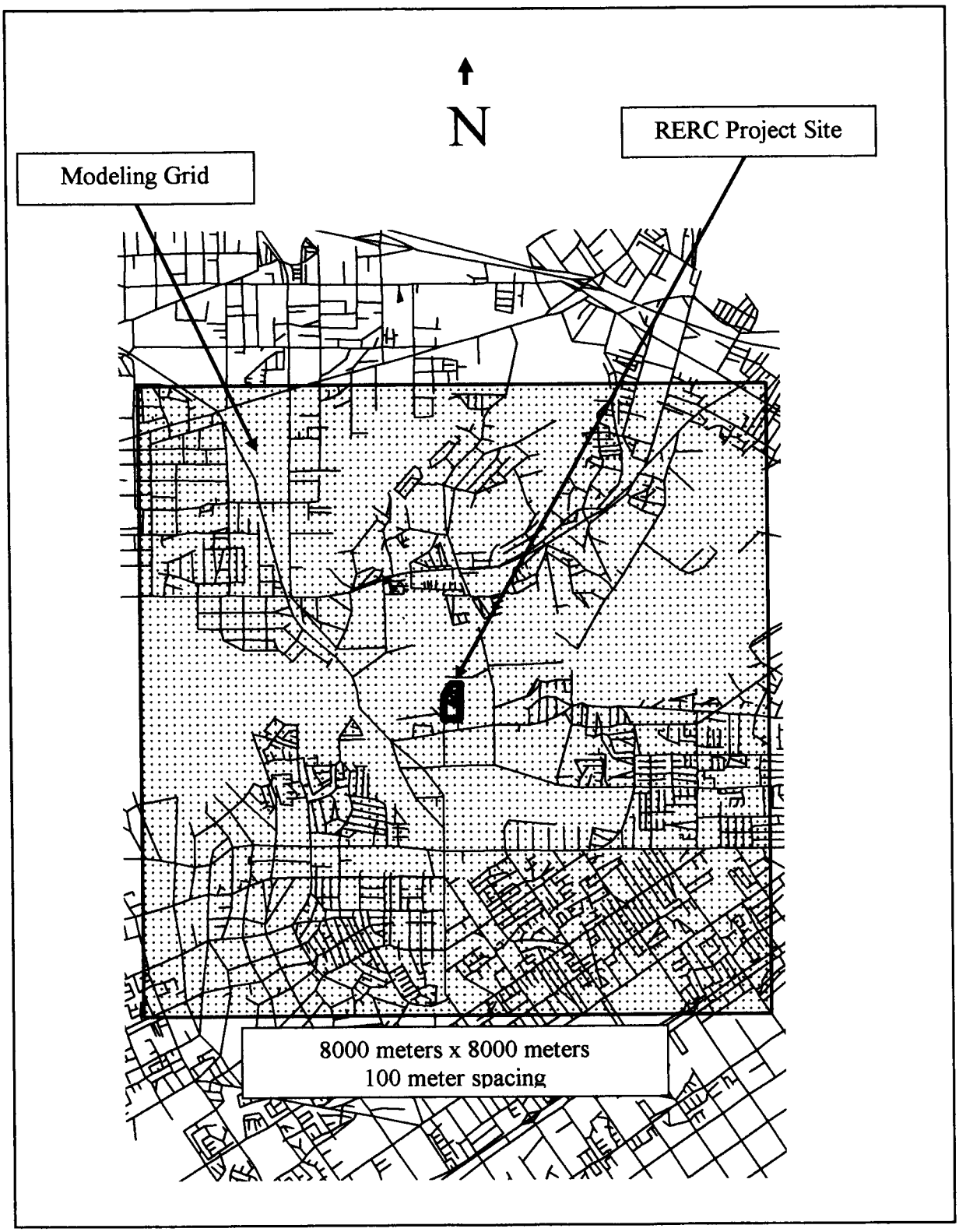
Source	Base Elev.	Stack Height	Stack Diameter	Temp (^{0}F)	Flow Rate (acfm)	Coordinates (UTME)	(UTMN)
Turbine No.3	724.5'	80'	13'	833	596,475	458,262.70	3,758,001.85
Turbine No.4	724.5'	80'	13'	833	596,475	458,262.70	3,758,040.54
Cooling Tower (Cell No.1)	724.5'	45.5'	13.9'	98.6	200,900	458,270.2	3,758,017.5
Cooling Tower (Cell No.2)	724.5'	45.5'	13.9'	98.6	200,900	458,262.8	3,758,017.5
Cooling Tower (Cell No.3)	724.5'	45.5'	13.9'	98.6	200,900	458,255.4	3,758,017.5
Black Start ICE	724.5'	25'	12"	850	8,207	458,162.8	3,757,896.0

HRA Coordinates
Riverside Energy Resource Center Units 3 & 4
January 2008

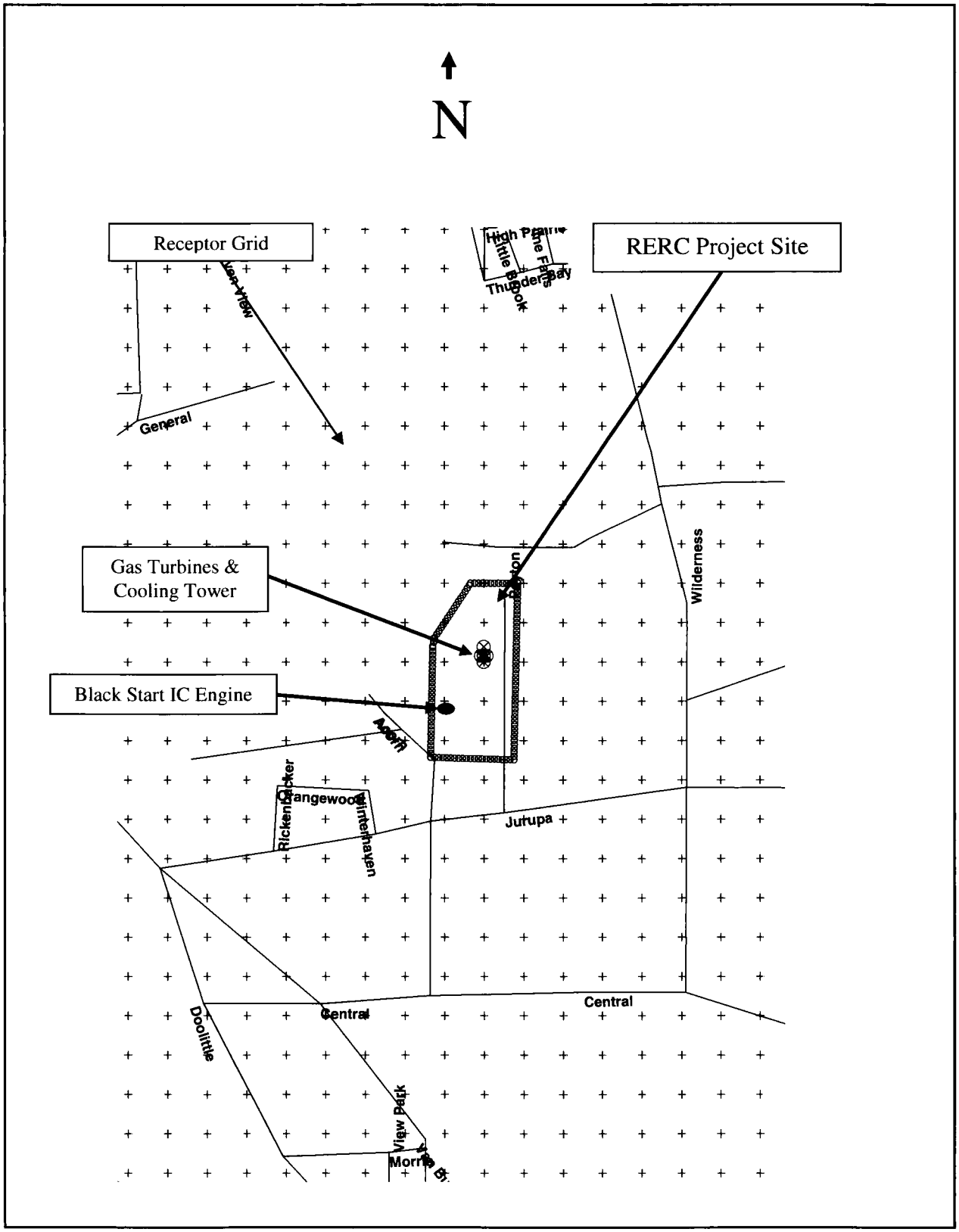
	UTME	UTMN	Height	Elevation
Gas Turbines:				
Unit No.3	458262.70	3758001.85	80'	724.5
Property Boundary Coordinates (Relative To Unit No.3):				
Property Corner A	+85.8	+200.2	-	724.5
Property Corner B	+75.8	-248.8	-	724.5
Property Corner C	-134.4	-243.1	-	724.5
Property Corner D	-128.7	+40.0	-	724.5
Property Corner E	-124.4	+61.5	-	724.5
Property Corner F	-32.9	+200.2	-	724.5
Cooling Tower Building Coordinates (Relative To Unit No.3):				
Corner A	+14.3	+22.0	45'	724.5
Corner B	+14.3	+10.0	45'	724.5
Corner C	-10.7	+10.0	45'	724.5
Corner D	-10.7	+22.0	45'	724.5
Unit No.3 Air Inlet Building Coordinates (Relative To Unit No.3):				
Corner A	-21.5	+7.2	43'	724.5
Corner B	-41.5	+7.2	43'	724.5
Corner C	-41.5	-7.2	43'	724.5
Corner D	-21.5	-7.2	43'	724.5
Unit No.3 SCR Building Coordinates (Relative To Unit No.3):				
Corner A	0.0	+4.3	40'	724.5
Corner B	-21.5	+4.3	40'	724.5
Corner C	-21.5	-4.3	40'	724.5
Corner D	0.0	-4.3	40'	724.5
Unit No.4 Air Inlet Building Coordinates (Relative To Unit No.3):				
Corner A	-21.5	+45.5	43'	724.5
Corner B	-41.5	+45.5	43'	724.5
Corner C	-41.5	+31.4	43'	724.5
Corner D	-21.5	+31.4	43'	724.5
Unit No.4 SCR Building Coordinates (Relative To Unit No.3):				
Corner A	0.0	+42.5	40'	724.5
Corner B	-21.5	+42.5	40'	724.5
Corner C	-21.5	-34.5	40'	724.5
Corner D	0.0	-34.5	40'	724.5

Notes: HRA coordinates are relative to gas turbine No.3.

HARP Regional Diagram
RERC 3-4 Project
February 2008

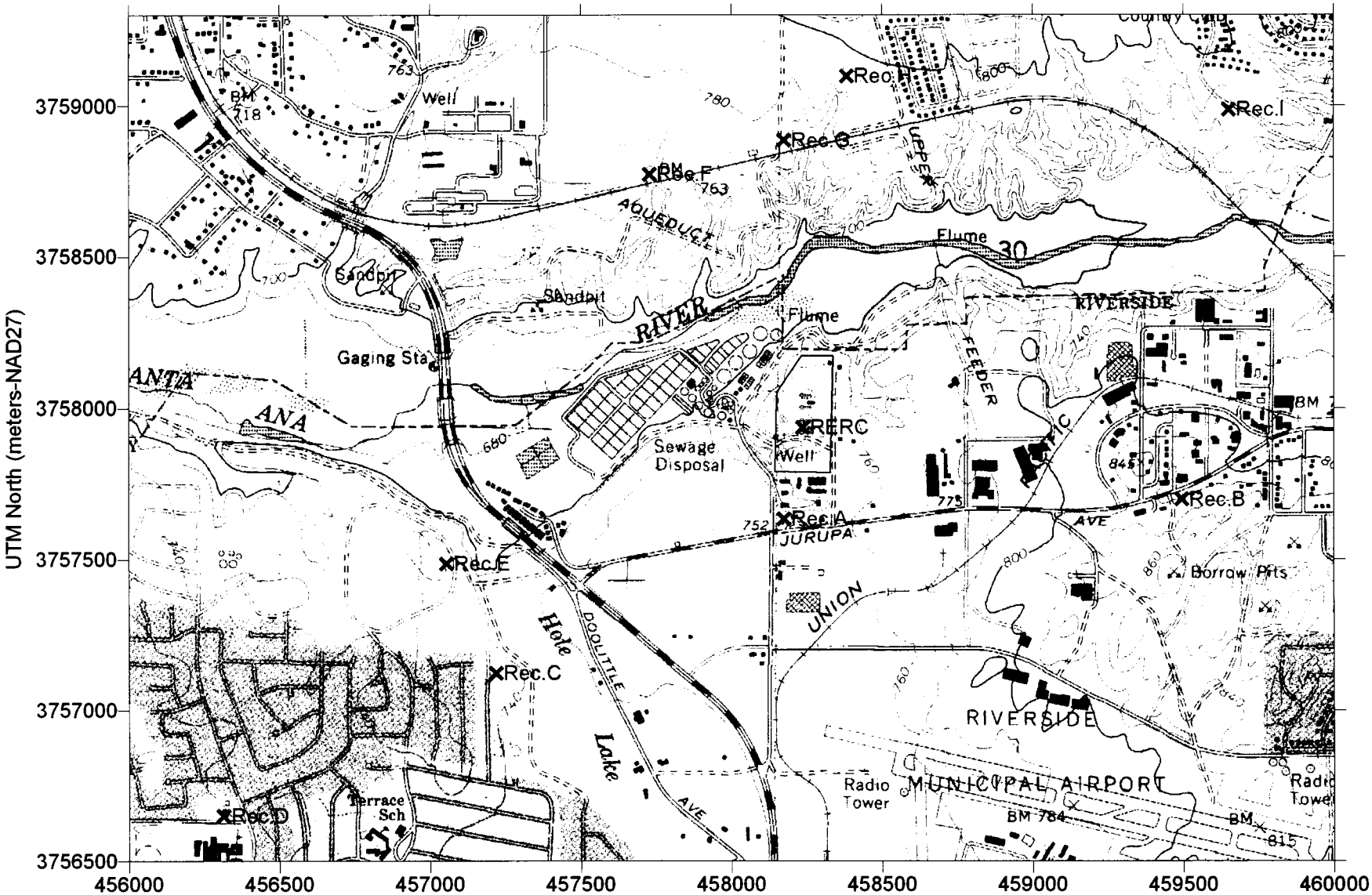


HARP Detailed Diagram
RERC 3-4 Project
February 2008



Riverside Energy Resource Center
Aerial Map

Sensitive Receptors



Source: Seamless DRG Files of 1:24,000 Scale
USGS Maps for Riverside West and Fontana Quads

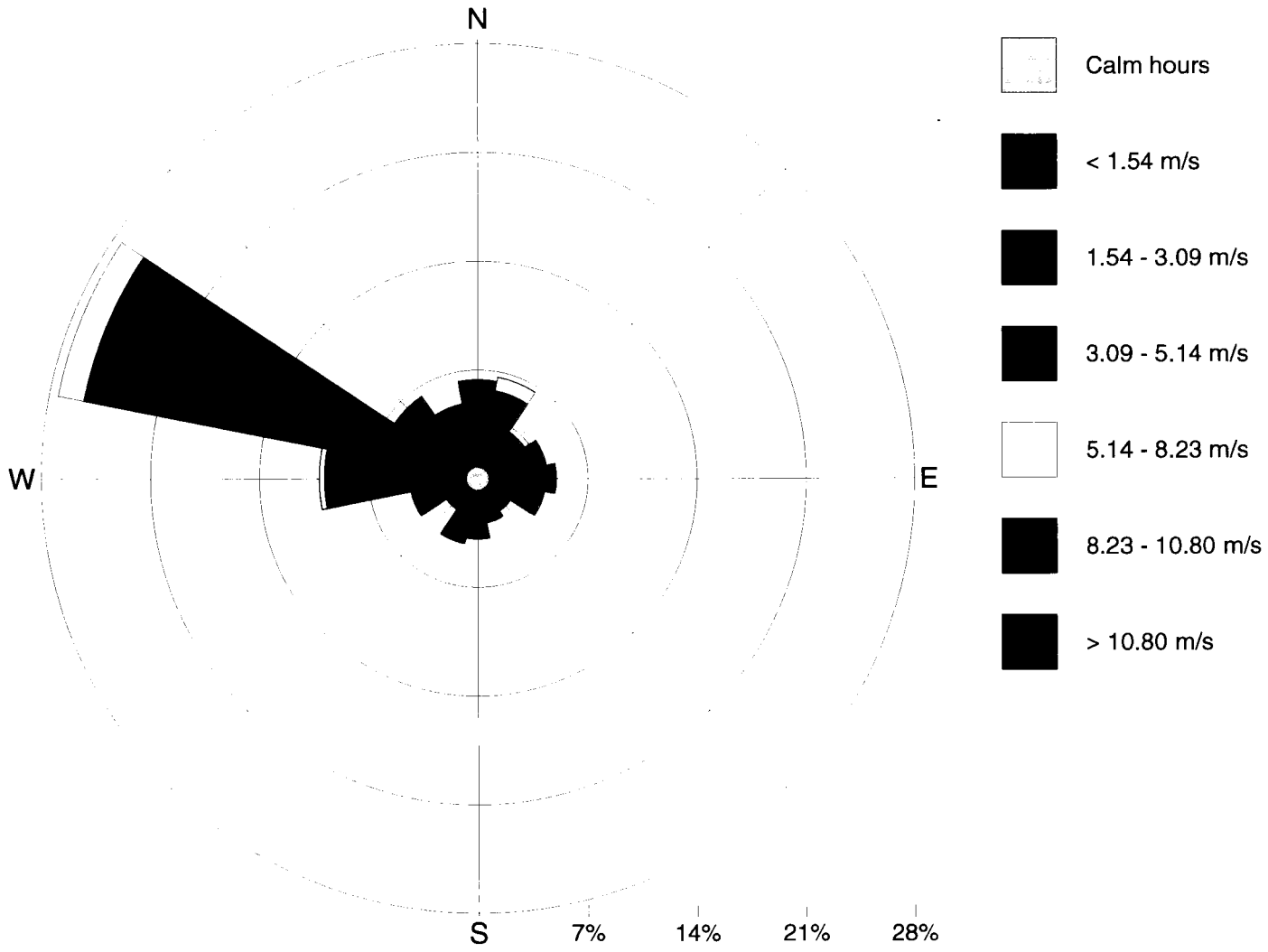
0 500 1000

Scale: 1" = 500 meters

N

Windrose – Riverside Met File
RERC 3-4 Project
February 2008

1/1/1981 Hr 1 to 12/31/1981 Hr 24



Toxic Emission Estimates - Gas Turbines Normal Operations
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per turbine):

Unit	Rating MMBTU	Load (%)	Hrs/Yr	Fuel (cfh)	Fuel (MMcfh)	EPA HHV
Turbine	490.35	100	1230	480735	0.48074	1020

Number of Turbines: 2

Turbine Toxic Emissions Information:

Compound	Factor (lb/MMBtu)	Control Efficiency (%)	Emissions (per turbine) (lb/hr)	(lb/yr)	(tons/yr)	Emissions (total) (lb/hr)	(lb/yr)	(tons/yr)	Emission Factor Source	Factors (lb/MMcf)
Acetaldehyde	4.00E-05	85%	2.94E-03	3.62E+00	1.81E-03	5.88E-03	7.24E+00	3.62E-03	AP-42	
Acrolein	6.40E-06	85%	4.71E-04	5.79E-01	2.90E-04	9.41E-04	1.16E+00	5.79E-04	AP-42	
Ammonia	-	-	3.33E+00	4.10E+03	2.05E+00	6.66E+00	8.19E+03	4.10E+00	Manufacturer	
Benzene	1.20E-05	85%	8.83E-04	1.09E+00	5.43E-04	1.77E-03	2.17E+00	1.09E-03	AP-42	
Butadiene (1,3)	4.30E-07	85%	3.16E-05	3.89E-02	1.95E-05	6.33E-05	7.78E-02	3.89E-05	AP-42	
Ethylbenzene	3.20E-05	85%	2.35E-03	2.90E+00	1.45E-03	4.71E-03	5.79E+00	2.90E-03	AP-42	
Formaldehyde	7.10E-04	85%	5.22E-02	6.42E+01	3.21E-02	1.04E-01	1.28E+02	6.42E-02	AP-42	
PAH										
Benzo(a)anthracene	2.22E-08	-	1.09E-05	1.34E-02	6.68E-06	2.17E-05	2.67E-02	1.34E-05	CATEF Mean	2.26E-05
Benzo(a)pyrene	1.36E-08	-	6.68E-06	8.22E-03	4.11E-06	1.34E-05	1.64E-02	8.22E-06	CATEF Mean	1.39E-05
Benzo(b)flouranthene	1.11E-08	-	5.43E-06	6.68E-03	3.34E-06	1.09E-05	1.34E-02	6.68E-06	CATEF Mean	1.13E-05
Benzo(k)flouranthene	1.08E-08	-	5.29E-06	6.50E-03	3.25E-06	1.06E-05	1.30E-02	6.50E-06	CATEF Mean	1.10E-05
Chrysene	2.47E-08	-	1.21E-05	1.49E-02	7.45E-06	2.42E-05	2.98E-02	1.49E-05	CATEF Mean	2.52E-05
Dibenz(a,h)anthracene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Indeno(1,2,3-cd)pryene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Naphthalene	1.63E-06	-	7.98E-04	9.82E-01	4.91E-04	1.60E-03	1.96E+00	9.82E-04	CATEF Mean	1.66E-03
Propylene Oxide	2.90E-05	85%	2.13E-03	2.62E+00	1.31E-03	4.27E-03	5.25E+00	2.62E-03	AP-42	
Toluene	1.30E-04	85%	9.56E-03	1.18E+01	5.88E-03	1.91E-02	2.35E+01	1.18E-02	AP-42	
Xylene	6.40E-05	85%	4.71E-03	5.79E+00	2.90E-03	9.41E-03	1.16E+01	5.79E-03	AP-42	

Notes:
- AP-42 Emission Factor Source - US EPA AP-42, April 2000, Section 3.1. Uncontolled emission factors for natural gas fired gas turbines.
- CATEF Emission Factor Source - CARB CATEF database, emission factors for natural gas fired gas turbines (controlled or uncontrolled).
- Ammonia Emission Factor Source - Riverside RERC Units 1 & 2 AFC.
- Spreadsheet Revised 01/01/08.

Toxic Emission Estimates - Gas Turbines Commissioning Operations
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per turbine):

Unit	Rating MMBTU	Load (%)	Hrs/Yr	Fuel (cfh)	Fuel (MMcfh)	EPA HHV
Turbine	490.35	100	1230	480735	0.48074	1020

Number of Turbines: 2

Turbine Toxic Emissions Information:

Compound	Factor (lb/MMBtu)	Control Efficiency (%)	Emissions (per turbine) (lb/hr)	(lb/yr)	(tons/yr)	Emissions (total) (lb/hr)	(lb/yr)	(tons/yr)	Emission Factor Source	Factors (lb/MMcf)
Acetaldehyde	4.00E-05	0%	1.96E-02	2.41E+01	1.21E-02	3.92E-02	4.83E+01	2.41E-02	AP-42	
Acrolein	6.40E-06	0%	3.14E-03	3.86E+00	1.93E-03	6.28E-03	7.72E+00	3.86E-03	AP-42	
Ammonia	-	-	3.33E+00	4.10E+03	2.05E+00	6.66E+00	8.19E+03	4.10E+00	Manufacturer	
Benzene	1.20E-05	0%	5.88E-03	7.24E+00	3.62E-03	1.18E-02	1.45E+01	7.24E-03	AP-42	
Butadiene (1,3)	4.30E-07	0%	2.11E-04	2.59E-01	1.30E-04	4.22E-04	5.19E-01	2.59E-04	AP-42	
Ethylbenzene	3.20E-05	0%	1.57E-02	1.93E+01	9.65E-03	3.14E-02	3.86E+01	1.93E-02	AP-42	
Formaldehyde	7.10E-04	0%	3.48E-01	4.28E+02	2.14E-01	6.96E-01	8.56E+02	4.28E-01	AP-42	
PAH										
Benzo(a)anthracene	2.22E-08	-	1.09E-05	1.34E-02	6.68E-06	2.17E-05	2.67E-02	1.34E-05	CATEF Mean	2.26E-05
Benzo(a)pyrene	1.36E-08	-	6.68E-06	8.22E-03	4.11E-06	1.34E-05	1.64E-02	8.22E-06	CATEF Mean	1.39E-05
Benzo(b)flouranthene	1.11E-08	-	5.43E-06	6.68E-03	3.34E-06	1.09E-05	1.34E-02	6.68E-06	CATEF Mean	1.13E-05
Benzo(k)flouranthene	1.08E-08	-	5.29E-06	6.50E-03	3.25E-06	1.06E-05	1.30E-02	6.50E-06	CATEF Mean	1.10E-05
Chrysene	2.47E-08	-	1.21E-05	1.49E-02	7.45E-06	2.42E-05	2.98E-02	1.49E-05	CATEF Mean	2.52E-05
Dibenz(a,h)anthracene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Indeno(1,2,3-cd)pryene	2.30E-08	-	1.13E-05	1.39E-02	6.95E-06	2.26E-05	2.78E-02	1.39E-05	CATEF Mean	2.35E-05
Naphthalene	1.63E-06	-	7.98E-04	9.82E-01	4.91E-04	1.60E-03	1.96E+00	9.82E-04	CATEF Mean	1.66E-03
Propylene Oxide	2.90E-05	0%	1.42E-02	1.75E+01	8.75E-03	2.84E-02	3.50E+01	1.75E-02	AP-42	
Toluene	1.30E-04	0%	6.37E-02	7.84E+01	3.92E-02	1.27E-01	1.57E+02	7.84E-02	AP-42	
Xylene	6.40E-05	0%	3.14E-02	3.86E+01	1.93E-02	6.28E-02	7.72E+01	3.86E-02	AP-42	

Notes:
- AP-42 Emission Factor Source - US EPA AP-42, April 2000, Section 3.1. Uncontolled emission factors for natural gas fired gas turbines.
- CATEF Emission Factor Source - CARB CATEF database, emission factors for natural gas fired gas turbines (controlled or uncontrolled).
- Ammonia Emission Factor Source - Riverside RERC Units 1 & 2 AFC.
- Spreadsheet Revised 01/01/08.

Toxic Emission Estimates - Cooling Tower
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per cooling tower):

Unit	Rating (gpm)	Drift Rate (%)	TDS (ppm)	Hrs/Yr
Cooling Tower	5190	0.001	-	1230

Number of Cooling Tower: 1

Cooling Tower Toxic Emissions Information:

Compound	Concentration (ppmW)	Drift Rate (%)	Emissions (per tower)			Emissions (total)			Emission Factor Source
			(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)	
Arsenic	0.018	0.001	4.67E-07	5.75E-04	2.87E-07	4.67E-07	5.75E-04	2.87E-07	Typical Analysis
Cadmium	0.003	0.001	7.79E-08	9.58E-05	4.79E-08	7.79E-08	9.58E-05	4.79E-08	Typical Analysis
Chloride	0.201	0.001	5.22E-06	6.42E-03	3.21E-06	5.22E-06	6.42E-03	3.21E-06	Typical Analysis
Chromium	0.015	0.001	3.90E-07	4.79E-04	2.40E-07	3.90E-07	4.79E-04	2.40E-07	Typical Analysis
Chromium (hexavalent)	0.005	0.001	1.30E-07	1.60E-04	7.99E-08	1.30E-07	1.60E-04	7.99E-08	Typical Analysis
Copper	0.081	0.001	2.10E-06	2.59E-03	1.29E-06	2.10E-06	2.59E-03	1.29E-06	Typical Analysis
Dichloroethene	0.013	0.001	3.38E-07	4.15E-04	2.08E-07	3.38E-07	4.15E-04	2.08E-07	Typical Analysis
Lead	0.012	0.001	3.12E-07	3.83E-04	1.92E-07	3.12E-07	3.83E-04	1.92E-07	Typical Analysis
Manganese	0.054	0.001	1.40E-06	1.72E-03	8.62E-07	1.40E-06	1.72E-03	8.62E-07	Typical Analysis
Nickel	0.015	0.001	3.90E-07	4.79E-04	2.40E-07	3.90E-07	4.79E-04	2.40E-07	Typical Analysis
Trichloroethene	0.010	0.001	2.60E-07	3.19E-04	1.60E-07	2.60E-07	3.19E-04	1.60E-07	Typical Analysis
Zinc	0.321	0.001	8.34E-06	1.03E-02	5.13E-06	8.34E-06	1.03E-02	5.13E-06	Typical Analysis

Notes:
- Spreadsheet Revised 01/01/08.

Toxic Emission Estimates - Black Start IC Engine
Riverside Energy Resource Center Units 3 & 4
January 2008

Equipment Information (per engine):

Unit	Rating MMBTU	Load (%)	Hrs/Yr	Fuel (cfh)	Fuel (MMcfh)
ICE	1.04	100	54	1020	0.00102

Number of Engines: 1

Toxic Emissions Information:

Compound	Factor (lb/MMBtu)	Control Efficiency (%)	Emissions (per turbine) (lb/hr)	(lb/yr)	(tons/yr)	Emissions (total) (lb/hr)	(lb/yr)	(tons/yr)	Emission Factor Source
Particulate Matter	3.10E-01	0%	3.22E-01	1.74E+01	8.70E-03	3.22E-01	1.74E+01	8.70E-03	CARB E.O. (U-R001-0331)

PAH List

California Air Toxics Emission Factors Search Result

Download these data as a comma delimited file

ID	System Type	Material Type	SCC	APC Device	Other Description	CAS	Substance	Max Emission factor	Mean	Median	Unit
4674	Turbine	Natural gas	20200203	None	None	85-01-8	Phenanthrene	2.35E-03	3.13E-04	8.57E-05	lbs/MMcf
4689	Turbine	Natural gas	20200203	None	None	129-00-0	Pyrene	1.27E-04	2.77E-05	1.18E-05	lbs/MMcf
4559	Turbine	Natural gas	20200203	None	None	83-32-9	Acenaphthene	1.22E-04	1.90E-05	5.23E-06	lbs/MMcf
4564	Turbine	Natural gas	20200203	None	None	208-96-8	Acenaphthylene	8.25E-05	1.47E-05	2.88E-06	lbs/MMcf
4579	Turbine	Natural gas	20200203	None	None	120-12-7	Anthracene	1.53E-04	3.38E-05	9.38E-06	lbs/MMcf
4594	Turbine	Natural gas	20200203	None	None	56-55-6	Benzo(a) anthracene	1.34E-04	2.26E-05	3.61E-06	lbs/MMcf ✓
4599	Turbine	Natural gas	20200203	None	None	50-32-8	Benzo(a)pyrene	9.16E-05	1.39E-05	2.57E-06	lbs/MMcf ✓
4604	Turbine	Natural gas	20200203	None	None	205-99-2	Benzo(b) fluoranthene	6.72E-05	1.13E-05	2.87E-06	lbs/MMcf ✓
4609	Turbine	Natural gas	20200203	None	None	192-97-2	Benzo(e)pyrene	7.33E-07	5.44E-07	4.63E-07	lbs/MMcf
4614	Turbine	Natural gas	20200203	None	None	191-24-2	Benzo(g,h,i) perylene	8.25E-05	1.37E-05	3.03E-06	lbs/MMcf
4619	Turbine	Natural gas	20200203	None	None	207-08-9	Benzo(k) fluoranthene	6.72E-05	1.10E-05	2.87E-06	lbs/MMcf ✓
4624	Turbine	Natural gas	20200203	None	None	218-01-9	Chrysene	1.50E-04	2.52E-05	4.99E-06	lbs/MMcf ✓
4659	Turbine	Natural gas	20200203	None	None	193-39-5	Indeno(1,2,3-cd) pyrene	1.34E-04	2.35E-05	2.87E-06	lbs/MMcf ✓
4664	Turbine	Natural gas	20200203	None	None	91-20-3	Naphthalene	7.88E-03	1.66E-03	9.26E-04	lbs/MMcf ✓
4629	Turbine	Natural gas	20200203	None	None	53-70-3	Dibenz(a,h) anthracene	1.34E-04	2.35E-05	3.03E-06	lbs/MMcf ✓
4639	Turbine	Natural gas	20200203	None	None	206-44-0	Fluoranthene	3.05E-04	4.32E-05	1.07E-05	lbs/MMcf
4644	Turbine	Natural gas	20200203	None	None	86-73-7	Fluorene	4.58E-04	5.80E-05	1.56E-05	lbs/MMcf

* Natural Gas Fired Turbines
* Factors are lb/mmcf
* With or without control.

Table 3.1-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_X) AND CARBON MONOXIDE (CO) FROM STATIONARY GAS TURBINES

Emission Factors[a]				
Turbine Type	Nitrogen Oxides		Carbon Monoxide	
Natural Gas-Fired Turbines[b]	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating
Uncontrolled	3.2 E-01	A	8.2 E-02[d]	A
Water-Steam Injection	1.3 E-01	A	3.0 E-02	A
Lean-Premix	9.9 E-02	D	1.5 E-02	D
Distillate Oil-Fired Turbines[e]	(lb/MMBtu)[f] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[f] (Fuel Input)	Emission Factor Rating
Uncontrolled	8.8 E-01	C	3.3 E-03	C
Water-Steam Injection	2.4 E-01	B	7.6 E-02	C
Landfill Gas-Fired Turbines[g]	(lb/MMBtu)[h] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[h] (Fuel Input)	Emission Factor Rating
Uncontrolled	1.4 E-01	A	4.4 E-01	A
Digester Gas-Fired Turbines[j]	(lb/MMBtu)[k] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[k] (Fuel Input)	Emission Factor Rating
Uncontrolled	1.6 E-01	D	1.7 E-02	D

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".

[b] Source Classification Codes (SCCs) for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020.

[d] It is recognized that the uncontrolled emission factor for CO is higher than the water-steam injection and lean-premix emission factors, which is contrary to expectation. The EPA could not identify the reason for this behavior, except that the data sets used for developing these factors are different.

[e] SCCs for distillate oil-fired turbines include 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[f] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[g] SCC for landfill gas-fired turbines is 2-03-008-01.

[h] Emission factors based on an average landfill gas heating value of 400 Btu/scf at 60°F. To convert from (lb/MMBtu), to (lb/10^6 scf) multiply by 400.

[j] SCC for digester gas-fired turbine is 2-03-007-01.

[k] Emission factors based on an average digester gas heating value of 600 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf) multiply by 600.

Table 3.1-2a. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Emission Factors[a] - Uncontrolled				
Pollutant	Natural Gas-Fired Turbines[b]		Distillate Oil-Fired Turbines[d]	
	(lb/MMBtu)[c] (Fuel Input)	Emission Factor Rating	(lb/MMBtu)[e] (Fuel Input)	Emission Factor Rating
CO_2[f]	110	A	157	A
N_2O	0.003[g]	E	ND	NA
Lead	ND	NA	1.4 E-05	C
SO_2	0.94S[h]	B	1.01S[h]	B
Methane	8.6 E-03	C	ND	NA
VOC	2.1 E-03	D	4.1 E-04[j]	E
TOC[k]	1.1 E-02	B	4.0 E-03[l]	C
PM (condensible)	4.7 E-03[l]	C	7.2 E-03[l]	C
PM (filterable)	1.9 E-03[l]	C	4.3 E-03[l]	C
PM (total)	6.6 E-03[l]	C	1.2 E-02[l]	C

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.

[b] SCCs for natural gas-fired turbines include 2-01-002-01, 2-02-002-01 & 03, and 2-03-002-02 & 03.

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. Similarly, these emission factors can be converted to other natural gas heating values.

[d] SCCs for distillate oil-fired turbines are 2-01-001-01, 2-02-001-01, 2-02-001-03, and 2-03-001-02.

[e] Emission factors based on an average distillate oil heating value of 139 MMBtu/10^3 gallons. To convert from (lb/MMBtu) to (lb/10^3 gallons), multiply by 139.

[f] Based on 99.5% conversion of fuel carbon to CO_2 for natural gas and 99% conversion of fuel carbon to CO_2 for distillate oil. CO_2 (Natural Gas) [lb/MMBtu] = (0.0036 scf/Btu)(%CON)(C)(D), where %CON = weight percent conversion of fuel carbon to CO_2, C = carbon content of fuel by weight, and D = density of fuel. For natural gas, C is assumed at 75%, and D is assumed at 4.1 E+04 lb/10^6scf. For distillate oil, CO_2 (Distillate Oil) [lb/MMBtu] = (26.4 gal/MMBtu) (%CON)(C)(D), where C is assumed at 87%, and the D is assumed at 6.9 lb/gallon.

[g] Emission factor is carried over from the previous revision to AP-42 (Supplement B, October 1996) and is based on limited source tests on a single turbine with water-steam injection (Reference 5).

[h] All sulfur in the fuel is assumed to be converted to SO_2. S = percent sulfur in fuel. Example, if sulfur content in the fuel is 3.4 percent, then S = 3.4. If S is not available, use 3.4 E-03 lb/MMBtu for natural gas turbines, and 3.3 E-02 lb/MMBtu for distillate oil turbines (the equations are more accurate).

[j] VOC emissions are assumed equal to the sum of organic emissions.

[k] Pollutant referenced as THC in the gathered emission tests. It is assumed as TOC, because it is based on EPA Test Method 25A.

[l] Emission factors are based on combustion turbines using water-steam injection.

Table 3.1-2b. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM STATIONARY GAS TURBINES

Emission Factors[a] - Uncontrolled				
Pollutants	Landfill Gas-Fired Turbines[b]		Digester Gas-Fired Turbines[d]	
	(lb/MMBtu)[c]	Emission Factor Rating	(lb/MMBtu)[e]	Emission Factor Rating
CO_2[f]	50	D	27	C
Lead	ND	NA	< 3.4 E-06[g]	D
PM-10	2.3 E-02	B	1.2 E-02	C
SO_2	4.5 E-02	C	6.5 E-03	D
VOC[h]	1.3 E-02	B	5.8 E-03	D

[a] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief". ND = No Data, NA = Not Applicable.
[b] SCC for landfill gas-fired turbines is 2-03-008-01.
[c] Emission factors based on an average landfill gas heating value (HHV) of 400 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 400.
[d] SCC for digester gas-fired turbine include 2-03-007-01.
[e] Emission factors based on an average digester gas heating value of 600 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 600.
[f] For landfill gas and digester gas, CO_2 is presented in test data as volume percent of the exhaust stream (4.0 percent to 4.5 percent).
[g] Compound was not detected. The presented emission value is based on one-half of the detection limit.
[h] Based on adding the formaldehyde emissions to the NMHC.

Table 3.1-3. EMISSION FACTORS FOR HAZARDOUS AIR POLLUTANTS FROM NATURAL GAS-FIRED STATIONARY GAS TURBINES[a]

Emission Factors[b] - Uncontrolled		
Pollutant	Emission Factor (lb/MMBtu)[c]	Emission Factor Rating
1,3-Butadiene[d]	< 4.3 E-07	D
Acetaldehyde	4.0 E-05	C
Acrolein	6.4 E-06	C
Benzene[e]	1.2 E-05	A
Ethylbenzene	3.2 E-05	C
Formaldehyde[f]	7.1 E-04	A
Naphthalene	1.3 E-06	C
PAH	2.2 E-06	C
Propylene Oxide[d]	< 2.9 E-05	D
Toluene	1.3 E-04	C
Xylenes	6.4 E-05	C

[a] SCC for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. Hazardous Air Pollutants as defined in Section 112 (b) of the *Clean Air Act*.

[b] Factors are derived from units operating at high loads (≥80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".

[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. These emission factors can be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this heating value.

[d] Compound was not detected. The presented emission value is based on one-half of the detection limit.

[e] Benzene with SCONOX catalyst is 9.1 E-07, rating of D.

[f] Formaldehyde with SCONOX catalyst is 2.0 E-05, rating of D.

FILE: C:\HARP\PROJECTS\RERC3-4_Normal\Rep_PMI.txt - Point of Maximum Impact

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
3282	GRID	1.06E-07	1.54E-03	5.38E-02	458363	3758002	11
3364	GRID	5.97E-08	2.45E-04	3.50E-02	458463	3757902	11
3365	GRID	4.14E-08	1.59E-04	2.15E-02	458563	3757902	11
3283	GRID	3.87E-08	2.35E-04	4.11E-02	458463	3758002	11
3361	GRID	3.34E-08	3.09E-04	8.14E-02	458163	3757902	11
3443	GRID	2.83E-08	4.07E-05	3.01E-02	458263	3757802	11
3366	GRID	2.79E-08	8.14E-05	1.33E-02	458663	3757902	11
3442	GRID	2.69E-08	1.97E-04	3.26E-02	458163	3757802	11
3363	GRID	2.57E-08	3.85E-05	2.74E-02	458363	3757902	11
6587	BOUNDARY	2.43E-08	2.93E-05	2.11E-02	458343	3757952	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
3282	GRID	1.06E-07	1.54E-03	5.38E-02	458363	3758002	11
3361	GRID	3.34E-08	3.09E-04	8.14E-02	458163	3757902	11
3364	GRID	5.97E-08	2.45E-04	3.50E-02	458463	3757902	11
3283	GRID	3.87E-08	2.35E-04	4.11E-02	458463	3758002	11
3442	GRID	2.69E-08	1.97E-04	3.26E-02	458163	3757802	11
1344	GRID	1.10E-08	1.66E-04	9.38E-03	458963	3760402	11
3365	GRID	4.14E-08	1.59E-04	2.15E-02	458563	3757902	11
1343	GRID	9.85E-09	1.49E-04	9.05E-03	458863	3760402	11
1263	GRID	9.85E-09	1.49E-04	8.41E-03	458963	3760502	11
1423	GRID	9.70E-09	1.45E-04	8.86E-03	458763	3760302	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6653	BOUNDARY	2.20E-08	8.29E-05	8.48E-02	458133	3757999	11
6654	BOUNDARY	1.66E-08	8.56E-05	8.16E-02	458133	3758009	11
3361	GRID	3.34E-08	3.09E-04	8.14E-02	458163	3757902	11
6652	BOUNDARY	1.93E-08	6.43E-05	6.35E-02	458133	3757989	11
6648	BOUNDARY	1.54E-08	8.61E-05	6.03E-02	458132	3757949	11
6649	BOUNDARY	1.43E-08	7.28E-05	5.89E-02	458132	3757959	11
6650	BOUNDARY	1.69E-08	6.87E-05	5.78E-02	458133	3757969	11
3282	GRID	1.06E-07	1.54E-03	5.38E-02	458363	3758002	11
6643	BOUNDARY	1.60E-08	1.29E-04	4.85E-02	458131	3757899	11
6651	BOUNDARY	1.92E-08	6.49E-05	4.83E-02	458133	3757979	11

FILE: C:\HARP\PROJECTS\RERC3-4_Normal\Rep_PMI.txt - Workplace Point of Maximum Impact

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
3282	GRID	6.87E-09	1.54E-03	5.38E-02	458363	3758002	11
3364	GRID	6.75E-09	2.45E-04	3.50E-02	458463	3757902	11
3365	GRID	4.87E-09	1.59E-04	2.15E-02	458563	3757902	11
3283	GRID	4.06E-09	2.35E-04	4.11E-02	458463	3758002	11
3443	GRID	3.78E-09	4.07E-05	3.01E-02	458263	3757802	11
3366	GRID	3.46E-09	8.14E-05	1.33E-02	458663	3757902	11
3363	GRID	3.40E-09	3.85E-05	2.74E-02	458363	3757902	11
6587	BOUNDARY	3.32E-09	2.93E-05	2.11E-02	458343	3757952	11
6586	BOUNDARY	3.21E-09	3.58E-05	1.45E-02	458343	3757962	11
3447	GRID	3.02E-09	4.50E-05	9.24E-03	458663	3757802	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
3282	GRID	6.87E-09	1.54E-03	5.38E-02	458363	3758002	11
3361	GRID	2.69E-09	3.09E-04	8.14E-02	458163	3757902	11
3364	GRID	6.75E-09	2.45E-04	3.50E-02	458463	3757902	11
3283	GRID	4.06E-09	2.35E-04	4.11E-02	458463	3758002	11
3442	GRID	2.51E-09	1.97E-04	3.26E-02	458163	3757802	11
1344	GRID	4.70E-10	1.66E-04	9.38E-03	458963	3760402	11
3365	GRID	4.87E-09	1.59E-04	2.15E-02	458563	3757902	11
1263	GRID	4.29E-10	1.49E-04	8.41E-03	458963	3760502	11
1343	GRID	4.29E-10	1.49E-04	9.05E-03	458863	3760402	11
1423	GRID	4.28E-10	1.45E-04	8.86E-03	458763	3760302	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6653	BOUNDARY	2.62E-09	8.29E-05	8.48E-02	458133	3757999	11
6654	BOUNDARY	1.83E-09	8.56E-05	8.16E-02	458133	3758009	11
3361	GRID	2.69E-09	3.09E-04	8.14E-02	458163	3757902	11
6652	BOUNDARY	2.35E-09	6.43E-05	6.35E-02	458133	3757989	11
6648	BOUNDARY	1.67E-09	8.61E-05	6.03E-02	458132	3757949	11
6649	BOUNDARY	1.56E-09	7.28E-05	5.89E-02	458132	3757959	11
6650	BOUNDARY	1.93E-09	6.87E-05	5.78E-02	458133	3757969	11
3282	GRID	6.87E-09	1.54E-03	5.38E-02	458363	3758002	11
6643	BOUNDARY	1.43E-09	1.29E-04	4.85E-02	458131	3757899	11
6651	BOUNDARY	2.30E-09	6.49E-05	4.83E-02	458133	3757979	11

FILE: C:\HARP\PROJECTS\RERC3-4_Normal\Rep_PMI.txt - Nearest Residence

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6690	SENSITIVE	7.30E-12	1.12E-07	2.02E-05	0	0	11
1	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454263	3762002	11
2	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454363	3762002	11
3	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454463	3762002	11
4	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454563	3762002	11
5	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454663	3762002	11
6	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454763	3762002	11
7	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454863	3762002	11
8	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454963	3762002	11
9	GRID	-1.00E+00	-1.00E+00	-1.00E+00	455063	3762002	11

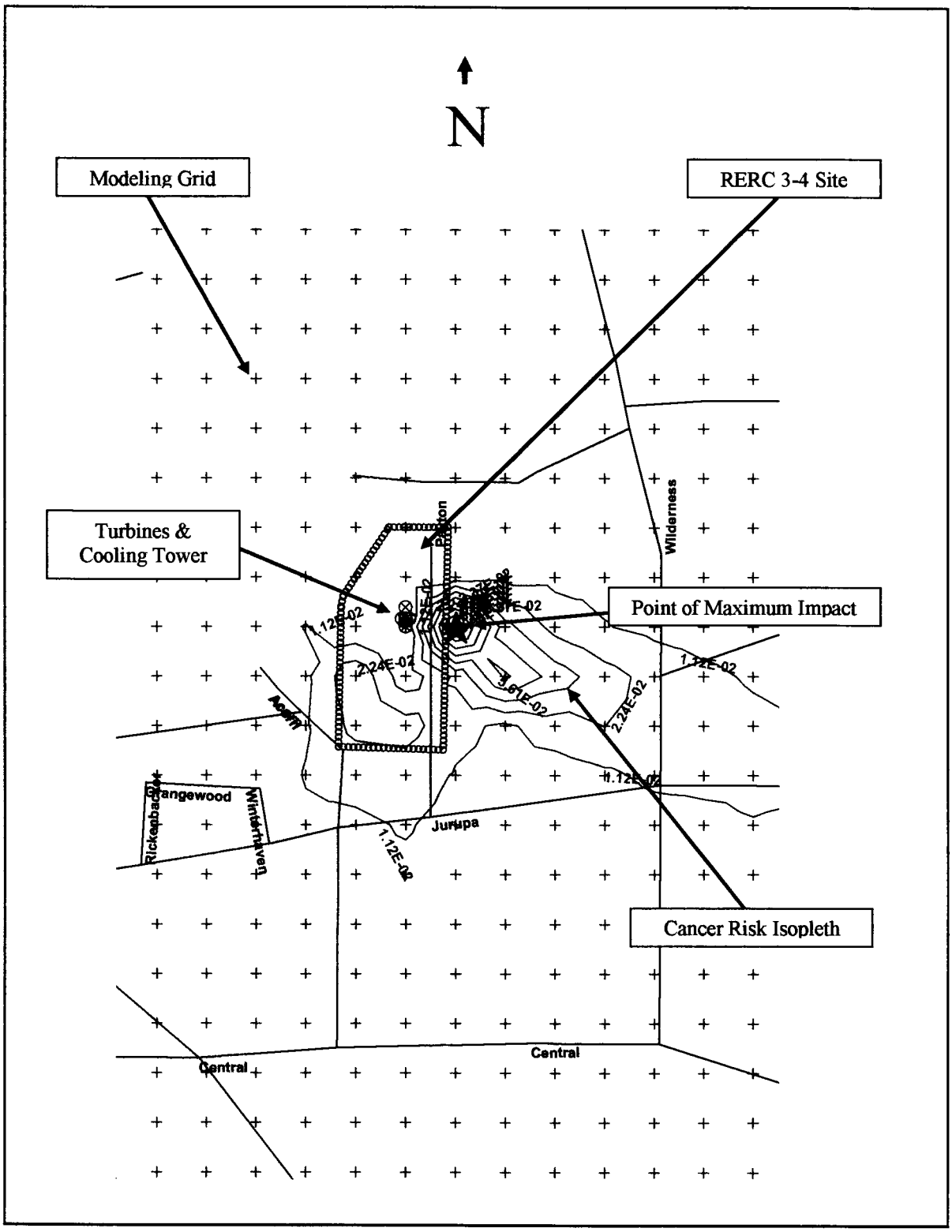
RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6690	SENSITIVE	7.30E-12	1.12E-07	2.02E-05	0	0	11
1	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454263	3762002	11
2	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454363	3762002	11
3	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454463	3762002	11
4	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454563	3762002	11
5	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454663	3762002	11
6	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454763	3762002	11
7	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454863	3762002	11
8	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454963	3762002	11
9	GRID	-1.00E+00	-1.00E+00	-1.00E+00	455063	3762002	11

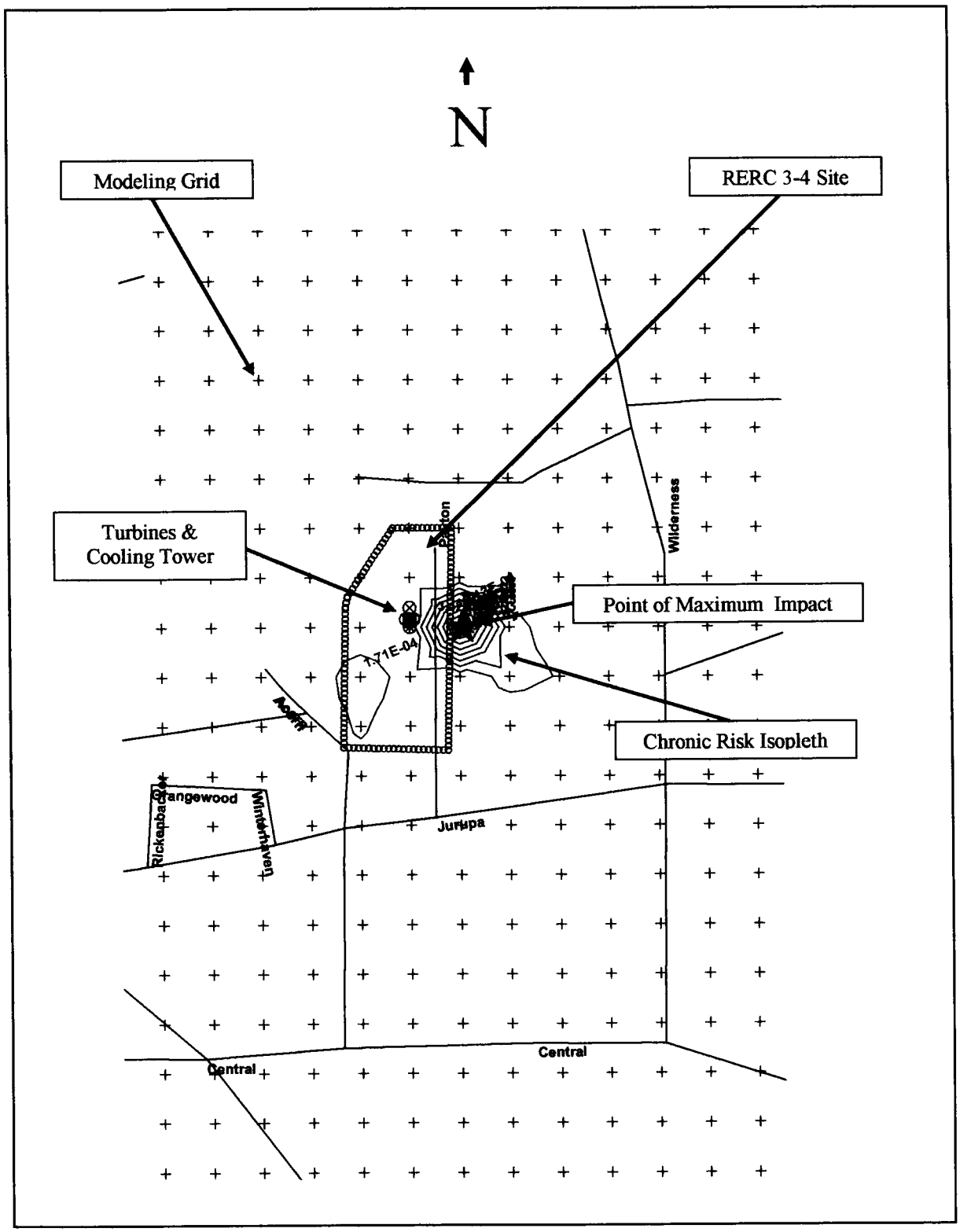
RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6690	SENSITIVE	7.30E-12	1.12E-07	2.02E-05	0	0	11
1	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454263	3762002	11
2	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454363	3762002	11
3	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454463	3762002	11
4	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454563	3762002	11
5	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454663	3762002	11
6	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454763	3762002	11
7	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454863	3762002	11
8	GRID	-1.00E+00	-1.00E+00	-1.00E+00	454963	3762002	11
9	GRID	-1.00E+00	-1.00E+00	-1.00E+00	455063	3762002	11

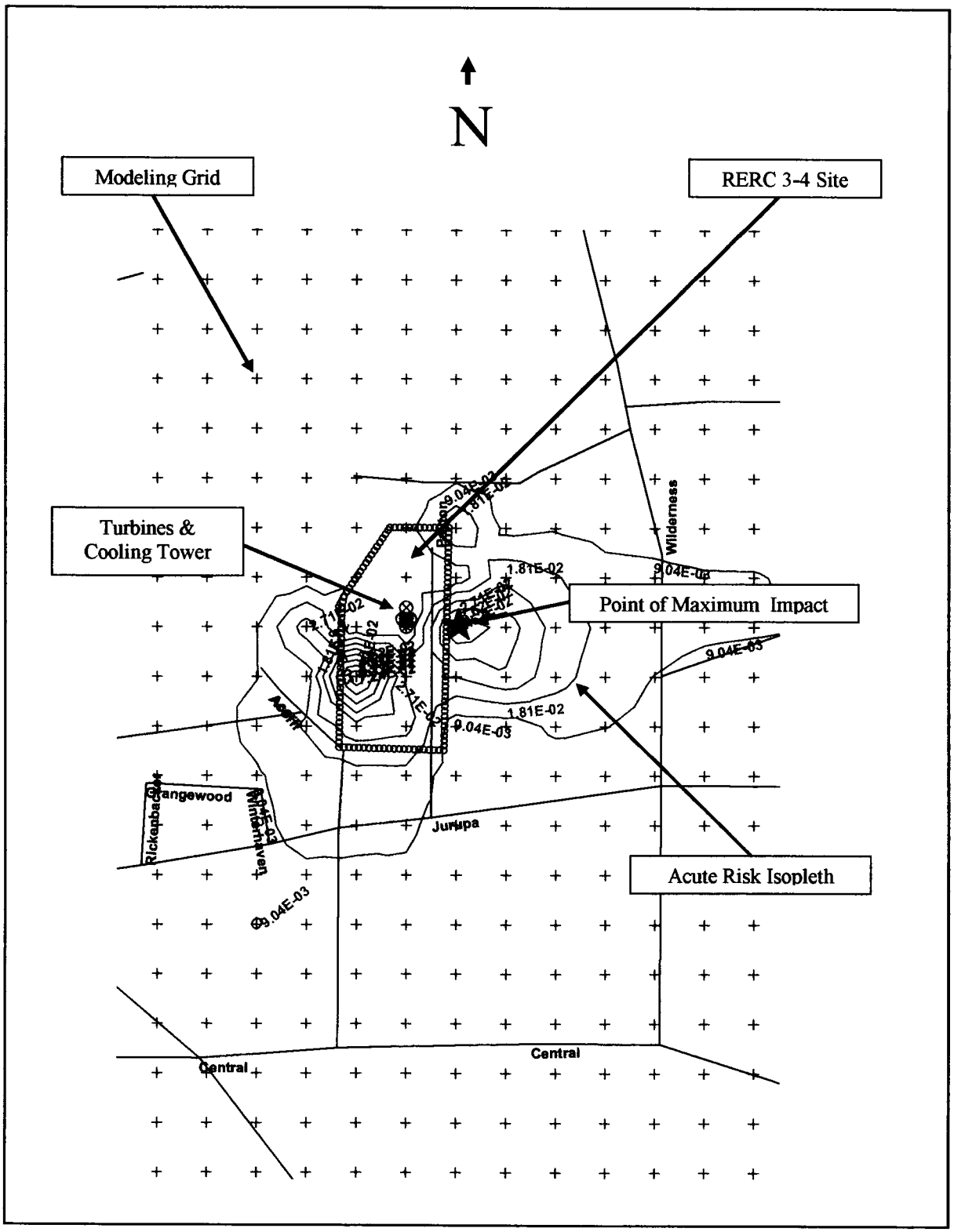
Cancer Risk Isopleth – Normal Operations
RERC 3-4 Project
February 2008



Chronic Risk Isopleth – Normal Operations
RERC 3-4 Project
February 2008



Acute Risk Isopleth – Normal Operations
RERC 3-4 Project
February 2008



```
** ISC input file generated by HARP from
** workbook file C:\HARP\PROJECTS\RERC3-4_NORMAL\DEFAULT.INP
** Date: 2/14/2008 9:19:26 AM

CO STARTING

   TITLEONE RIVERSIDE RERC UNITS 3-4
   TITLETWO HEALTH RISK ASSESSMENT
   MODELOPT CONC RURAL NOCALM
   AVERTIME 1 PERIOD
   POLLUTID Other
   TERRHGTS ELEV
   RUNORNOT RUN
   ERRORFIL C:\HARP\PROJECTS\RERC3-4_NORMAL\DEFAULT.ERR

CO FINISHED
** UTMZONE  11


SO STARTING

   ELEVUNIT  FEET

   LOCATION S001 POINT 458262.7 3758001.85 724.500
   SRCPARAM S001  1.00E+00 24.390 718.150 22.834 3.963

   LOCATION S002 POINT 458262.7 3758040.54 724.500
   SRCPARAM S002  1.00E+00 24.390 718.150 22.834 3.963

   LOCATION S003 POINT 458270.2 3758017.5 724.500
   SRCPARAM S003  1.00E+00 13.872 310.150 6.727 4.238

   LOCATION S004 POINT 458262.8 3758017.5 724.500
   SRCPARAM S004  1.00E+00 13.872 310.150 6.727 4.238

   LOCATION S005 POINT 458255.4 3758017.5 724.500
   SRCPARAM S005  1.00E+00 13.872 310.150 6.727 4.238

** building downwash parameters for source S001
** source type is POINT
** number of buildings = 5
   BUILDHGT S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    43.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    43.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
   BUILDWID S001    61.17    64.68    66.22    65.76    63.29    58.90
            S001    52.73    44.95    53.00    33.86    34.20    33.50
            S001    35.18    38.93    43.62    49.22    53.32    55.80
            S001    61.17    64.68    66.22    65.76    63.29    58.90
```

**MODELOPTs:
CONC RURAL ELEV NOCALM

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
S001	1ST HIGHEST VALUE IS	0.31156 AT (	458462.84,	3757901.75,	231.95,	0.00)	GC	1
	2ND HIGHEST VALUE IS	0.28346 AT (	458162.84,	3757901.75,	226.53,	0.00)	GC	1
	3RD HIGHEST VALUE IS	0.18715 AT (	458162.84,	3757801.75,	225.19,	0.00)	GC	1
	4TH HIGHEST VALUE IS	0.14417 AT (	458462.84,	3758001.75,	227.50,	0.00)	GC	1
	5TH HIGHEST VALUE IS	0.13784 AT (	458562.84,	3757901.75,	233.20,	0.00)	GC	1
	6TH HIGHEST VALUE IS	0.13510 AT (	458962.84,	3760401.75,	401.15,	0.00)	GC	1
	7TH HIGHEST VALUE IS	0.12090 AT (	458130.91,	3757888.75,	220.83,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.12028 AT (	458962.84,	3760501.75,	389.90,	0.00)	GC	1
	9TH HIGHEST VALUE IS	0.11865 AT (	458862.84,	3760401.75,	392.28,	0.00)	GC	1
	10TH HIGHEST VALUE IS	0.11849 AT (	458762.84,	3760301.75,	383.53,	0.00)	GC	1
S002	1ST HIGHEST VALUE IS	2.04715 AT (	458362.84,	3758001.75,	227.38,	0.00)	GC	1
	2ND HIGHEST VALUE IS	0.22616 AT (	458162.84,	3757901.75,	226.53,	0.00)	GC	1
	3RD HIGHEST VALUE IS	0.21126 AT (	458462.84,	3758001.75,	227.50,	0.00)	GC	1
	4TH HIGHEST VALUE IS	0.14720 AT (	458343.38,	3757972.00,	220.83,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.13839 AT (	458162.84,	3757801.75,	225.19,	0.00)	GC	1
	6TH HIGHEST VALUE IS	0.13629 AT (	458962.84,	3760401.75,	401.15,	0.00)	GC	1
	7TH HIGHEST VALUE IS	0.12352 AT (	458862.84,	3760401.75,	392.28,	0.00)	GC	1
	8TH HIGHEST VALUE IS	0.12254 AT (	458131.72,	3757928.75,	220.83,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.12217 AT (	458962.84,	3760501.75,	389.90,	0.00)	GC	1
	10TH HIGHEST VALUE IS	0.11857 AT (	458762.84,	3760301.75,	383.53,	0.00)	GC	1
S003	1ST HIGHEST VALUE IS	20.57417 AT (	458462.84,	3757901.75,	231.95,	0.00)	GC	1
	2ND HIGHEST VALUE IS	15.32069 AT (	458562.84,	3757901.75,	233.20,	0.00)	GC	1
	3RD HIGHEST VALUE IS	12.30134 AT (	458462.84,	3758001.75,	227.50,	0.00)	GC	1
	4TH HIGHEST VALUE IS	11.85614 AT (	458262.84,	3757801.75,	228.94,	0.00)	GC	1
	5TH HIGHEST VALUE IS	11.71305 AT (	458362.84,	3757901.75,	229.94,	0.00)	GC	1
	6TH HIGHEST VALUE IS	11.02900 AT (	458662.84,	3757901.75,	235.70,	0.00)	GC	1
	7TH HIGHEST VALUE IS	9.82441 AT (	458342.03,	3757912.00,	220.83,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	9.70009 AT (	458662.84,	3757801.75,	234.94,	0.00)	GC	1
	9TH HIGHEST VALUE IS	9.28825 AT (	458341.81,	3757902.00,	220.83,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	8.63778 AT (	458228.53,	3757756.00,	220.83,	0.00)	DC	NA

**MODELOPTs:
CONC RURAL ELEV NOCALM

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID	
S004	1ST HIGHEST VALUE IS	20.60660 AT (	458462.84,	3757901.75,	231.95,	0.00)	GC	1	
	2ND HIGHEST VALUE IS	14.83705 AT (	458562.84,	3757901.75,	233.20,	0.00)	GC	1	
	3RD HIGHEST VALUE IS	12.37179 AT (	458262.84,	3757801.75,	228.94,	0.00)	GC	1	
	4TH HIGHEST VALUE IS	11.55284 AT (	458462.84,	3758001.75,	227.50,	0.00)	GC	1	
	5TH HIGHEST VALUE IS	11.00130 AT (	458362.84,	3757901.75,	229.94,	0.00)	GC	1	
	6TH HIGHEST VALUE IS	10.78073 AT (	458662.84,	3757901.75,	235.70,	0.00)	GC	1	
	7TH HIGHEST VALUE IS	10.60059 AT (	458342.94,	3757952.00,	220.83,	0.00)	DC		NA
	8TH HIGHEST VALUE IS	10.06643 AT (	458342.25,	3757922.00,	220.83,	0.00)	DC		NA
	9TH HIGHEST VALUE IS	10.06505 AT (	458342.50,	3757932.00,	220.83,	0.00)	DC		NA
	10TH HIGHEST VALUE IS	9.88290 AT (	458342.72,	3757942.00,	220.83,	0.00)	DC		NA
S005	1ST HIGHEST VALUE IS	30.79370 AT (	458343.16,	3757962.00,	220.83,	0.00)	DC		NA
	2ND HIGHEST VALUE IS	28.45711 AT (	458362.84,	3758001.75,	227.38,	0.00)	GC	1	
	3RD HIGHEST VALUE IS	21.41571 AT (	458342.94,	3757952.00,	220.83,	0.00)	DC		NA
	4TH HIGHEST VALUE IS	20.32809 AT (	458462.84,	3757901.75,	231.95,	0.00)	GC	1	
	5TH HIGHEST VALUE IS	14.36527 AT (	458562.84,	3757901.75,	233.20,	0.00)	GC	1	
	6TH HIGHEST VALUE IS	13.37106 AT (	458342.72,	3757942.00,	220.83,	0.00)	DC		NA
	7TH HIGHEST VALUE IS	12.13019 AT (	458262.84,	3757801.75,	228.94,	0.00)	GC	1	
	8TH HIGHEST VALUE IS	10.88032 AT (	458462.84,	3758001.75,	227.50,	0.00)	GC	1	
	9TH HIGHEST VALUE IS	10.54006 AT (	458662.84,	3757901.75,	235.70,	0.00)	GC	1	
	10TH HIGHEST VALUE IS	10.46983 AT (	458342.50,	3757932.00,	220.83,	0.00)	DC		NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:
CONC RURAL ELEV NOCALM

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
S001	HIGH	1ST HIGH VALUE IS	86.31264	ON 81103020:	AT (458162.84, 3757901.75, 226.53, 0.00)	GC	1
S002	HIGH	1ST HIGH VALUE IS	104.74831	ON 81071116:	AT (458362.84, 3758001.75, 227.38, 0.00)	GC	1
S003	HIGH	1ST HIGH VALUE IS	1648.87830	ON 81091619:	AT (458362.84, 3758101.75, 226.25, 0.00)	GC	1
S004	HIGH	1ST HIGH VALUE IS	1382.88245	ON 81082421:	AT (458362.84, 3757901.75, 229.94, 0.00)	GC	1
S005	HIGH	1ST HIGH VALUE IS	1504.32019	ON 81062022:	AT (458362.84, 3758001.75, 227.38, 0.00)	GC	1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

```
**MODELOPTs:
CONC                        RURAL  ELEV                                  NOCALM


*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            1 Warning Message(s)
A Total of         1062 Informational Message(s)

A Total of         1062 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W360  1830 SET_WI:2-Digit Year Specified: Valid for Range 1950-2049  SURFDATA

   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

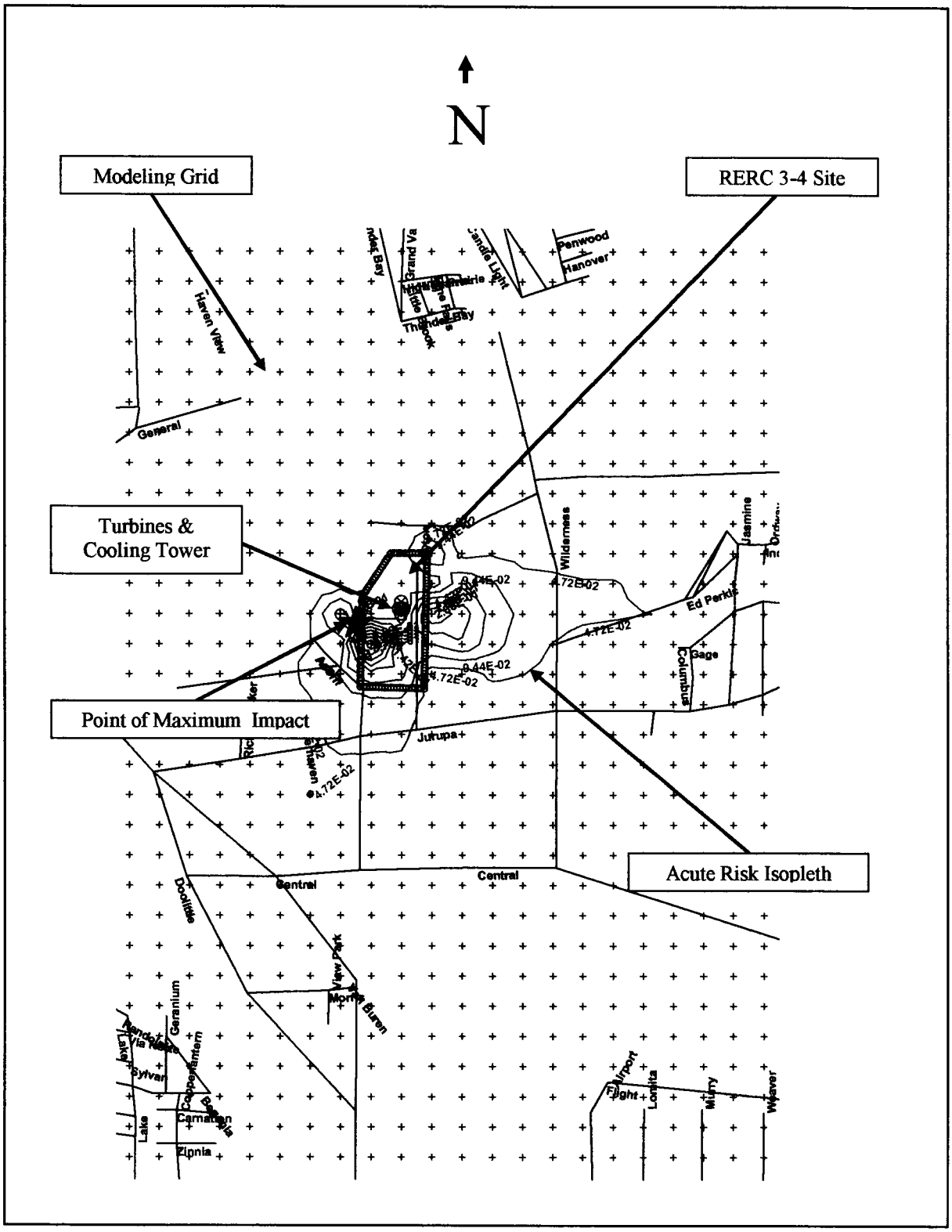
FILE: C:\HARP\PROJECTS\RERC3-4_Commission\Rep_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
6653	BOUNDARY	-1.00E+00	-1.00E+00	4.42E-01	458133	3757999	11
6654	BOUNDARY	-1.00E+00	-1.00E+00	4.26E-01	458133	3758009	11
3361	GRID	-1.00E+00	-1.00E+00	4.25E-01	458163	3757902	11
6652	BOUNDARY	-1.00E+00	-1.00E+00	3.31E-01	458133	3757989	11
6648	BOUNDARY	-1.00E+00	-1.00E+00	3.15E-01	458132	3757949	11
6649	BOUNDARY	-1.00E+00	-1.00E+00	3.07E-01	458132	3757959	11
6650	BOUNDARY	-1.00E+00	-1.00E+00	3.02E-01	458133	3757969	11
3282	GRID	-1.00E+00	-1.00E+00	2.81E-01	458363	3758002	11
6643	BOUNDARY	-1.00E+00	-1.00E+00	2.53E-01	458131	3757899	11
6651	BOUNDARY	-1.00E+00	-1.00E+00	2.52E-01	458133	3757979	11

Acute Risk Isopleth – Commissioning Operations
RERC 3-4 Project
February 2008



```
** ISC input file generated by HARP from
** workbook file C:\HARP\PROJECTS\RERC3-4_COMMISSION\DEFAULT.INP
** Date: 2/14/2008 12:27:25 PM

CO STARTING

   TITLEONE RIVERSIDE RERC UNITS 3-4
   TITLETWO HEALTH RISK ASSESSMENT
   MODELOPT CONC RURAL NOCALM
   AVERTIME 1 PERIOD
   POLLUTID Other
   TERRHGTS ELEV
   RUNORNOT RUN
   ERRORFIL C:\HARP\PROJECTS\RERC3-4_COMMISSION\DEFAULT.ERR

CO FINISHED
** UTMZONE  11


SO STARTING

   ELEVUNIT  FEET

   LOCATION S001 POINT 458262.7 3758001.85 724.500
   SRCPARAM S001  1.00E+00 24.390 718.150 22.834 3.963

   LOCATION S002 POINT 458262.7 3758040.54 724.500
   SRCPARAM S002  1.00E+00 24.390 718.150 22.834 3.963

   LOCATION S003 POINT 458270.2 3758017.5 724.500
   SRCPARAM S003  1.00E+00 13.872 310.150 6.727 4.238

   LOCATION S004 POINT 458262.8 3758017.5 724.500
   SRCPARAM S004  1.00E+00 13.872 310.150 6.727 4.238

   LOCATION S005 POINT 458255.4 3758017.5 724.500
   SRCPARAM S005  1.00E+00 13.872 310.150 6.727 4.238

** building downwash parameters for source S001
** source type is POINT
** number of buildings = 5
   BUILDHGT S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    43.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
            S001    40.00    40.00    43.00    40.00    40.00    40.00
            S001    40.00    40.00    40.00    40.00    40.00    40.00
   BUILDWID S001    61.17    64.68    66.22    65.76    63.29    58.90
            S001    52.73    44.95    53.00    33.86    34.20    33.50
            S001    35.18    38.93    43.62    49.22    53.32    55.80
```

**MODELOPTs:
CONC RURAL ELEV NOCALM

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
S001	HIGH	1ST HIGH VALUE IS	86.31264	ON 81103020: AT (	458162.84, 3757901.75, 226.53, 0.00)	GC	1
S002	HIGH	1ST HIGH VALUE IS	104.74831	ON 81071116: AT (	458362.84, 3758001.75, 227.38, 0.00)	GC	1
S003	HIGH	1ST HIGH VALUE IS	1648.87830	ON 81091619: AT (	458362.84, 3758101.75, 226.25, 0.00)	GC	1
S004	HIGH	1ST HIGH VALUE IS	1382.88245	ON 81082421: AT (	458362.84, 3757901.75, 229.94, 0.00)	GC	1
S005	HIGH	1ST HIGH VALUE IS	1504.32019	ON 81062022: AT (	458362.84, 3758001.75, 227.38, 0.00)	GC	1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

```
**MODELOPTs:
CONC                    RURAL  ELEV                                NOCALM


*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            1 Warning Message(s)
A Total of         1062 Informational Message(s)

A Total of         1062 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W360  1830 SET_WI:2-Digit Year Specified: Valid for Range 1950-2049  SURFDATA

   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

Health Risk Assessment Results Summary - Black Start ICE
Riverside Energy Resource Center Units 3 & 4
February 2008

Condition/Scenario	Results			
	Cancer Risk	Chronic Risk	Acute Risk	Cancer Burden
Black Start IC Engine				
Point of Maximum Impact:	1.53E-06	0.005	Not Applicable	Not Applicable

Condition/Scenario	Receptor Description
Black Start IC Engine	
Point of Maximum Impact:	Cancer and chronic points of maximum impact are located near eastern property boundary on City of Riverside property where no actual sensitive or residential receptors exist. Analysis was conducted as a workplace receptor.

FILE: C:\HARP\PROJECTS\RERC3-4_ICE\Rep_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
~~3362~~	~~GRID~~	~~2.18E-06~~	~~6.94E-03~~	0.00E+00	458263	3757902	11
3444	GRID	1.53E-06	4.86E-03	0.00E+00	458363	3757802	11
3445	GRID	1.06E-06	3.36E-03	0.00E+00	458463	3757802	11
3280	GRID	1.03E-06	3.29E-03	0.00E+00	458163	3758002	11
6599	BOUNDARY	9.87E-07	3.14E-03	0.00E+00	458340	3757832	11
6598	BOUNDARY	9.73E-07	3.10E-03	0.00E+00	458340	3757842	11
6600	BOUNDARY	9.59E-07	3.05E-03	0.00E+00	458340	3757822	11
6601	BOUNDARY	9.05E-07	2.88E-03	0.00E+00	458340	3757812	11
6597	BOUNDARY	8.96E-07	2.85E-03	0.00E+00	458341	3757852	11
3443	GRID	8.74E-07	2.78E-03	0.00E+00	458263	3757802	11

RECEPTORS WITH HIGHEST CHRONIC HI

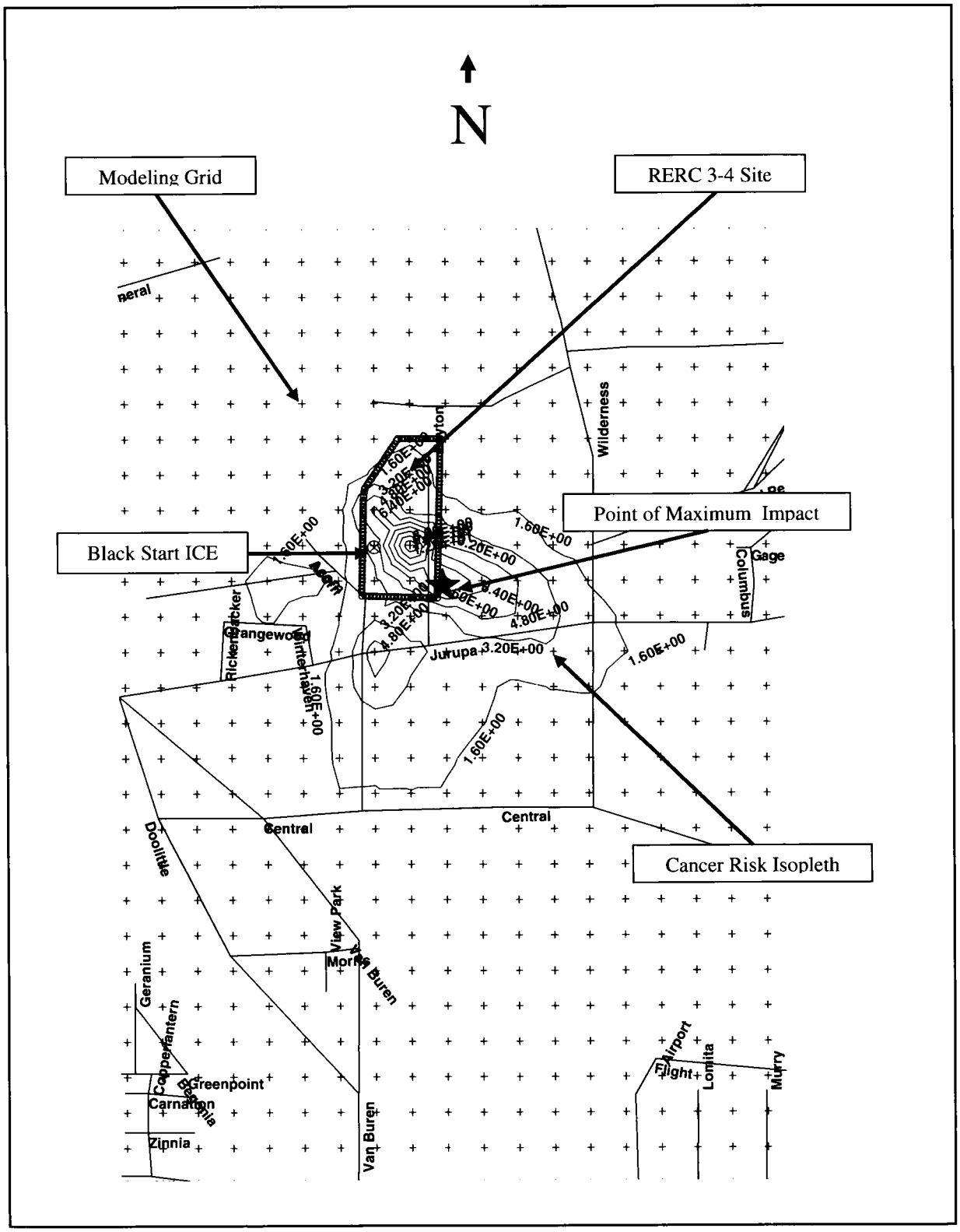
REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
~~3362~~	~~GRID~~	~~2.18E-06~~	~~6.94E-03~~	0.00E+00	458263	3757902	11
3444	GRID	1.53E-06	4.86E-03	0.00E+00	458363	3757802	11
3445	GRID	1.06E-06	3.36E-03	0.00E+00	458463	3757802	11
3280	GRID	1.03E-06	3.29E-03	0.00E+00	458163	3758002	11
6599	BOUNDARY	9.87E-07	3.14E-03	0.00E+00	458340	3757832	11
6598	BOUNDARY	9.73E-07	3.10E-03	0.00E+00	458340	3757842	11
6600	BOUNDARY	9.59E-07	3.05E-03	0.00E+00	458340	3757822	11
6601	BOUNDARY	9.05E-07	2.88E-03	0.00E+00	458340	3757812	11
6597	BOUNDARY	8.96E-07	2.85E-03	0.00E+00	458341	3757852	11
3443	GRID	8.74E-07	2.78E-03	0.00E+00	458263	3757802	11

* Notes:

1. Receptor 3362 is an on-site location.

2. Cancer and chronic points of maximum impact are located near eastern property boundary on City of Riverside property where no actual sensitive or residential receptors exist.

Cancer Risk Isopleth – Black Start ICE
RERC 3-4 Project
February 2008



```
** ISC input file generated by HARP from
** workbook file C:\HARP\PROJECTS\RERC3-4_ICE\DEFAULT.INP
** Date: 2/22/2008 11:05:48 AM

CO STARTING

   TITLEONE RIVERSIDE RERC UNITS 3-4
   TITLETWO HEALTH RISK ASSESSMENT
   MODELOPT CONC RURAL NOCALM
   AVERTIME 1 PERIOD
   POLLUTID Other
   TERRHGTS ELEV
   RUNORNOT RUN
   ERRORFIL C:\HARP\PROJECTS\RERC3-4_ICE\DEFAULT.ERR

CO FINISHED
** UTMZONE  11


SO STARTING

   ELEVUNIT  FEET

   LOCATION S001 POINT 458162.8 3757896 724.500
   SRCPARAM S001  1.00E+00 7.622 727.594 0.207 0.305

** building downwash parameters for source S001
** source type is POINT
** number of buildings = 5
   BUILDHGT S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00    40.00    40.00    40.00    40.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
   BUILDWID S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00    64.68    66.22    65.76    63.29     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00
            S001     0.00     0.00     0.00     0.00     0.00     0.00

   SRCGROUP S001 S001

SO FINISHED


RE STARTING

   ELEVUNIT  FEET
```

**MODELOPTs:
CONC RURAL ELEV NOCALM

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
S001	1ST HIGHEST VALUE IS	138.75082 AT (	458262.84,	3757901.75,	228.42,	0.00)	GC	1
	2ND HIGHEST VALUE IS	97.03339 AT (	458362.84,	3757801.75,	229.94,	0.00)	GC	1
	3RD HIGHEST VALUE IS	67.19308 AT (	458462.84,	3757801.75,	231.10,	0.00)	GC	1
	4TH HIGHEST VALUE IS	65.72720 AT (	458162.84,	3758001.75,	228.94,	0.00)	GC	1
	5TH HIGHEST VALUE IS	62.73792 AT (	458340.25,	3757832.25,	220.83,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	61.86229 AT (	458340.47,	3757842.25,	220.83,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	60.96071 AT (	458340.03,	3757822.25,	220.83,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	57.51107 AT (	458339.81,	3757812.25,	220.83,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	56.92300 AT (	458340.72,	3757852.25,	220.83,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	55.57464 AT (	458262.84,	3757801.75,	228.94,	0.00)	GC	1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

```
**MODELOPTs:
CONC                        RURAL  ELEV                                    NOCALM


*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            1 Warning Message(s)
A Total of         1062 Informational Message(s)

A Total of         1062 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
ME W360  1750 SET_WI:2-Digit Year Specified: Valid for Range 1950-2049  SURFDATA

   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

APPENDIX 6.9-A

TRAFFIC STUDY

A Traffic Study for Riverside Energy Resource Center
Units 3 & 4
City of Riverside, California

January 31, 2008

Prepared for:

Power Engineers

3940 Glenbrook Drive
Hailey, Idaho 83333
(208) 788-3456

Prepared by:

KOA CORPORATION
PLANNING & ENGINEERING

3190 C Shelby Street
Ontario, California 91764
(909) 890-9693
fax: (909) 890-9694

Job No: JA6814

Table of Contents

1. INTRODUCTION 1

PROJECT LOCATION 1
PROJECT DESCRIPTION 1

2. PROJECT STUDY METHODOLOGY 4

STUDY TIMEFRAMES 4
PROJECT STUDY AREA 4
ANALYSIS METHODOLOGIES 4
INTERSECTION CAPACITY ANALYSIS 5
TRAFFIC COUNT DATA 6
FUTURE YEAR 2009 TRAFFIC VOLUMES 6

3. EXISTING CONDITIONS (YEAR 2008) 7

EXISTING CIRCULATION NETWORK 7
Acorn Street 7
Jurupa Avenue 7
Van Buren Boulevard 7
Grand Avenue 7
State Route 91 (SR-91) 7
State Route 60 (SR-60) 8

4. FUTURE BASELINE CONDITIONS (YEAR 2009) 13

FUTURE GROWTH 13
PEAK HOUR INTERSECTION LEVEL OF SERVICE 13

5. PROJECT CONSTRUCTION TRIPS 17

PROJECT DESCRIPTION 17
PROJECT CONSTRUCTION TRIP GENERATION FORECAST 17
PROJECT TRIP DISTRIBUTION 19

6. FUTURE WITH PROJECT CONSTRUCTION CONDITIONS (2009) 24

FUTURE PEAK HOUR INTERSECTION LEVEL OF SERVICE 24

7. DETERMINATION OF SIGNIFICANT TRAFFIC IMPACTS 27

8. CALIFORNIA ENERGY COMMISSION REQUIRED ASSESSMENTS 29

SCHOOL IMPACTS 29
PLUME IMPACTS ON TRAFFIC SAFETY 30
IMPACTS ON EMERGENCY SERVICES 30
CONSTRUCTION IMPACTS 30

9. PROJECT ACCESS AND INTERNAL CIRCULATION 32

10. MITIGATIONS AND PROJECT RECOMMENDATIONS 33

TRAFFIC IMPACTS 33
NEED FOR ANY IMPROVEMENTS 33

CEQA CHECKLIST 33
11. CONCLUSIONS 35

List of Figures

FIGURE 6.9-1 – PROJECT VICINITY MAP 2
FIGURE 6.9-2 – PROJECT SITE PLAN 3
FIGURE 6.9-3 – EXISTING GEOMETRIES 9
FIGURE 6.9-4- EXISTING (YEAR 2008) TRAFFIC VOLUMES - AM PEAK HOUR 11
FIGURE 6.9-5- EXISTING (YEAR 2008) TRAFFIC VOLUMES - PM PEAK HOUR 12
FIGURE 6.9-6- FUTURE BASELINE CONDITIONS (YEAR 2009) TRAFFIC VOLUMES – AM PEAK HOUR 14
FIGURE 6.9-7- FUTURE BASELINE CONDITIONS (YEAR 2009) TRAFFIC VOLUMES - PM PEAK HOUR 15
FIGURE 6.9-8 – PROJECT TRIP DISTRIBUTION 21
FIGURE 6.9-9 – PROJECT-RELATED CONSTRUCTION TRAFFIC VOLUMES – AM PEAK HOUR 22
FIGURE 6.9-10 – PROJECT-RELATED CONSTRUCTION TRAFFIC VOLUMES – PM PEAK HOUR 23
FIGURE 6.9-11 – FUTURE (YEAR 2009) WITH PROPOSED PROJECT CONSTRUCTION TRAFFIC VOLUMES – AM PEAK HOUR 25
FIGURE 6.9-12 – FUTURE (YEAR 2009) WITH PROPOSED PROJECT CONSTRUCTION TRAFFIC VOLUMES – PM PEAK HOUR 26

List of Tables

TABLE 6.9-1 - LEVELS OF SERVICE DEFINITIONS 5
TABLE 6.9-2 - AM/PM PEAK HOUR INTERSECTION PERFORMANCE FOR EXISTING CONDITIONS (YEAR 2008) 10
TABLE 6.9-3 - AM/PM PEAK HOUR INTERSECTION PERFORMANCE FOR FUTURE CONDITIONS WITHOUT PROJECT (YEAR 2009) 13
TABLE 6.9-4 - PROJECT CONSTRUCTION TRAFFIC GENERATION FORECAST 19
TABLE 6.9-5 - AM/PM PEAK HOUR INTERSECTION PERFORMANCE FUTURE WITH PROJECT CONSTRUCTION CONDITIONS (YEAR 2009) 24
TABLE 6.9-6 - LEVEL-OF-SERVICE ANALYSIS /DETERMINATION OF IMPACTS FOR FUTURE WITH PROJECT CONSTRUCTION CONDITIONS (YEAR 2009) 27
TABLE 6.9-7 – SCHOOLS CHARACTERISTICS IN THE PROJECT VICINITY 29
TABLE 6.9-8 - CEQA CHECKLIST 34

Appendices

Appendix A: Traffic Count Data
Appendix B: Intersection Level-of-Service Calculation Worksheets - Existing Conditions (Year 2008)
Appendix C: Intersection Level-of-Service Calculation Worksheets – Future Baseline Conditions

(Year 2009)
Appendix D: Intersection Level-of-Service Calculation Worksheets – Future "With Project Construction" Conditions (Year 2009)

1. Introduction

Power Engineers is preparing a site development plan for the expansion of an existing power plant facility in the City of Riverside. The proposed site is owned by the City of Riverside and is located adjacent to and on the east side of the City of Riverside's Regional Water Quality Control Plant (WQCP) in a light industrial/manufacturing area. The proposed expansion will involve construction of two simple cycle units. The project will interconnect to the City of Riverside's sixty-nine (69) kV high-voltage transmission system at the existing RERC Switchyard.

The California Energy Commission requested a traffic study be prepared for the subject development. This report provides the requested traffic analysis. The analysis is intended primarily to address existing and future traffic conditions, project-related traffic, and potential traffic impacts on the surrounding street system both during construction and after completion of the expansion project.

The existing project site currently employs 18 persons. The proposed project expansion will add 12 employees for a total of 30 employees. The addition of 12 employees would not be expected to generate a significant number of additional trips to warrant a detailed traffic analysis. Increased trips to support the project expansion, once completed, are not expected to be significant. Since this project will not result is a significant increase in traffic once the expansion is operational, this traffic study focuses on the project's construction impacts, when construction activities will occur and up 100 construction workers will be working on site for several months.

Project Location

The project will be located at the existing Riverside Energy Resource Center east of Acorn Street within the City of Riverside, California. Intersections within the project vicinity that could be affected by the project include:

- Jurupa Avenue at Van Buren Boulevard
- Jurupa Avenue at Acorn Street
- Jurupa Avenue at Grand Avenue

The project was prepared to meet the City of Riverside Traffic Study Guidelines.

Project Description

The proposed project consists of two new units, RERC Units 3&4, with a nominal generation capacity of 96 megawatts (MW), which will be largely identical to the first two units and co-located with and to the north of Units 1 and 2. Figure 1 is a vicinity map showing the project location and the surrounding major street system. Figure 2 depicts the project site plan.

FIGURE 6.9-1 – PROJECT VICINITY MAP

FIGURE 6.9-2 –PROJECT SITE PLAN

2. Project Study Methodology

This chapter documents the methodologies and assumptions used to conduct the circulation impact analysis for the proposed project. This section contains the following background information:

- Study timeframes
- Study area description
- Capacity analysis methodologies

Study Timeframes

This report presents an analysis of the intersection operating conditions during the morning and evening peak hours for the following anticipated timeframes:

- Existing: Year 2008
- Future: Year 2009

The Year 2009 was selected for analysis to coincide with the proposed construction and project completion.

Project Study Area

The study area was determined through a review of the project area. KOA Corporation gave the City of Riverside the option of commenting on the breadth of the traffic study (study intersections). The City had no comment. As shown in Figure 1, the study area consists of the following intersections:

- Jurupa Avenue at Van Buren Boulevard
- Jurupa Avenue at Acorn Street
- Jurupa Avenue at Grand Avenue

Analysis Methodologies

This section presents a brief overview of traffic analysis methodologies and concepts used in this study. These methodologies are found in the *Highway Capacity Manual (HCM)*. Level of service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Level of service (LOS) ranges from Level of Service A (free flow, little congestion) to Level of Service F (forced flow, extreme congestion).

Level of service for signalized intersections is based upon the average time (seconds) that vehicles approaching an intersection are delayed. There is a specific delay and level of service associated with each approach and an overall average delay for all movements. The overall level of service for the intersection is based upon the overall average delay. Unsignalized intersection level of service is also based upon the control delay, but delay is only assessed for those traffic movements that are stopped or must yield to through traffic.

Some movements, including cross traffic on the minor street or left turns onto the major street, can be subject to long delays, however through traffic and right turns from the major street will not experience any delays at stopped intersections. When delay for cross traffic is severe (Level of Service F) the intersection should be evaluated further for possible improvement with traffic signals. In some cases, this analysis determines that the delay is being experienced by a very low number of vehicles and traffic signals are not warranted. In other cases, the number of stopped vehicles is substantial and traffic signals may be justified as a mitigation measure, additional analysis is required to determine the need and justification for the installation of a traffic signal.

Table 1 shows the relationship between level of service and the performance measures for signalized and unsignalized intersections and lists the HCM delay criteria for signalized intersections.

Table 6.9-1 - Levels of Service Definitions

Level of Service	Signalized Intersection Control Delay (in sec/veh)	Unsignalized Intersection Control Delay (in sec/veh)
A	0 – 10	0 – 10
B	10.1 – 20	10.1 – 15
C	20.1 – 35	15.1 – 25
D	35.1 – 55	25.1 – 35
E	55.1 – 80	35.1 – 50
F	80.1 or more	50.1 or more

The City of Riverside does not have any guidelines but follows Riverside County level of service standards. The County's policy has identified a Level of Service D as the minimum allowable service level during peak hours at signalized intersections along all County-maintained roads and conventional state highways. Mitigation measures should be considered when traffic conditions are forecasted to decline to poorer levels of service.

Intersection Capacity Analysis

The analysis of peak hour intersection conditions was conducted using the TRAFFIX software. The following peak hours were selected for analysis to coincide with normal weekday peak traffic periods:

- Weekday AM (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM (peak hour between 4:00 PM and 6:00 PM)

All signalized intersections were analyzed based on the "operational analysis" procedure for signalized intersections, as defined in the 2000 *Highway Capacity Manual* (HCM). Local practice uses 1,900 passenger cars per hour of green per lane (pcphgpl) as the maximum saturation flow of a single lane at an intersection for existing and future future scenarios. This saturation flow rate is adjusted to account for lane width, on-street parking, conflicting pedestrian flow, traffic composition, (i.e., percent of trucks) and shared lane movements

(e.g., through and right-turn movements from the same lane). Level of service for signalized intersections is based on the average time (seconds) that vehicles entering an intersection are delayed. Table 1 lists the *HCM* delay criteria for signalized intersections.

In addition, a peak hour factor was added to all of the volumes, to analyze the peak hour. Traffic volumes may fluctuate from minute to minute within the peak periods, so a peak hour factor increases the hourly volume, to simulate the higher 15 minute peak period for the entire peak period. The existing peak hour factor (or a default of 0.95, if the existing was higher) was calculated from existing traffic count information and applied to all intersections for the existing and future scenarios. To follow County of Riverside guidelines, a loss time of 4 seconds per phase (16 seconds for all studied intersections) and a minimum 7 seconds of green time per movement were also assumed.

Traffic Count Data

Existing average daily traffic data was obtained from a study submitted to the City and completed by Counts Unlimited in April and May 2007. All traffic count data used in this study is compiled in Appendix A.

Future Year 2009 Traffic Volumes

Peak hour intersection volumes under future conditions were forecast based on existing peak hour intersection volumes adjusted to reflect anticipated growth in the City. Project trips were added to this background base to determine the relative impact of the project.

3. Existing Conditions (Year 2008)

This section documents the existing conditions in the study area. The discussion presented here is limited to specific roadways in the project's vicinity.

Existing Circulation Network

Streets in the site vicinity, which could be affected by the proposed project include Acorn Street, Jurupa Avenue, Van Buren Boulevard, and Grand Avenue.

Figure 3 shows the existing roadway classifications/circulation network and intersection configurations/control in the project vicinity.

Acorn Street is a two-lane roadway running on a north/south alignment located approximately 500 feet to the west of the project site. It extends from Central Avenue and ends about one quarter mile north of Jurupa Avenue. It provides one travel lane per direction and is divided by a broken yellow center line. The speed limit is posted at 40 mph. Land uses along this roadway in the project vicinity are mostly industrial uses with some vacant lots. Acorn Street is controlled by a four-way stop sign at Jurupa Avenue.

Jurupa Avenue is a four-lane roadway running on an east/west alignment located adjacent to and south of the project site. It extends east from Van Buren Boulevard, past the project site where it turns into Olivewood Avenue. It provides two travel lanes per direction and is divided by a two way left turn lane. The speed limit is posted at 50 mph near the intersection of Van Buren Boulevard, and then drops to 45 mph at Acorn Street. Land uses along this roadway in the project vicinity are mostly industrial uses with many vacant lots. Jurupa Avenue is controlled by a traffic signal at Van Buren Boulevard and Grand Avenue and an all-way stop sign at Acorn Street.

Van Buren Boulevard is a four-lane roadway running on a north/south alignment located approximately one-half mile west of the project site. It provides two travel lanes per direction, and is divided by a raised median. The speed limit is posted at 55 mph in the project vicinity. Van Buren Boulevard begins approximately 16 miles southwest of the site, at the I-215 Freeway and extends east then curves north, past the project site, where it turns into Mission Boulevard at the SR-60 Freeway. It is controlled by a traffic signal at Jurupa Avenue. The land uses in the vicinity are mostly industrial uses with some vacant lots.

Grand Avenue is a four-lane roadway running on a north/south alignment located approximately two miles east of the project site. It provides two travel lanes per direction, and is divided by a double yellow line. The speed limit is posted at 40 mph in the project vicinity. Grand Avenue, which derives from Streeter Ave where it begins on Jurupa Ave east of the project site and continues on one and a half miles northeast to become Bandini Ave. The land uses in the vicinity are mostly residential uses with some commercial lots. It is controlled by at traffic signal at Jurupa Avenue and a stop sign at Rubidoux Ave.

State Route 91 (SR-91) is the nearest freeway to the project site. It is located approximately four miles to the south of the project site. It provides regional east/west throughout the region, beginning in Los Angeles and continuing east to Riverside where it ends at Interstate

215 (I-215). In the project area, it has 3-4 lanes per direction. Van Buren Boulevard provides a full interchange with this freeway.

State Route 60 (SR-60) is also near to the project site. It is located approximately six miles to the north of the project site. It provides regional east/west throughout the region, beginning in Los Angeles and continuing east to Beaumont where it ends at Interstate 10. In the project area, it has 3-4 lanes per direction. Van Buren/Mission Boulevard provides a partial interchange with this freeway.

FIGURE 6.9-3 – EXISTING GEOMETRIES

Peak Hour Intersection Level of Service

Figure 4 illustrates the existing peak hour traffic volumes during the AM peak hour. Figure 5 illustrates the PM peak hour volumes. Table 2 summarizes the results of the level-of-service analysis for the existing conditions.

The study area was observed during both the morning and the evening peak hours. The indicated Levels of Service shown in Table 2 are representative of observed traffic conditions in the study area.

Table 6.9-2 - AM/PM Peak Hour Intersection Performance for Existing Conditions (Year 2008)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.2	B	13.7	B
Jurupa Ave. at Van Buren Blvd.	55.7	E	61.4	E
Jurupa Ave. at Grand Ave.	31.4	C	35.3	D

Note: *Analyzed as an all-way stop

As shown in Table 2, the Jurupa Avenue/Van Buren Boulevard Intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable level of service, LOS D. Appendix B contains the analysis worksheets.

FIGURE 6.9-4- EXISTING (YEAR 2008) TRAFFIC VOLUMES - AM PEAK HOUR

FIGURE 6.9-5- EXISTING (YEAR 2008) TRAFFIC VOLUMES - PM PEAK HOUR

4. Future Baseline Conditions (Year 2009)

This section develops future traffic conditions in the study area with ambient growth added without the proposed project construction trips. The Year 2009 was selected for analysis based on correspondence with the applicant regarding the project's construction and completion timeline. The project is scheduled for completion before the end of the year 2009.

Future Growth

Based on discussions with the City of Riverside and County of Riverside staff, it has been established that traffic in the study area has historically increased at a rate of about 4% per year. Future increases in the background traffic volumes due to regional growth are expected to continue at this rate in the vicinity of the project. Assuming a completion date within 1 years, the existing traffic volumes were adjusted upward by 4% to reflect area wide growth.

The future scenario should also consider additional traffic that may be generated by other developments that have been approved. The City of Riverside did not identify any development projects that would add traffic to the intersections analyzed in the study.

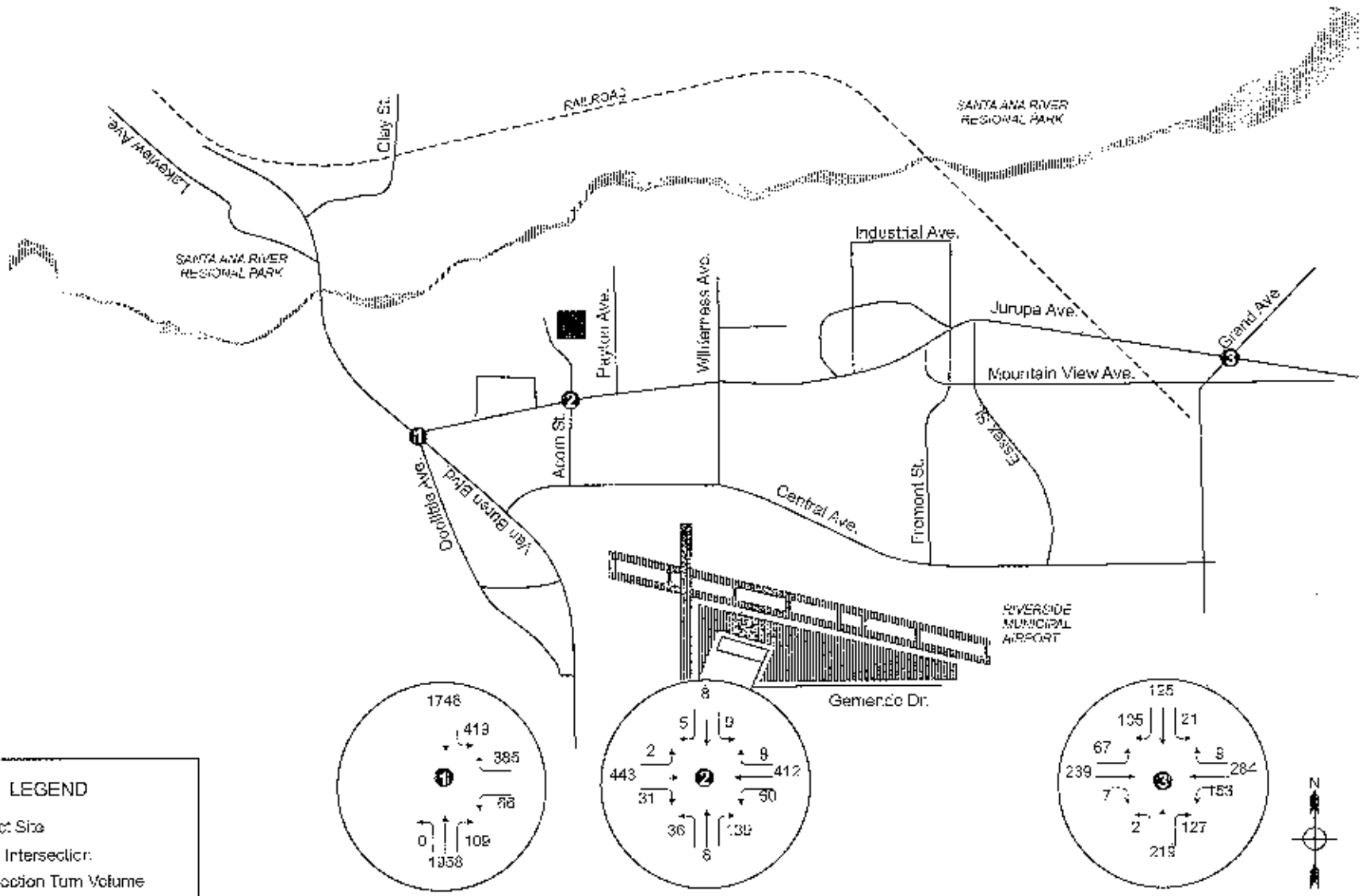
Peak Hour Intersection Level of Service

To simulate the Future Growth Conditions of the year 2009, the peak hour volumes in Figure 4 and Figure 5 were increased by 4%. Figure 6 illustrates the resulting AM peak hour volumes. Figure 7 illustrates the PM peak hour volumes. Table 3 summarizes the results of the level of service analysis for this scenario. The level of service worksheets are provided in Appendix C.

Table 6.9-3 - AM/PM Peak Hour Intersection Performance for Future Conditions Without Project (Year 2009)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.6	B	14.4	B
Jurupa Ave. at Van Buren Blvd.	65.3	E	73.9	E
Jurupa Ave. at Grand Ave.	31.5	C	35.7	D

Note: *Analyzed as an all-way stop

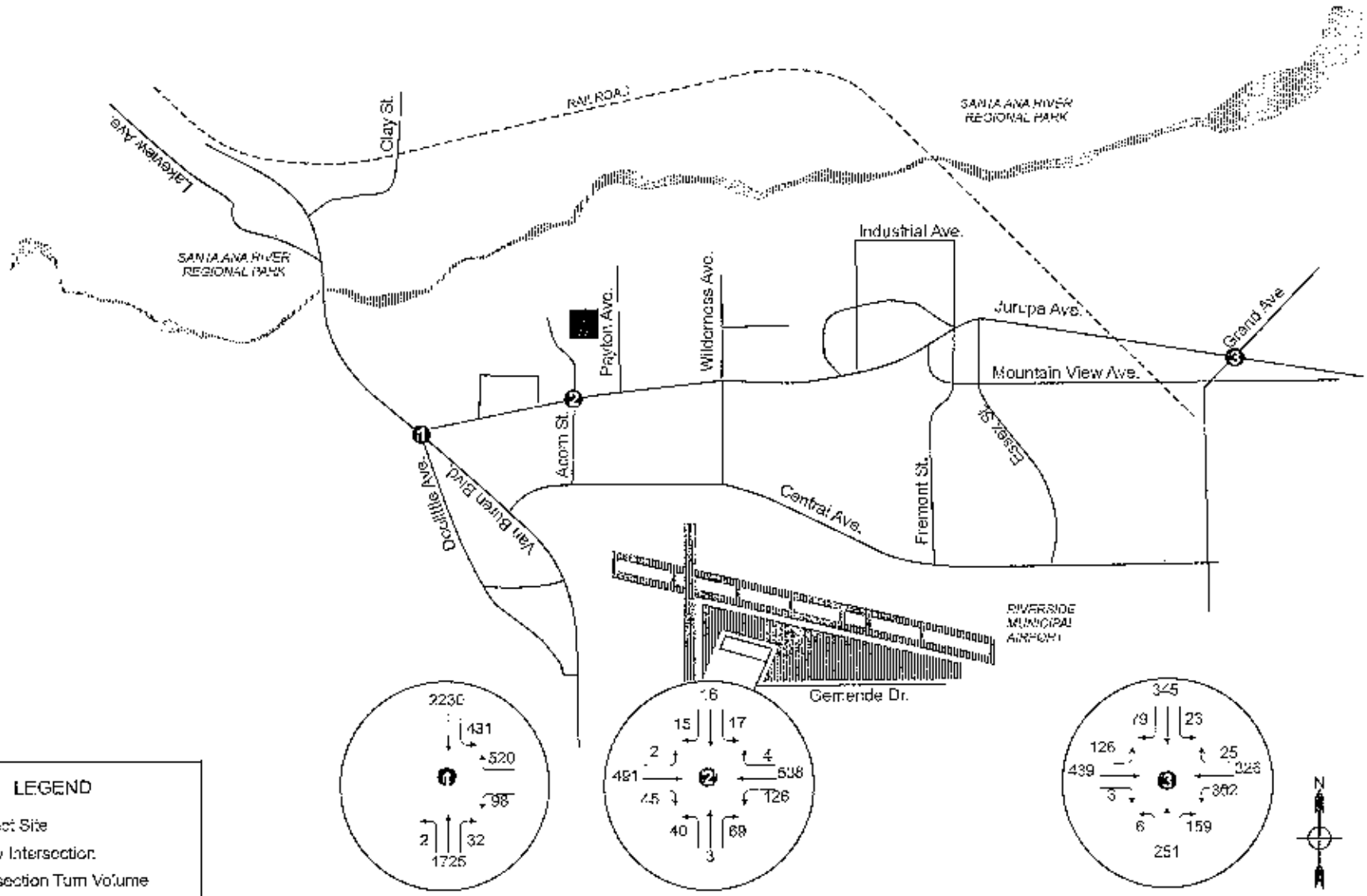


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-6

Future Baseline Conditions (Year 2009) Traffic Volumes - AM Peak Hour



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-7

Future Baseline Conditions (Year 2009) Traffic Volumes - PM Peak Hour

As shown in Table 3, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable level of service, LOS D. The addition of area traffic volumes for forecast area growth does not change the letter grade level of service when compared to the level-of-service calculations for existing conditions.

Level-of-service calculation worksheets for Future Baseline Conditions (Year 2009) are provided in Appendix C.

5. Project Construction Trips

Once the project is completed, the project is not expected to generate a significant number of trips above those already generated by the exiting project site. However, the construction phase of the project will include trips generated by up to 100 construction workers and supplies and equipment delivered by truck to the site. As such, this traffic analysis focuses on the traffic impacts that could occur during construction of the site expansion project.

This section focuses on the characteristics of the construction of proposed project.

Project Description

RERC Units 3&4 will be located immediately north of Units 1&2. The new units will occupy an area of the currently undeveloped portion of the site. The remaining undeveloped space will be used for construction laydown. Construction parking will occur in the same location as was used for RERC Units 1&2 (immediately to the west of the project).

Construction of RERC Units 3&4 is anticipated to last approximately nine months following approval by the CEC and once all permits and authorizations are in place. Commencement of construction is anticipated in the forth quarter of 2008, with commercial operation of the first unit anticipated in Summer 2009. Completion of the second unit would follow as soon as possible after the first unit is available for dispatch.

Project Construction Trip Generation Forecast

The project is expected to generate a maximum of 25 truck two-trips daily. Transport truck deliveries include heavy equipment and material deliveries. In addition, based information obtained from the project proponent, the project site will employ a workforce of approximately 100 people during peak construction periods. The calculations below account for the heavier vehicles types such as trucks by converting truck trips to "passenger car equivalents". A rate of 2.2 passenger car equivalents (PCEs) per truck trip was used in this analysis. This conversation rate falls within the guidelines set for in the *Highway Capacity Manual*.

Construction of the project will take approximately 9 months. The project will require an average construction workforce of 50 workers at the beginning of construction and a peak of 100 workers in the 3rd and 7th months of construction and a tapering of fewer employees thereafter. The workforce vehicle trips associated with construction were calculated based upon these assumptions.

Construction of the project will require the use and installation of heavy equipment and associated systems. Heavy equipment will be delivered via truck, using Van Buren Avenue from State Route 60 to the north. The number of trucks expected during construction is small. Approximately 5 trucks are estimated to be used daily during construction. Daily heavy equipment deliveries will vary from approximately 1 to 10. The peak of 10 would likely occur in months 5 and 6.

Peak hour traffic related to material deliveries would approximately be 15. Daily truck traffic will vary from approximately 3-15. The peak of 15 would likely occur in months 5 and 6.

Peak Hour Trip Generation Forecast

For purposes of forecasting future peak hour trip generation, it is assumed that the majority of the daily project trips will occur during daylight hours. It is assumed that each employee arrives during the AM peak hour and departs during the PM peak hour and that some miscellaneous trips occur during this time. This assumption assumes that out of 100 employees; 75 employees arrive alone and 25 employees will carpool. It is also assumed that truck trips will occur randomly over a 10-hour workday. Based on these assumptions, a daily and peak hour trip generation calculation is provided below.

Employee Trips

It is estimated that 50 to 100 employees will work on the site during the construction phases. To evaluate a worst-case scenario, it is assumed that 75 employees arrive alone and 25 employees will carpool. In addition it is assumed that half the employees go to lunch or some other errand therefore creating additional trips.

- 75 employees will drive alone = 75 inbound trips in the AM and 75 outbound trips in the PM
- 25 employees carpool (assumed two in a carpool) = 13 inbound trips in the AM and 13 outbound trips in the PM
- 42 employees go to lunch/run errands = 42 additional inbound and 42 additional outbound trips during the day

AM Peak Hour: 88 inbound employee trips
PM Peak Hour: 88 outbound employee trips

Total trips = (88*2) + (42*2) = 260 daily employee trips

The AM peak hour for the project would be expected to occur with the arrival of personnel at, 6:00AM. This does not coincide with the AM peak hour of the adjacent street, which occurs between 7AM and 9AM therefore was not used in the trip generation.

During the peak hour of adjacent street traffic during the AM peak hour, the project would only generate trips from the delivery of supplies and equipment and trip generation that would occur during normal construction activities, such as activities of supervisors and construction representatives.

Truck Trips

For the purposes of forecasting, it is assumed that 25 trucks per day will arrive and depart the site per day to deliver materials and equipment. This accounts for 50 one-way truck trips per day (110 PCEs). These trips will likely occur randomly during the day, assuming a 10-hour day.

- 25 daily two-way truck trips = 50 one-way truck trips at a PCE of 2.2 = 110 PCE truck trips per day.
- 110 PCE truck trips / 10-hour day = 11 PCE truck trips during the AM peak hour and 11 PCE truck trips during the PM peak hour.

AM Peak Hour: 6 inbound and 5 outbound truck PCE trips
PM Peak Hour: 5 inbound and 6 outbound truck PCE trips

Additional Work Related Trips
For the purposes of forecasting, it is assumed that other trips associated with the activities of supervisors, inspectors and vendors would be equal to 20% of the employee trips and would occur randomly over a 10-hour work day.

260 daily employee trips x 0.20 = 52 ancillary trips (PCEs) daily trips

AM Peak Hour: 3 inbound and 2 outbound ancillary trips
PM Peak Hour: 2 inbound and 3 outbound ancillary trips

Table 4 shows the traffic generation expected from the project based on the information provided by the Power Engineers.

Table 6.9-4 - Project Construction Traffic Generation Forecast

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Employee Trips*	260	0	0	0	88	0	88
Truck Trips	110	11	6	5	11	5	6
Ancillary Trips	52	5	3	2	5	2	3
NET Project Trips (PCEs)	**422**	**16**	**9**	**7**	**104**	**7**	**97**

Note: AM Peak Hour does not coincide with the arrival time of employees

The project will generate a total of 422 trips daily, including 16 trips during the AM peak hour and 104 trips during the PM peak hour.

Project Trip Distribution

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by project traffic. The potential interaction between the proposed

land use and surrounding regional access routes are considered to identify the route where the project traffic will distribute.

The anticipated trip distribution for the proposed development is presented on Figure 8. This figure indicates the proportion of project traffic which will use the street segments and turning movements indicated.

Figures 9 and 10 indicate the project-related construction traffic volumes expected at locations within the study area, including use of driveways and local access routes. This figure shows the direction of all traffic related to the project construction.

FIGURE 6.9-8 – PROJECT TRIP DISTRIBUTION

FIGURE 6.9-9 – PROJECT-RELATED CONSTRUCTION TRAFFIC VOLUMES – AM PEAK HOUR

FIGURE 6.9-10 – PROJECT-RELATED CONSTRUCTION TRAFFIC VOLUMES – PM PEAK HOUR

6. Future WITH Project Construction Conditions (2009)

This section documents the future traffic conditions with the addition of project-related construction traffic to the surrounding street system.

Future Peak Hour Intersection Level of Service

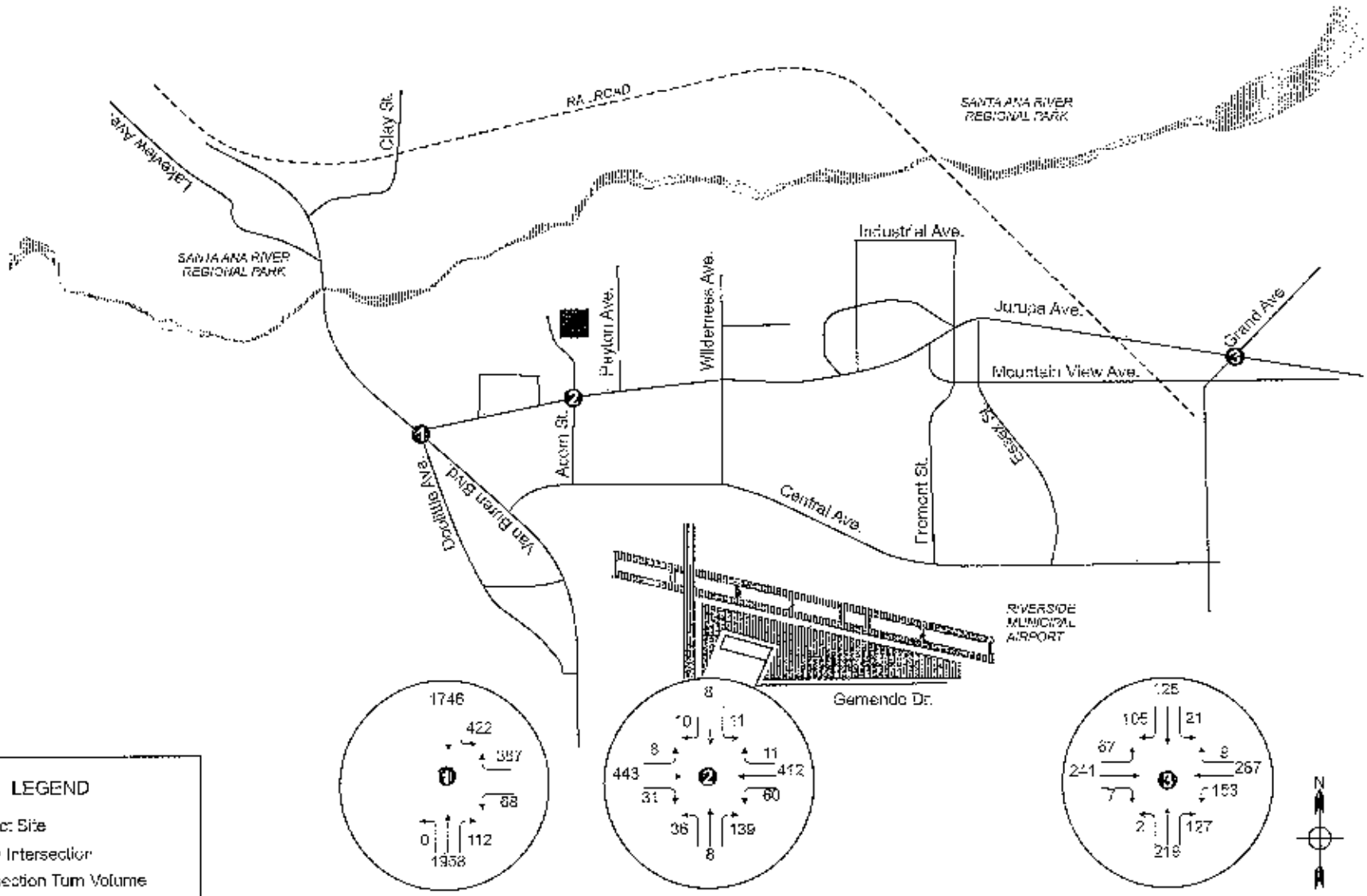
The Future "WITH Project" construction traffic volumes were derived by adding the project construction trips shown in Figures 11 and 12 to the forecast Baseline traffic volumes for the Year 2009. Table 5 summarizes the results of the level of service analysis for the Future "WITH Project" conditions

Table 6.9-5 - AM/PM Peak Hour Intersection Performance
Future WITH Project Construction Conditions (Year 2009)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec)	Level of Service	Delay (sec)	Level of Service
	Average	LOS	Average	LOS
Signalized Intersections				
Jurupa Ave. at Acorn Street*	12.6	B	15.6	C
Jurupa Ave. at Van Buren Blvd.	66.1	E	79.6	F
Jurupa Ave. at Grand Ave.	31.5	C	35.8	D

Note: Delay based on seconds per vehicle average. LOS = Level of Service *Analyzed as an all-way stop

As shown in Table 5, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable level of service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth does not change the letter-grade level of service when compared to the level-of-service calculations for existing conditions or Year 2009 Baseline Conditions.

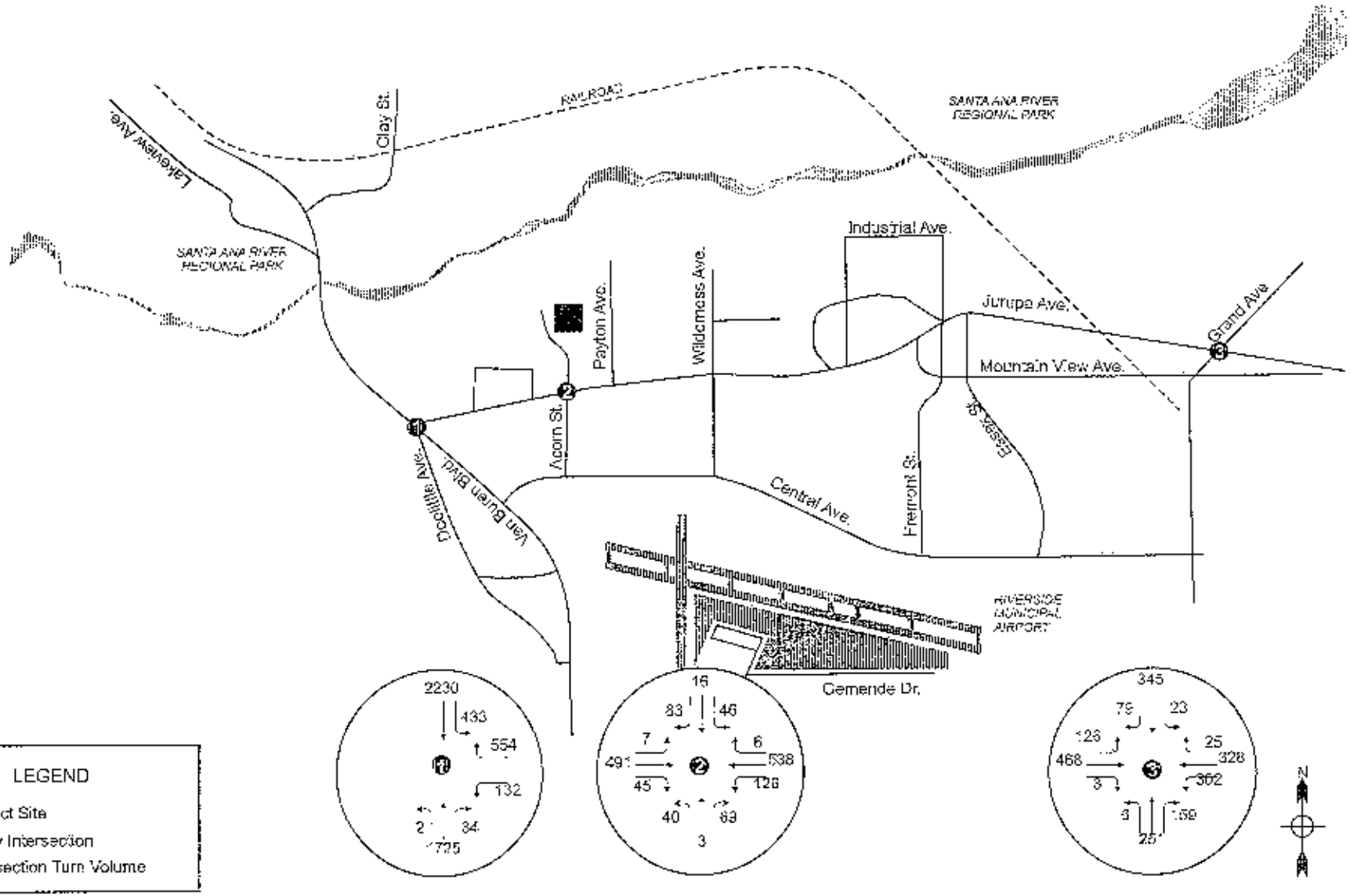


KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-11

Future (Year 2009) With Proposed Project Construction Traffic Volumes - AM Peak Hour



KOA CORPORATION
PLANNING & ENGINEERING

Riverside Energy Resource Center Units 3 and 4 - Traffic Impact Study

Figure 6.9-12

Future (Year 2009) With Proposed Project Construction Traffic Volumes - PM Peak Hour

7. Determination of Significant Traffic Impacts

Traffic impacts are identified if the proposed project will result in a significant change in traffic conditions on a roadway or intersection. A significant impact is normally defined when project related traffic would cause level of service to deteriorate to below the minimum acceptable level by a measurable amount. Impacts may also be significant if the location is already below the minimum acceptable level and project related traffic causes a further decline.

The City of Riverside does not have any guidelines but follows Riverside County level of service standards. The County's policy has identified a Level of Service D as the minimum allowable service level during peak hours at signalized intersections along all County-maintained roads and conventional state highways. Mitigation measures should be considered when traffic conditions are forecasted to decline to poorer levels of service.

Unsignalized intersections are considered to be impacted if the Level of Service is poor, traffic signals are warranted, and delay is increased significantly. If signals are not warranted, mitigation measures other than signalization may be considered to improve stop control operation.

Table 6 displays a comparison of future study scenarios (Year 2009) with and without the addition of forecast project construction traffic.

Table 6.9-6 - Level-of-Service Analysis /Determination of Impacts for Future with Project Construction Conditions (Year 2009)

Intersection	Future Without Project		Future WITH Project		Increase	Impact?
Weekday AM Peak Hour (Delay/Level of Service)						
Jurupa Ave. at Acorn St.*	12.6	B	12.6	B	0.0	No
Jurupa Ave. at Van Buren Blvd.	65.3	E	66.1	E	0.8	No
Jurupa Ave. at Grand Ave.	31.5	C	31.5	C	0.0	No
Weekday PM Peak Hour (Delay/Level of Service)						
Jurupa Ave. at Acorn St.	14.4	B	15.6	C	1.2	No
Jurupa Ave. at Van Buren Blvd.	73.9	E	79.6	E	5.7	No
Jurupa Ave. at Grand Ave.	35.7	D	35.8	D	0.1	No

Note: Delay based on seconds per vehicle average. LOS = Level of Service. *Analyzed as an all way stop

As shown in Table 6, the Jurupa Avenue/Van Buren Boulevard intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable level of

service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth and project construction traffic does not change the letter-grade level of service when compared to the level-of-service calculations for existing conditions or Year 2009 Baseline Conditions.

The increases in intersection delay resulting from the addition of project trips is in all cases less than 10% for the periods with the heaviest construction activity. As previously stated, project impacts once construction is completed are expected to be nominal. Based on this analysis, the project construction and project itself are not expected to have significant traffic impacts.

School Impacts

The California Energy Commission has requested traffic information related to schools on similar projects. It is understood that the potential impacts of traffic, namely construction truck traffic may have some impact on school children in the area (children being picked up or dropped off on local roads near the proposed project site). The following indicates schools, their location, distance from project site, and bus routes designated by the school district as follows in Table 7.

Table 6.9-7 – Schools Characteristics in the Project Vicinity

School Name	Distance from the Project Site	School Designated Bus Routes
Arizona Intermediate (La Sierra Avenue at Arizona Avenue)	6 miles south of the project site.	Bus Routes 10, 11, 12, 13, 15 & 23
Villegas Intermediate (Harvill Lane at Magnolia Avenue)	7 miles south of the project site.	Bus Routes 12, 13, 15, 19 & 20
Loma Vista Intermediate (La Sierra Avenue at Arlington Avenue)	5.5 miles west of the project site.	Bus Routes 9, 11, 12 & 13
Terrance Elementary (Rutland Avenue, North of Arlington Avenue)	3 miles west of the project site.	Bus Route 1
Alvord High School (Pierce Street, South of Magnolia Avenue)	5.5 miles south of the project site.	Bus Route 1
Foothill Elementary (Well Avenue, West of Van Buren Boulevard)	3 miles southwest of the project site.	Bus Route 2
Myra Linn Elementary (Meredith Street at Brannigan Court)	3.5 miles southwest of the project site.	Bus Routes 2 & 7
Rosemary Kennedy Elementary (Mitchell Avenue at Arlington Avenue)	4 miles west of the project site.	Bus Routes 3, 4 & 5
Norte Vista High School (Arlington Avenue at Tyler Street)	3 miles west of the project site.	Bus Route 7
Twinnhill Elementary (La Sierra Avenue at Campbell Avenue)	4 miles southwest of the project site.	Bus Route 7

None of these schools will experience significant traffic changes due to the temporary increases in traffic resulting from project construction. They are all remote from the project

and not located along roadways with project related traffic. The bus routes designated by the school district do not run along Jurupa Avenue within the project vicinity; therefore no school bus routes or bus stops will be affected by the project.

Plume Impacts on Traffic Safety

The California Energy Commission has indicated that there may be some visibility impairment due to vapor plumes created by heat generated on the project site once the project is completed. KOA Corporation understands that these vapors are transparent. It is likely that the plumes, if they were to reach ground level would create the same level of visual impairment as standard pavement does when it is heated, creating gradients and variations in air temperature and density that make the air above the distant roadway appear wavy. This does not appear to have any impact on traffic safety or operations, based upon the location of the site and proximity to heavily used roadways.

Impacts on Emergency Services

The California Energy Commission has requested information on similar projects to determine if there will be an impact to emergency service vehicles in the project area, due to increased traffic generated by the projects. Neither the daily traffic nor the construction traffic will be significant enough to cause delays, increase congestion, or inhibit access for emergency vehicles.

Construction Impacts

The vehicles used to transport heavy equipment and construction materials will require transportation permits when they exceed the size, weight, width or length thresholds set forth in Section 35780 of the California Vehicle Code, Sections 117 and 660-711 of the California Streets and Highways Code, and Sections 1411.1 to 1411.6 of the California Code of Regulations. Affected vehicles will be required to obtain transportation permits from the City of Riverside and Caltrans.

Only a small percent of the truck trips are estimated to be consumable material deliveries including some small amount of hazardous materials (solvents, lube oils, paint, paint thinners, adhesives, batteries, construction gases, etc) in their original manufacturer containers. Of the estimated truck deliveries with hazardous materials, total quantities of hazardous materials and subsequent public risk should be relatively low. It is anticipated that hazardous wastes would be sent from the site to treatment storage or disposal facilities on a biweekly or monthly basis. Proper containers and transportation procedures that conform to applicable Caltrans requirements will be used for all material and waste shipments (ie. 49 CFR Chapters II, III; California Vehicle code Section 31300, et seq.). No acutely hazardous materials will be used or stored onsite during construction. Because of the small quantities of hazardous materials involved, separate truck deliveries of hazardous materials during construction are unlikely.

The average increase of 5 additional daily truck trips (with 10 truck trips as a worst case scenario) on state routes in the project area is minor compared with existing truck traffic on these routes and will represent a minimal increase in truck traffic along the proposed routes

of travel. Therefore, the impact of truck traffic on state routes is considered to be less than significant.

The average increase of 5 additional daily truck trips (with 10 truck trips as a worst case scenario) on state routes in the project area is minor compared with existing truck traffic on these routes and will represent a minimal increase in truck traffic along the proposed routes of travel. Due to the size and weight of these trucks, the increase in truck traffic will contribute to wear on the roads and will increase the need for regular roadway maintenance. However, the increase in project-related roadway wear and tear is considered less than significant.

Construction debris and small quantities of hazardous wastes will be generated during construction (see Section 2.9 section 2, Project and Facility Description). During construction, a minimal number of truck trips per month will be required to haul waste for disposal. Transportation of hazardous materials to and from the project site will be conducted in accordance with California Vehicle Code Section 31300. Because the transportation of hazardous wastes will be conducted in accordance with the relevant transportation regulations, less than significant impact is expected.

The proposed laydown area for the project site is located adjacent to and north of the project site on property. Construction equipment and materials will be stored and stockpiled within the potential laydown areas. Construction and safety measures moving equipment and materials to the project site from the laydown area would be implemented by the contractor.

The proposed linear routes consist of a sub transmission line and fiber optic communication cable, potable and non-potable waterlines, sewer line, storm waterline and gas pipeline. The potential traffic impacts associated with the construction of the linear routes are minimal.

The project will interconnect to the City of Riversides 69 Kv high voltage transmission system at the existing RERC Switchyard. The switchyard will be expanded to add two more bays for connection of the two new generators. No new transmission facilities will be needed as part of the project.

During the operations of the proposed site, a minimal number of hazardous materials deliveries will be made to the project site. The anticipated travel routes for hazardous materials deliveries will be along SR 60, Van Buren Boulevard, and Jurupa Avenue. Potential long-term traffic impacts are expected to be less than significant with the delivery of hazardous and non-hazardous materials to the project site and hauling of waste generated during the projects operations.

Facility operation is not anticipated to include any routine or periodic deliveries via local or regional railroads. Because any such deliveries would be non-routine and limited, no adverse impacts to rail services will occur.

9. Project Access and Internal Circulation

The project will take access to Acorn Street, which will connect to Jurupa Avenue. Driveways should be placed at planned locations and should not be less than 150 feet from existing intersections, if possible.

Parking stalls should be located on appropriate distance from entrance driveways based on City Standards, in order to allow unobstructed access to the project site. We recommend that a sufficient amount of parking be provided to meet the requirements of the City of Riverside based upon office and warehouse space. Additionally, this parking should meet the American with Disabilities Act (ADA) requirements for access and designated handicap parking spaces.

The proposed project site will be submitted to the City of Riverside, who will review the plan for compliance with applicable City standards. We anticipate that any minor internal circulation or parking issues will be addressed in conjunction with this review.

10. Mitigations and Project Recommendations

Traffic Impacts

The Jurupa Avenue/Van Buren Boulevard Intersection currently operates below the County of Riverside Traffic Study Guideline threshold of acceptable level of service, LOS D, during both the AM and PM peak hours. The addition of area traffic volumes for forecast area growth and forecast construction traffic does not change the letter-grade level of service when compared to the level-of-service calculations for existing conditions or Year 2009 Baseline Conditions.

The increases in intersection delay resulting from the addition of project trips is in all cases less than 10% for the periods with the heaviest construction activity. As previously stated, project impacts once construction is completed are expected to be nominal. Based on this analysis, the project construction and project itself are not expected to have significant traffic impacts.

Need for Any Improvements

Since the project (construction) will occur over a 9-month period and will not be permanent and does not change the letter-grade level of service during peak hours at any of the study intersections, specific traffic mitigation measures are not required.

CEQA Checklist

The California Environmental Quality Act requires that specific qualities be looked at to determine if the project has a potentially significant impact on the surrounding system. The tests for traffic-related issues are included in Table 7 below.

Table 6.9-8 - CEQA Checklist

Would the Project	Potentially Significant Impact	Less Than Significant with Mitigation	Less than Significant	No Impact
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?			X	
b) Exceed, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways??			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels, or a change in location that results in substantial safety risks?			X	
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Result in inadequate parking supply?				X
g) Create a significant hazard to the public or the environment through the routine transportation of hazardous materials?			X	

11. Conclusions

California Energy Commission is evaluating the site development analysis for the construction of two simple cycle units at an existing power plant facility in the City of Riverside. The proposed site is owned by the City of Riverside and is located adjacent to and on the east side of the City of Riverside's Regional Water Quality Control Plant (WQCP) in a light industrial/manufacturing area. The project will connect to the s 69 kV high-voltage transmission system at the existing RERC Switchyard. The project will create 97 daily trips, including 12 trips during the AM and 13 trips during the PM peak hour.

Once the project is completed, the increase in staffing from 18 to 30 employees will not result in the generation of a significant number of additional trips. Support trips to the facility are also not expected to increase significantly. This traffic study focused the potential impact of project construction traffic. Construction activities during peak periods will require 100 employees and be supported by truck supply and equipment deliveries. Construction will occur over a 9-month period. Based on the traffic analysis, no significant traffic impacts are anticipated as a result of construction activities.

APPENDIX 6.9-B

TRAFFIC COUNT DATA

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Acorn Street
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIACJUAM
Site Code : 04120213
Start Date : 5/2/2007
Page No : 1

Groups Printed- Total Volume

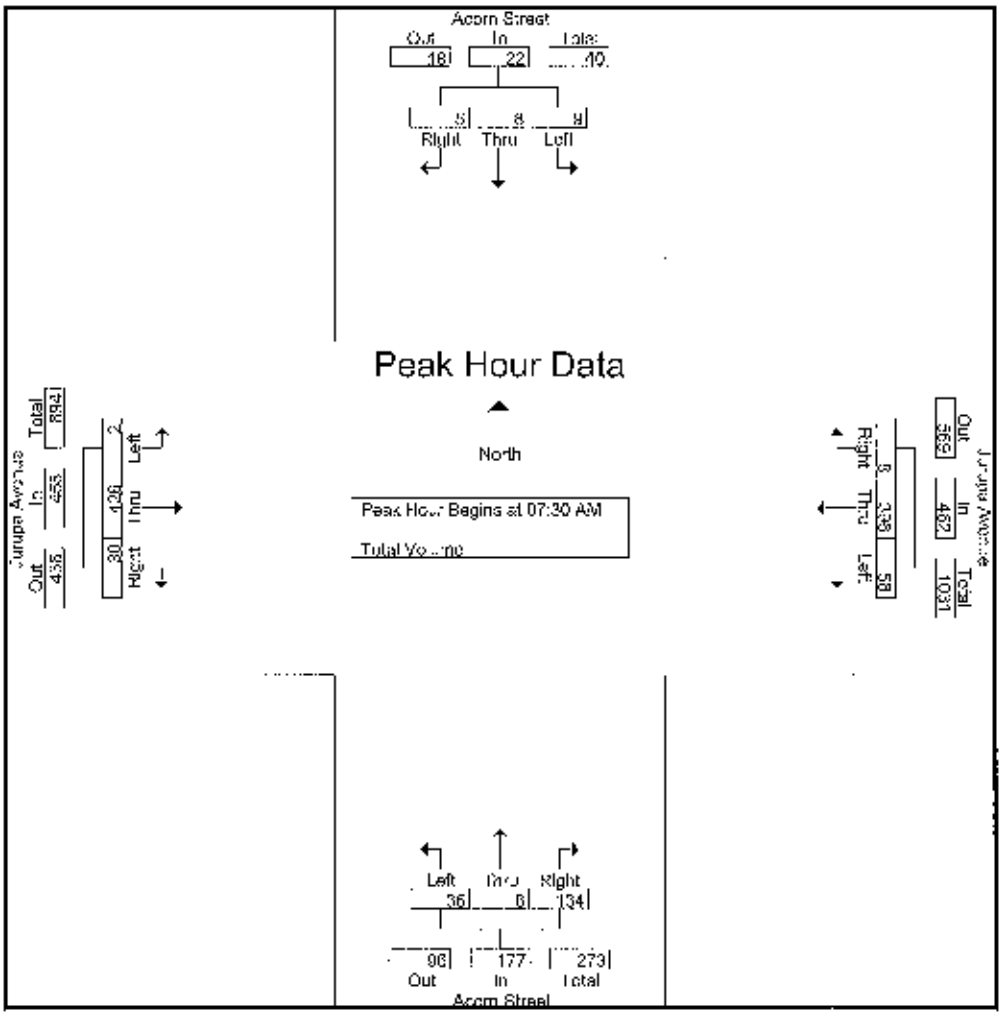
	Acorn Street Southbound				Jurupa Avenue Westbound				Acorn Street Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:45 AM	3	3	0	6	16	98	10	124	12	12	61	85	5	89	3	97	312
Total	3	3	0	6	16	98	10	124	12	12	61	85	5	89	3	97	312
07:00 AM	3	3	0	6	20	104	8	132	14	5	16	35	9	57	3	69	242
07:15 AM	0	1	2	3	12	99	3	114	9	11	53	53	6	82	6	94	264
07:30 AM	2	0	0	2	17	97	4	118	9	1	36	46	1	102	6	109	275
07:45 AM	4	1	0	5	16	112	2	130	13	1	43	57	1	107	14	122	314
Total	9	5	2	16	65	412	17	494	45	18	128	191	17	348	29	394	1095
08:00 AM	3	5	4	12	16	91	0	107	11	5	25	41	0	100	5	105	265
08:15 AM	0	2	1	3	9	96	2	107	2	1	30	33	0	117	5	122	265
08:30 AM	0	2	0	2	20	82	0	102	9	4	24	37	1	84	8	93	234
Grand Total	15	17	7	39	126	779	29	934	79	40	268	387	23	738	50	811	2171
Apprch %	38.5	43.6	17.9		13.5	83.4	3.1		20.4	10.3	69.3		2.8	91	6.2		
Total %	0.7	0.8	0.3	1.8	5.8	35.9	1.3	43	3.6	1.8	12.3	17.8	1.1	34	2.3	37.4	

	Acorn Street Southbound				Jurupa Avenue Westbound				Acorn Street Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	0	0	2	17	97	4	118	9	1	36	46	1	102	6	109	275
07:45 AM	4	1	0	5	16	112	2	130	13	1	43	57	1	107	14	122	314
08:00 AM	3	5	4	12	16	91	0	107	11	5	25	41	0	100	5	105	265
08:15 AM	0	2	1	3	9	96	2	107	2	1	30	33	0	117	5	122	265
Total Volume	9	8	5	22	58	396	8	462	35	8	134	177	2	426	30	458	1119
% App. Total	40.9	36.4	22.7		12.6	85.7	1.7		19.8	4.5	75.7		0.4	93	6.6		
PHF	.563	.400	.313	.458	.853	.884	.500	.888	.673	.400	.779	.776	.500	.910	.536	.939	.891

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Acorn Street
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIACJUAM
Site Code : 04120213
Start Date : 5/2/2007
Page No : 2



Peak Hour Analysis From 06:45 AM to 08:30 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				06:45 AM				07:30 AM			
+0 mins.	0	1	2	3	**20**	104	**8**	**132**	12	**12**	**61**	**85**	**1**	102	6	109
+15 mins.	2	0	0	2	12	99	3	114	**14**	5	16	35	1	107	**14**	**122**
+30 mins.	4	1	0	5	17	97	4	118	9	11	33	53	0	100	5	105
+45 mins.	3	**5**	**4**	**12**	16	**112**	2	130	9	1	36	46	0	**117**	5	122
Total Volume	9	7	6	22	65	412	17	494	44	29	146	219	2	426	30	458
% App. Total	40.9	31.8	27.3		13.2	83.4	3.4		20.1	13.2	66.7		0.4	93	6.6	
PHF	.563	.350	.375	.458	.813	.920	.531	.936	.786	.604	.598	.644	.500	.910	.536	.939

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Acorn Street
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIACJUPM
Site Code : 04120213
Start Date : 5/1/2007
Page No : 1

Groups Printed- Total Volume

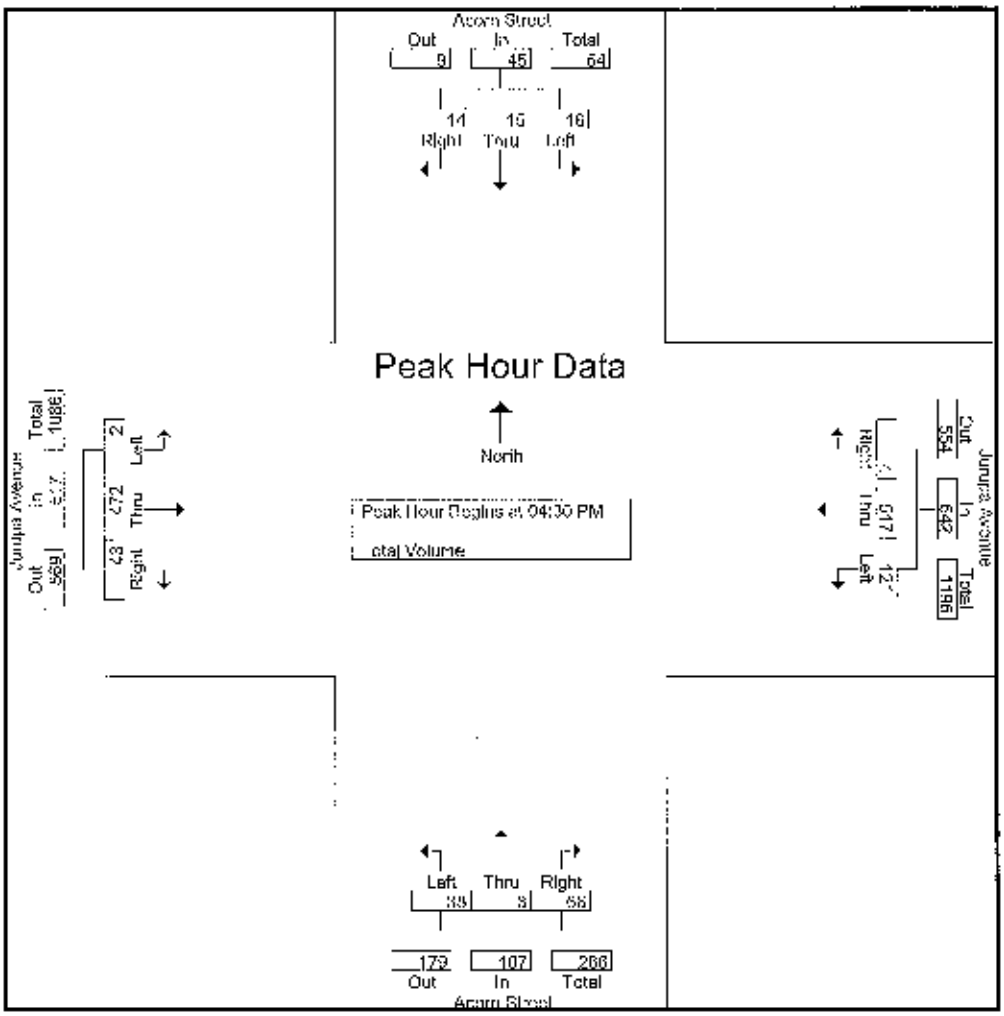
	Acorn Street Southbound				Jurupa Avenue Westbound				Acorn Street Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	2	6	5	13	36	109	4	149	5	0	25	30	0	107	8	115	307
04:15 PM	6	4	1	11	28	112	0	140	5	2	21	28	2	95	8	105	284
04:30 PM	12	10	5	27	29	136	0	165	3	0	17	20	0	115	5	120	332
04:45 PM	4	2	3	9	17	101	1	119	12	1	23	36	0	125	11	136	300
Total	24	22	14	60	110	458	5	573	25	3	86	114	2	442	32	476	1223
05:00 PM	0	3	5	8	37	139	1	177	10	1	13	24	2	120	17	139	348
05:15 PM	0	0	1	1	38	141	2	181	13	1	13	27	0	112	10	122	331
05:30 PM	1	1	1	3	24	106	0	130	11	0	15	26	0	115	6	121	280
05:45 PM	0	0	0	0	17	88	0	105	8	2	15	25	0	119	8	127	257
Total	1	4	7	12	116	474	3	593	42	4	56	102	2	466	41	509	1216
Grand Total	25	26	21	72	226	932	8	1166	67	7	142	216	4	908	73	985	2439
Apprch %	34.7	36.1	29.2		19.4	79.9	0.7		31	3.2	65.7		0.4	92.2	7.4		
Total %	1	1.1	0.9	3	9.3	38.2	0.3	47.8	2.7	0.3	5.8	8.9	0.2	37.2	3	40.4	

	Acorn Street Southbound				Jurupa Avenue Westbound				Acorn Street Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	12	10	5	27	29	136	0	165	3	0	17	20	0	115	5	120	332
04:45 PM	4	2	3	9	17	101	1	119	12	1	23	36	0	125	11	136	300
05:00 PM	0	3	5	8	37	139	1	177	10	1	13	24	2	120	17	139	348
05:15 PM	0	0	1	1	38	141	2	181	13	1	13	27	0	112	10	122	331
Total Volume	16	15	14	45	121	517	4	642	38	3	66	107	2	472	43	517	1311
% App. Total	35.6	33.3	31.1		18.8	80.5	0.6		35.5	2.8	61.7		0.4	91.3	8.3		
PHF	.333	.375	.700	.417	.796	.917	.500	.887	.731	.750	.717	.743	.250	.944	.632	.930	.942

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6718

City of Riverside
N/S: Acorn Street
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIACJUPM
Site Code : 04120213
Start Date : 5/1/2007
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:00 PM				04:45 PM			
+0 mins	2	6	5	13	29	136	1	165	5	0	25	30	0	125	11	136
+15 mins.	6	4	1	11	17	101	1	119	5	2	21	28	2	120	17	139
+30 mins.	12	10	5	27	37	139	1	177	3	0	17	20	0	112	10	122
+45 mins.	4	2	3	9	38	141	2	181	12	1	23	36	0	115	6	121
Total Volume	24	22	14	60	121	517	4	642	25	3	86	114	2	472	44	518
% App. Total	40	36.7	23.3		18.8	80.5	0.6		21.9	2.6	75.4		0.4	91.1	8.5	
PHF	.500	.550	.700	.556	.796	.917	.500	.887	.521	.375	.860	.792	.250	.944	.647	.932

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Van Buren Boulevard
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIVBJUAM
Site Code : 04120223
Start Date : 5/2/2007
Page No : 1

Groups Printed- Total Volume

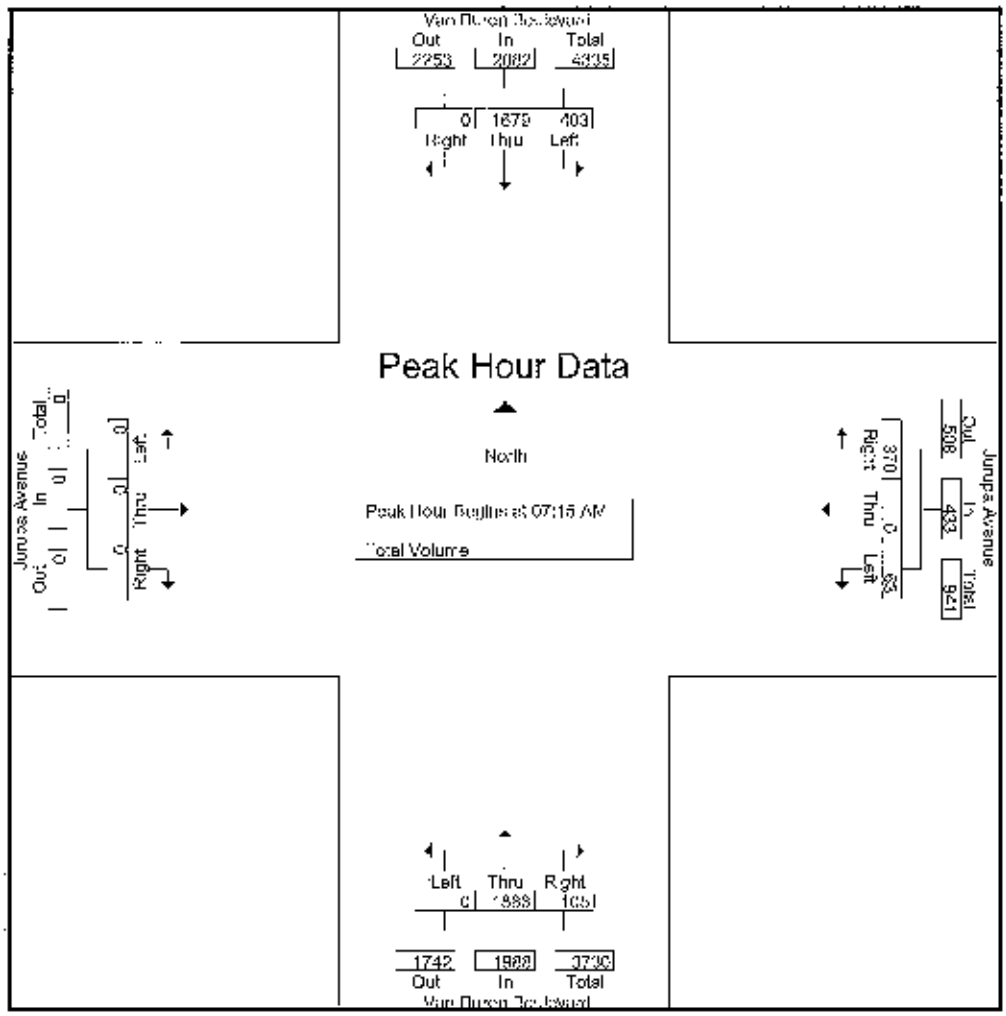
	Van Buren Boulevard Southbound				Jurupa Avenue Westbound				Van Buren Boulevard Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:45 AM	105	313	0	418	7	0	89	96	0	487	36	523	0	0	0	0	1037
Total	105	313	0	418	7	0	89	96	0	487	36	523	0	0	0	0	1037
07:00 AM	60	351	0	411	12	0	106	118	0	451	32	473	0	0	0	0	1002
07:15 AM	85	427	0	512	19	0	97	116	0	477	24	501	0	0	0	0	1129
07:30 AM	108	432	0	540	15	0	85	100	0	505	23	528	0	0	0	0	1168
07:45 AM	115	410	0	525	18	0	97	115	0	496	25	521	0	0	0	0	1161
Total	368	1620	0	1988	64	0	385	449	0	1929	94	2023	0	0	0	0	4460
08:00 AM	95	410	0	505	11	0	91	102	0	405	33	438	0	0	0	0	1045
08:15 AM	75	335	0	410	21	0	87	108	0	428	32	460	0	0	0	0	978
08:30 AM	79	333	0	412	12	0	93	105	1	351	15	367	0	0	0	0	884
Grand Total	722	3011	0	3733	115	0	745	860	1	3600	210	3811	0	0	0	0	8404
Apprch %	19.3	80.7	0		13.4	0	86.6		0	94.5	5.5		0	0	0		
Total %	8.6	35.8	0	44.4	1.4	0	8.9	10.2	0	42.8	2.5	45.3	0	0	0	0	

	Van Buren Boulevard Southbound				Jurupa Avenue Westbound				Van Buren Boulevard Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	85	427	0	512	19	0	97	116	0	477	24	501	0	0	0	0	1129
07:30 AM	108	432	0	540	15	0	85	100	0	505	23	528	0	0	0	0	1168
07:45 AM	115	410	0	525	18	0	97	115	0	496	25	521	0	0	0	0	1161
08:00 AM	95	410	0	505	11	0	91	102	0	405	33	438	0	0	0	0	1045
Total Volume	403	1679	0	2082	63	0	370	433	0	1883	105	1988	0	0	0	0	4503
% App. Total	19.4	80.6	0		14.5	0	85.5		0	94.7	5.3		0	0	0		
PHF	.876	.972	.000	.964	.829	.000	.954	.933	.000	.932	.795	.941	.000	.000	.000	.000	.964

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6718

City of Riverside
N/S: Van Buren Boulevard
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIVBJUAM
Site Code : 04120223
Start Date : 5/2/2007
Page No : 2



Peak Hour Analysis From 06:45 AM to 08:30 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				06:45 AM				06:45 AM			
+0 mins.	85	427	0	512	12	0	106	118	0	487	36	523	0	0	0	0
+15 mins.	108	432	0	540	19	0	97	116	0	451	22	473	0	0	0	0
+30 mins.	115	410	0	525	15	0	85	100	0	477	24	501	0	0	0	0
+45 mins.	95	410	0	505	18	0	97	115	0	505	23	528	0	0	0	0
Total Volume	403	1679	0	2082	64	0	385	449	0	1920	105	2025	0	0	0	0
% App. Total	19.4	80.6	0		14.3	0	85.7		0	94.8	5.2		0	0	0	
PHF	.876	.972	.000	.964	.842	.000	.908	.951	.000	.950	.729	.959	.000	.000	.000	.000

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-8716

City of Riverside
N/S: Van Buren Boulevard
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIVBJUPM
Site Code : 04120223
Start Date : 5/1/2007
Page No : 1

Groups Printed- Total Volume

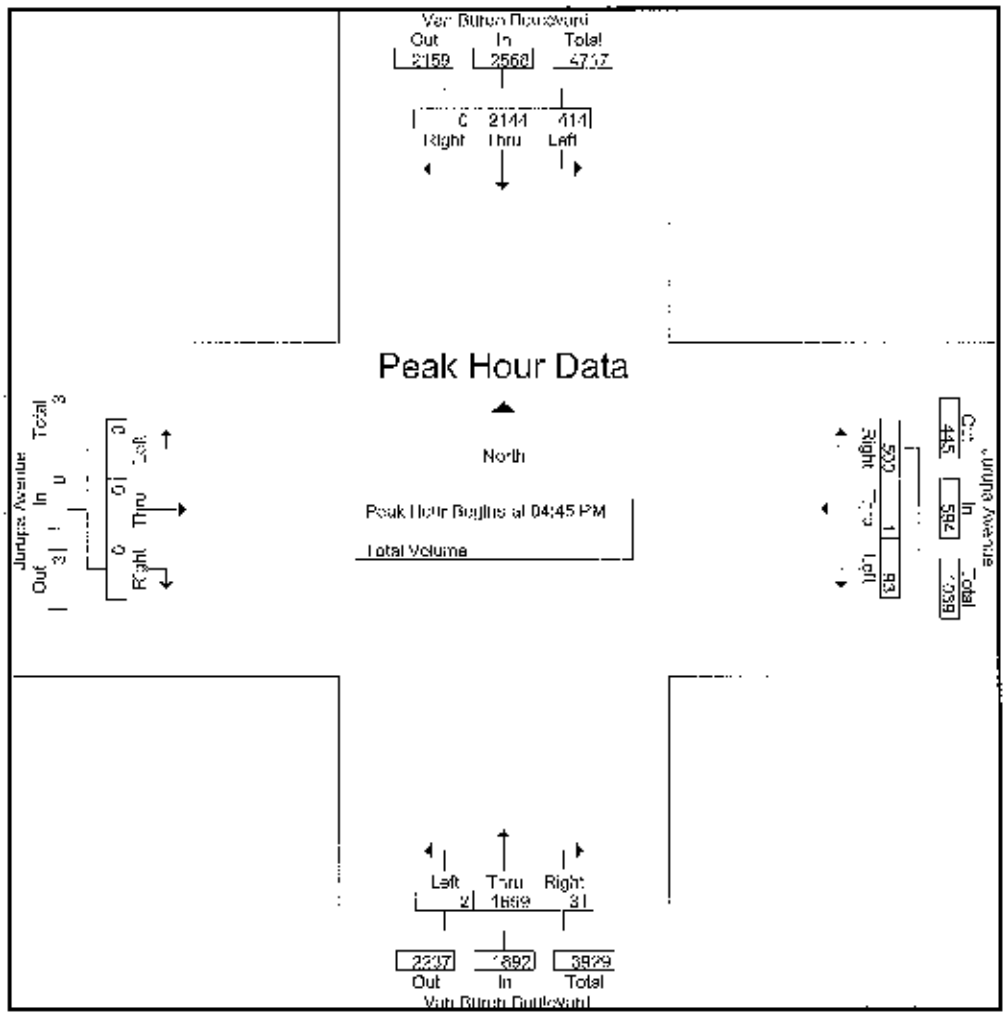
	Van Buren Boulevard Southbound				Jurupa Avenue Westbound				Van Buren Boulevard Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	86	530	0	616	40	0	97	137	3	402	12	417	0	0	0	0	1170
04:15 PM	93	455	0	548	30	0	86	116	8	400	19	427	0	0	0	0	1091
04:30 PM	87	479	1	567	31	0	125	156	1	381	14	396	0	0	0	0	1119
04:45 PM	112	562	0	674	28	0	112	140	1	415	10	426	0	0	0	0	1240
Total	378	2026	1	2405	129	0	420	549	13	1598	55	1666	0	0	0	0	4620
05:00 PM	106	492	0	598	27	1	130	158	0	370	6	376	0	0	0	0	1132
05:15 PM	91	531	0	622	18	0	146	164	0	445	6	451	0	0	0	0	1237
05:30 PM	105	559	0	664	20	0	112	132	1	429	9	439	0	0	0	0	1235
05:45 PM	107	557	0	664	11	6	93	110	0	370	8	378	0	0	0	0	1152
Total	409	2139	0	2548	76	7	481	564	1	1614	29	1644	0	0	0	0	4756
Grand Total	787	4165	1	4953	205	7	901	1113	14	3212	84	3310	0	0	0	0	9376
Approch %	15.9	84.1	0		18.4	0.6	81		0.4	97	2.5		0	0	0		
Total %	8.4	44.4	0	52.8	2.2	0.1	9.6	11.9	0.1	34.2	0.9	35.3	0	0	0	0	

	Van Buren Boulevard Southbound				Jurupa Avenue Westbound				Van Buren Boulevard Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**112**	**562**	0	**674**	**28**	0	112	140	1	415	**10**	426	0	0	0	0	**1240**
05:00 PM	106	492	0	598	27	1	130	158	0	370	6	376	0	0	0	0	1132
05:15 PM	91	531	0	622	18	0	146	**164**	0	445	6	**451**	0	0	0	0	1237
05:30 PM	105	559	0	664	20	0	112	132	1	429	9	439	0	0	0	0	1235
Total Volume	414	2144	0	2558	93	1	500	594	2	1659	31	1692	0	0	0	0	4844
% App. Total	16.2	83.8	0		15.7	0.2	84.2		0.1	98	1.8		0	0	0		
PHF	.924	.954	.000	.949	.830	.250	.856	.905	.500	.932	.775	.938	.000	.000	.000	.000	.977

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Van Buren Boulevard
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIVBJUPM
Site Code : 04120223
Start Date : 5/1/2007
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				04:45 PM				04:30 PM			
-0 mins.	112	562	0	674	31	11	125	156	2	415	10	426	0	0	0	0
+15 mins.	106	492	0	598	28	11	112	140	0	370	6	376	0	0	0	0
+30 mins.	91	531	0	622	27	1	130	158	0	445	6	451	0	0	0	0
+45 mins.	105	559	0	664	18	0	146	164	1	429	9	439	0	0	0	0
Total Volume	414	2144	0	2558	104	1	513	618	2	1659	31	1692	0	0	0	0
% App. Total	16.2	83.8	0		16.8	0.2	83		0.1	98	1.8		0	0	0	
PHF	.924	.954	.000	.949	.839	.250	.878	.942	.500	.932	.775	.938	.000	.000	.000	.000

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Grand Avenue
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIGRJUAM
Site Code : 04117159
Start Date : 4/12/2007
Page No : 1

Groups Printed- Total Volume

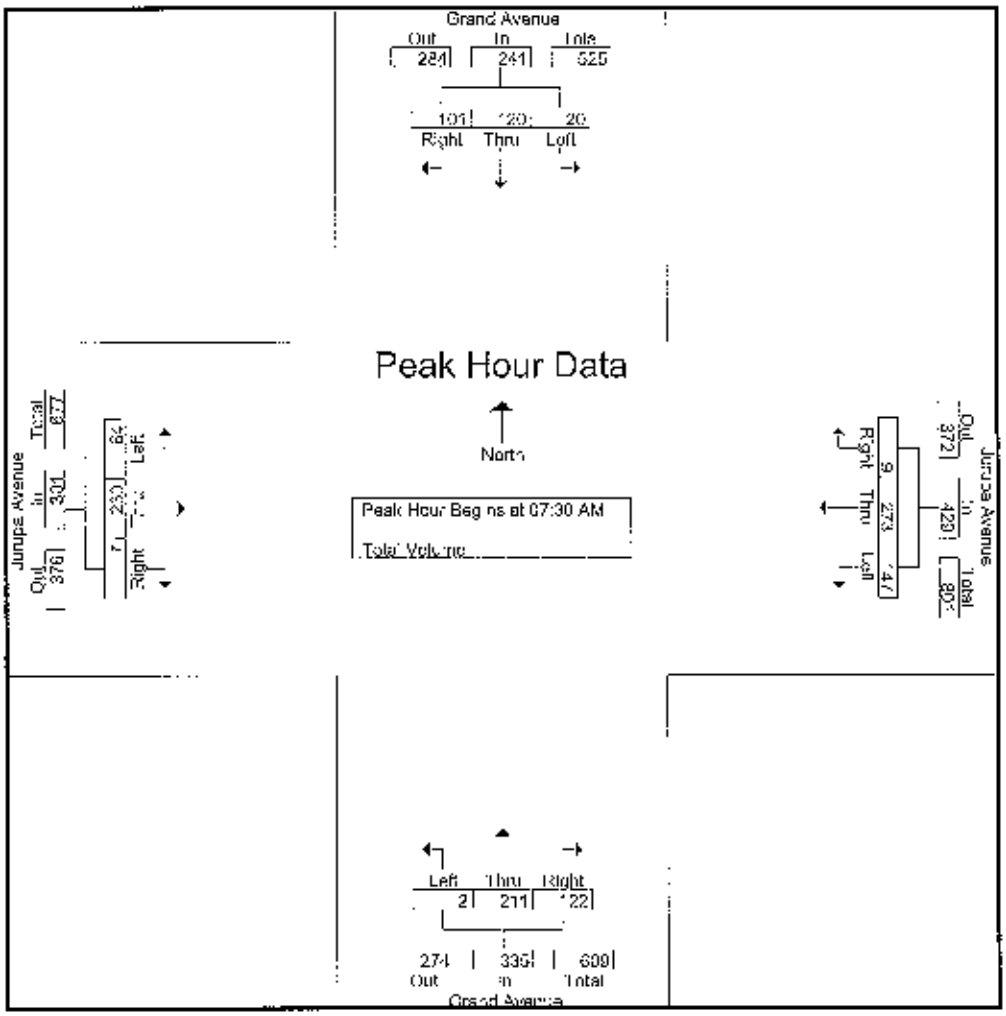
	Grand Avenue Southbound				Jurupa Avenue Westbound				Grand Avenue Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	38	24	65	30	70	1	101	2	39	30	71	10	55	2	67	304
07:15 AM	5	21	17	43	17	68	4	89	2	46	35	83	9	63	1	73	288
07:30 AM	4	27	23	54	24	61	2	87	2	68	33	103	20	66	0	86	330
07:45 AM	3	36	32	71	37	83	1	121	0	70	22	92	12	51	2	65	349
Total	15	122	96	233	108	282	8	398	6	223	120	349	51	235	5	291	1271
08:00 AM	4	25	19	48	42	67	2	111	0	45	40	85	18	61	1	80	324
08:15 AM	9	32	27	68	44	62	4	110	0	28	27	55	14	52	4	70	303
08:30 AM	6	20	18	44	39	43	2	84	1	57	50	108	28	64	1	93	329
08:45 AM	7	33	12	52	30	45	2	77	0	38	31	69	19	66	2	87	285
Total	26	110	76	212	155	217	10	382	1	168	148	317	79	243	8	330	1241
Grand Total	41	232	172	445	263	499	18	780	7	391	268	666	130	478	13	621	2512
Apprch %	9.2	52.1	38.7		33.7	64	2.3		1.1	58.7	40.2		20.9	77	2.1		
Total %	1.6	9.2	6.8	17.7	10.5	19.9	0.7	31.1	0.3	15.6	10.7	26.5	5.2	19	0.5	24.7	

	Grand Avenue Southbound				Jurupa Avenue Westbound				Grand Avenue Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	27	23	54	24	61	2	87	2	68	33	103	20	66	0	86	330
07:45 AM	3	36	32	71	37	83	1	121	0	70	22	92	12	51	2	65	349
08:00 AM	4	25	19	48	42	67	2	111	0	45	40	85	18	61	1	80	324
08:15 AM	9	32	27	68	44	62	4	110	0	28	27	55	14	52	4	70	303
Total Volume	20	120	101	241	147	273	9	429	2	211	122	335	64	230	7	301	1306
% App. Total	8.3	49.8	41.9		34.3	63.6	2.1		0.6	63	36.4		21.3	76.4	2.3		
PHF	.556	.833	.789	.849	.835	.822	.563	.886	.250	.754	.763	.813	.800	.871	.438	.875	.936

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6718

City of Riverside
N/S: Grand Avenue
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIGRJUAM
Site Code : 04117159
Start Date : 4/12/2007
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:15 AM				08:00 AM			
+0 mins.	4	27	23	54	24	61	2	87	2	46	35	83	18	61	1	80
+15 mins.	3	36	32	71	37	83	1	121	2	68	33	103	14	52	4	70
+30 mins.	4	25	19	48	42	67	2	111	0	70	22	92	28	64	1	93
+45 mins.	9	32	27	68	44	62	4	110	0	45	40	85	19	66	2	87
Total Volume	20	120	101	241	147	273	9	429	4	229	130	363	79	243	8	330
% App. Total	8.3	49.8	41.9		34.3	63.6	2.1		1.1	63.1	35.8		23.9	73.6	2.4	
PHF	.556	.833	.789	.849	.835	.822	.563	.886	.500	.818	.813	.881	.705	.920	.500	.887

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Grand Avenue
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIGRJUPM
Site Code : 04117156
Start Date : 4/12/2007
Page No : 1

Groups Printed- Total Volume

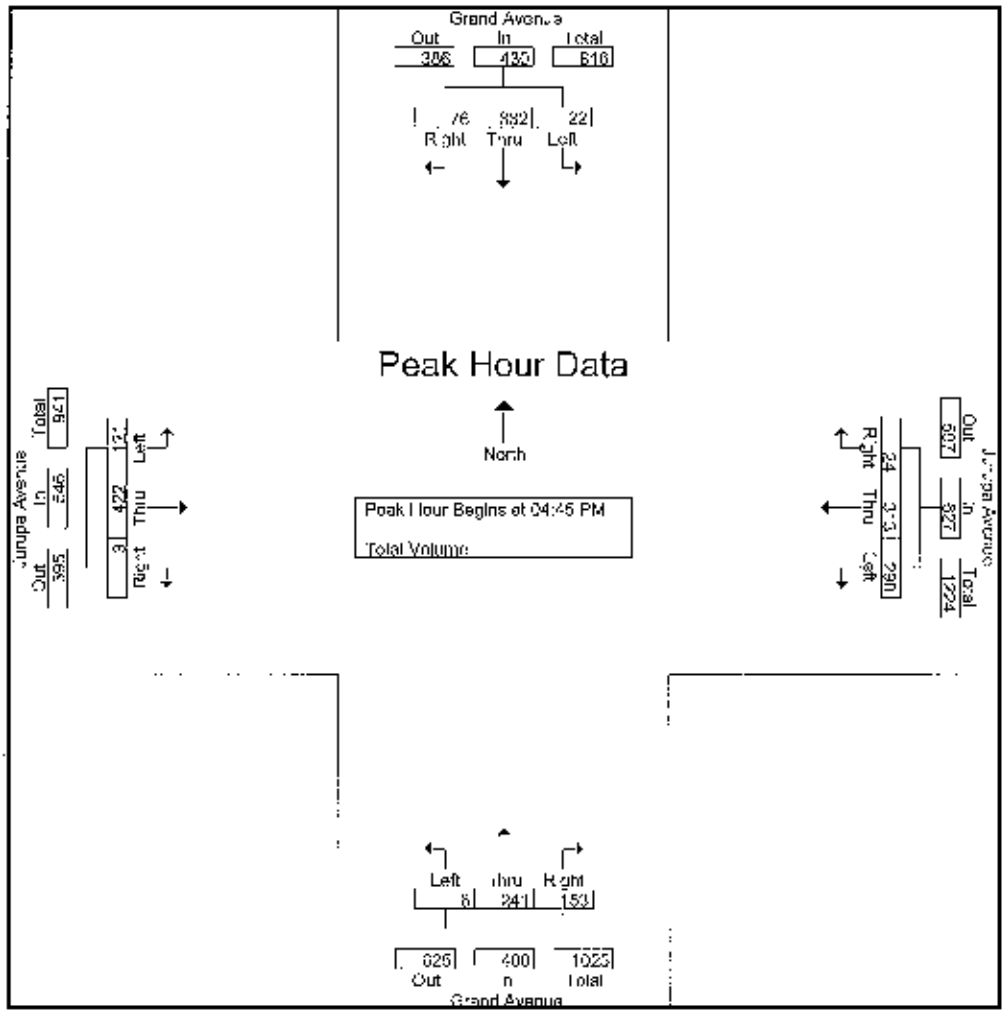
	Grand Avenue Southbound				Jurupa Avenue Westbound				Grand Avenue Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	8	57	11	76	68	79	5	152	0	70	45	115	23	127	3	153	496
04:15 PM	9	69	23	101	60	75	8	143	2	51	40	93	29	91	1	121	458
04:30 PM	4	53	13	70	51	70	1	122	0	52	27	79	37	118	3	158	429
04:45 PM	4	68	14	86	75	88	5	168	3	56	41	100	31	105	1	137	491
Total	25	247	61	333	254	312	19	585	5	229	153	387	120	441	8	569	1874
05:00 PM	7	91	28	126	76	70	9	155	2	67	46	115	30	133	0	163	559
05:15 PM	5	106	16	127	77	82	6	165	1	64	30	95	31	96	0	127	514
05:30 PM	6	67	18	91	62	73	4	139	0	54	36	90	29	88	2	119	439
05:45 PM	5	60	16	81	50	70	6	126	1	51	38	90	19	76	0	95	392
Total	23	324	78	425	265	295	25	585	4	236	150	390	109	393	2	504	1904
Grand Total	48	571	139	758	519	607	44	1170	9	465	303	777	229	834	10	1073	3778
Apprch %	6.3	75.3	18.3		44.4	51.9	3.8		1.2	59.8	39		21.3	77.7	0.9		
Total %	1.3	15.1	3.7	20.1	13.7	16.1	1.2	31	0.2	12.3	8	20.6	6.1	22.1	0.3	28.4	

	Grand Avenue Southbound				Jurupa Avenue Westbound				Grand Avenue Northbound				Jurupa Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	4	68	14	86	75	88	5	168	3	56	41	100	31	105	1	137	491
05:00 PM	7	91	28	126	76	70	9	155	2	67	46	115	30	133	0	163	559
05:15 PM	5	106	16	127	77	82	6	165	1	64	30	95	31	96	0	127	514
05:30 PM	6	67	18	91	62	73	4	139	0	54	36	90	29	88	2	119	439
Total Volume	22	332	76	430	290	313	24	627	6	241	153	400	121	422	3	546	2003
% App. Total	5.1	77.2	17.7		46.3	49.9	3.8		1.5	60.2	38.2		22.2	77.3	0.5		
PHF	.786	.783	.679	.846	.942	.889	.667	.933	.500	.899	.832	.870	.976	.793	.375	.837	.896

Counts Unlimited Inc.
25424 Jaclyn Avenue
Moreno Valley, CA 92557
951-247-6716

City of Riverside
N/S: Grand Avenue
E/W: Jurupa Avenue
Weather: Sunny

File Name : RIGRJUPM
Site Code : 04117156
Start Date : 4/12/2007
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				04:45 PM			
10 mins.	4	63	14	86	75	88	5	**168**	3	56	41	100	37	118	**3**	158
15 mins.	7	91	**28**	126	76	70	**9**	155	2	**67**	**46**	**115**	31	105	1	137
+30 mins.	5	**106**	16	**127**	77	82	6	165	1	64	30	95	30	**133**	0	**163**
+45 mins.	6	67	18	91	62	73	4	139	0	54	36	90	31	96	0	127
Total Volume	22	332	76	430	290	313	24	627	6	241	153	400	129	452	4	585
% App. Total	5.1	77.2	17.7		46.3	49.9	3.8		1.5	60.2	38.2		22.1	77.3	0.7	
PHF	.786	.783	.679	.846	.942	.889	.667	.933	.500	.899	.832	.870	.872	.850	.333	.897

APPENDIX 6.9-C

LEVEL OF SERVICE WORKSHEETS

Riverside Power Plant Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Scenario Report

Scenario:	Existing AM
Command:	Existing AM
Volume:	AM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Existing AM

Riverside Power Plant -- Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Trip Generation Report

Forecast for AM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Power Plant	7.00	Power Plant	9.00	7.00	9	7	16	100.0
	Zone 1 Subtotal					9	7	16	100.0
TOTAL						9	7	16	100.0

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Trip Distribution Report

Percent Of Trips All

Zone	To Gates 2	4	6
1	35.0	35.0	30.0

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Turning Movement Report
AM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	0	1883	105	403	1679	0	0	0	0	63	0	370	4503
Added	0	0	3	3	0	0	0	0	0	2	0	2	10
Total	0	1883	108	406	1679	0	0	0	0	65	0	372	4513
#2 Jurupa / Acorn													
Base	35	8	134	9	8	5	2	426	30	58	396	8	1119
Added	0	0	0	2	0	5	6	0	0	0	0	3	16
Total	35	8	134	11	8	10	8	426	30	58	396	11	1135
#3 Jurupa / Wilderness													
Base	8	18	19	10	2	17	44	419	7	3	405	27	979
Added	0	0	0	0	0	0	0	2	0	0	3	0	5
Total	8	18	19	10	2	17	44	421	7	3	408	27	984
#4 Jurupa /Grand													
Base	2	211	122	20	120	101	64	230	7	147	273	9	1306
Added	0	0	0	0	0	0	0	2	0	0	3	0	5
Total	2	211	122	20	120	101	64	232	7	147	276	9	1311

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Jurupa / Van Buren	E	55.7	1.063	E	56.4	1.066	+ 0.635 D/V
# 2 Jurupa / Acorn	B	12.2	0.405	B	12.2	0.407	+ 0.003 V/C
# 4 Jurupa /Grand	C	31.4	0.318	C	31.4	0.319	-0.013 D/V

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Jurupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.063
Lost Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	55.7
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0	2	0	1	1	0	2	0	0	0	0	1! 0	0	1	2	0	2
Volume Module:												
Base Vol:	0	1883	105	403	1679	0	0	0	0	63	0	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1883	105	403	1679	0	0	0	0	63	0	370
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	1982	0	424	1767	0	0	0	0	66	0	389
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1982	0	424	1767	0	0	0	0	66	0	389
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1982	0	424	1767	0	0	0	0	66	0	389
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1900	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.55	0.00	0.24	0.49	0.00	0.00	0.00	0.00	0.04	0.00	0.14
Crit Moves:		****		****								****
Green/Cycle:	0.00	0.52	0.00	0.22	0.66	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Volume/Cap:	0.00	1.06	0.00	1.06	0.74	0.00	0.00	0.00	0.00	0.28	0.00	1.06
Delay/Veh:	0.0	68.9	0.0	109.4	14.9	0.0	0.0	0.0	0.0	47.9	0.0	116.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	68.9	0.0	109.4	14.9	0.0	0.0	0.0	0.0	47.9	0.0	116.9
LOS by Move:	A	E	A	F	B	A	A	A	A	D	A	F
HCM2kAvgQ:	0	51	0	23	23	0	0	0	0	2	0	14

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Durupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.066
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	56.4
Optimal Cycle:	130	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	1! 0	0	1 0	0 0	2
Volume Module:												
Base Vol:	0	1883	105	403	1679	0	0	0	0	63	0	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1883	105	403	1679	0	0	0	0	63	0	370
Added Vol:	0	0	3	3	0	0	0	0	0	2	0	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1883	108	406	1679	0	0	0	0	65	0	372
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	1982	0	427	1767	0	0	0	0	68	0	392
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1982	0	427	1767	0	0	0	0	68	0	392
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1982	0	427	1767	0	0	0	0	68	0	392
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1900	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.55	0.00	0.24	0.49	0.00	0.00	0.00	0.00	0.04	0.00	0.14
Crit Moves:		****		****								****
Green/Cycle:	0.00	0.62	0.00	0.22	0.66	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Volume/Cap:	0.00	1.07	0.00	1.07	0.74	0.00	0.00	0.00	0.00	0.29	0.00	1.07
Delay/Veh:	0.0	70.0	0.0	110.1	15.0	0.0	0.0	0.0	0.0	48.0	0.0	117.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	70.0	0.0	110.1	15.0	0.0	0.0	0.0	0.0	48.0	0.0	117.7
LOS by Move:	A	E	A	F	B	A	A	A	A	D	A	F
HCM2kAvgQ:	0	57	0	23	23	0	0	0	0	2	0	14

Note: Queue reported is the number of cars per lane.

Riverside Power Plant Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Jurupa / Acorn

Cycle (sec):	100	Critical Vol./Cap.(X):	0.405
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	12.2
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign Include			Stop Sign Include			Stop Sign Include			Stop Sign Include		
Rights:												
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	35	8	134	9	8	5	2	426	30	58	396	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	8	134	9	8	5	2	426	30	58	396	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	8	141	9	8	5	2	448	32	61	417	8
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	8	141	9	8	5	2	448	32	61	417	8
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	8	141	9	8	5	2	448	32	61	417	8
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.81	0.19	1.00	0.53	0.47	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	384	88	554	237	211	509	509	1108	614	511	1108	614
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.25	0.04	0.04	0.01	0.00	0.40	0.05	0.12	0.38	0.01
Crit Moves:			****	****				****			****	
Delay/Veh:	10.6	10.6	10.7	10.4	10.4	9.2	9.5	13.0	8.6	10.4	12.6	8.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.6	10.6	10.7	10.4	10.4	9.2	9.5	13.0	8.6	10.4	12.6	8.4
LOS by Move:	B	B	B	B	B	A	A	B	A	B	B	A
ApproachDel:	10.7			10.1			12.7			12.2		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	10.7			10.1			12.7			12.2		
LOS by Appr:	B			B			B			B		
AllWayAvgQ:	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.6	0.0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

****

Intersection #2 Jurupa / Acorn

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.407
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	12.2
Optimal Cycle:	0	Level Of Service:	B

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	35	8	134	9	8	5	2	426	30	58	396	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	8	134	9	8	5	2	426	30	58	396	8
Added Vol:	0	0	0	2	0	5	6	0	0	0	0	3
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	35	8	134	11	8	10	8	426	30	58	396	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	8	141	12	8	11	8	448	32	61	417	12
Reduced Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	8	141	12	8	11	8	448	32	61	417	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	8	141	12	8	11	8	448	32	61	417	12
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.81	0.19	1.00	0.58	0.42	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	381	87	549	258	188	507	506	1101	610	508	1101	609
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.26	0.04	0.04	0.02	0.02	0.41	0.05	0.12	0.38	0.02
Crit Moves:			****		****			****			****	
Delay/Veh:	10.7	10.7	10.8	10.5	10.5	9.3	9.7	13.2	8.6	10.4	12.7	8.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.7	10.7	10.8	10.5	10.5	9.3	9.7	13.2	8.6	10.4	12.7	8.5
LOS by Move:	B	B	B	B	B	A	A	B	A	B	B	A
ApproachDel:		10.8			10.1			12.8			12.3	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		10.8			10.1			12.8			12.3	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.6	0.0

****

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 Garnet /Grand

Cycle (sec):	100	Critical Vol./Cap.(X):	0.318
Lost Time (sec):	16 (Y=R=4.0 sec)	Average Delay (sec/veh):	31.4
Optimal Cycle:	44	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	2	211	122	20	120	101	64	230	7	147	273	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	211	122	20	120	101	64	230	7	147	273	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	222	128	21	126	106	67	242	7	155	287	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	222	128	21	126	106	67	242	7	155	287	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	222	128	21	126	106	67	242	7	155	287	9
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.08	0.01	0.03	0.07	0.04	0.07	0.00	0.09	0.08	0.01
Crit Moves:			****		****			****		****		
Green/Cycle:	0.25	0.25	0.25	0.21	0.21	0.21	0.22	0.21	0.21	0.27	0.26	0.26
Volume/Cap:	0.00	0.25	0.32	0.06	0.17	0.32	0.17	0.32	0.02	0.32	0.31	0.02
Delay/Veh:	28.2	30.1	31.0	31.9	32.7	34.2	31.4	33.6	31.3	29.6	30.3	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.2	30.1	31.0	31.9	32.7	34.2	31.4	33.6	31.3	29.6	30.3	27.9
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	3	3	1	2	3	2	3	0	4	4	0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Jurupa /Grand

Cycle (sec):	100	Critical Vol./Cap.(X):	0.319
Loss Time (sec):	18 (Y+R=4.0 sec)	Average Delay (sec/veh):	31.4
Optimal Cycle:	44	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	2	211	122	20	120	101	64	230	7	147	273	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	211	122	20	120	101	64	230	7	147	273	9
Added Vol:	0	0	0	0	0	0	0	2	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	211	122	20	120	101	64	232	7	147	276	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	222	128	21	126	106	67	244	7	155	291	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	222	128	21	126	106	67	244	7	155	291	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	222	128	21	126	106	67	244	7	155	291	9
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.08	0.01	0.03	0.07	0.04	0.07	0.00	0.09	0.08	0.01
Crit Moves:			****		****			****		****		
Green/Cycle:	0.25	0.25	0.25	0.21	0.21	0.21	0.22	0.21	0.21	0.27	0.26	0.26
Volume/Cap:	0.00	0.25	0.32	0.06	0.17	0.32	0.17	0.32	0.02	0.32	0.31	0.02
Delay/Veh:	28.2	30.2	31.1	31.9	32.7	34.3	31.5	33.5	31.2	29.6	30.2	27.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.2	30.2	31.1	31.9	32.7	34.3	31.5	33.5	31.2	29.6	30.2	27.8
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	3	3	1	2	3	2	3	0	4	4	0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Scenario Report

Scenario:	Existing PM
Command:	Existing PM
Volume:	PM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Existing PM

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Power Plant	1.00	Power Plant	7.00	97.00	7	97	104	100.0
	Zone 1 Subtotal					7	97	104	100.0
TOTAL						7	97	104	100.0

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Trip Distribution Report

Percent Of Trips All

Zone	To Gates 2	4	6
1	35.0	35.0	30.0

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Turning Movement Report
PM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	2	1659	31	414	2144	0	0	0	0	94	0	500	4844
Added	0	0	2	2	0	0	0	0	0	34	0	34	72
Total	2	1659	33	416	2144	0	0	0	0	128	0	534	4916
#2 Jurupa / Acorn													
Base	38	3	66	16	15	14	2	472	43	121	517	4	1311
Added	0	0	0	29	0	68	5	0	0	0	0	2	104
Total	38	3	66	45	15	82	7	472	43	121	517	6	1415
#3 Jurupa / Milliken													
Base	13	7	13	63	33	75	21	477	21	9	451	13	1196
Added	0	0	0	0	0	0	0	29	0	0	2	0	31
Total	13	7	13	63	33	75	21	506	21	9	453	13	1227
#4 Jurupa /Grand													
Base	6	241	153	22	332	76	121	422	3	290	313	24	2003
Added	0	0	0	0	0	0	0	29	0	0	2	0	31
Total	6	241	153	22	332	76	121	451	3	290	315	24	2034

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/C	Future LOS	Future Del/ Veh	Future V/C	Change in
# 1 Jurupa / Van Buren	E	61.4	1.050	E	66.4	1.066	+ 4.939 D/V
# 2 Jurupa / Acorn	B	13.7	0.490	B	14.3	0.526	- 0.036 V/C
# 4 Jurupa /Grand	D	35.3	0.582	D	35.4	0.592	- 0.063 D/V

Riverside Power Plant -- Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Jurupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.050
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	61.4
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	1! 0	0	1 0	0 0	2
Volume Module:												
Base Vol:	2	1659	31	414	2144	0	0	0	0	94	0	500
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	1659	31	414	2144	0	0	0	0	94	0	500
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	1746	0	436	2257	0	0	0	0	99	0	526
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	1746	0	436	2257	0	0	0	0	99	0	526
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	1746	0	436	2257	0	0	0	0	99	0	526
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.95
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1805	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.48	0.00	0.24	0.63	0.00	0.00	0.00	0.00	0.05	0.00	0.19
Crit Moves:		****		****								****
Green/Cycle:	0.06	0.46	0.00	0.23	0.63	0.00	0.00	0.00	0.00	0.18	0.00	0.18
Volume/Cap:	0.02	1.05	0.00	1.05	0.99	0.00	0.00	0.00	0.00	0.31	0.00	1.05
Delay/Veh:	53.3	69.0	0.0	104.2	38.2	0.0	0.0	0.0	0.0	43.6	0.0	103.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.3	69.0	0.0	104.2	38.2	0.0	0.0	0.0	0.0	43.6	0.0	103.5
LOS by Move:	D	E	A	F	D	A	A	A	A	D	A	F
HCM2kAvgQ:	0	44	0	23	50	0	0	0	0	3	0	17

Note: Queue reported is the number of cars per lane.

Riverside Power Plant -- Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #1 Jurupa / Van Buren

****

Cycle (sec):	120	Critical Vol./Cap.(X):	1.096
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	66.4
Optimal Cycle:	180	Level Of Service:	E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	1! 0	0	1 0	0 0	2
Volume Module:												
Base Vol:	2	1659	31	414	2144	0	0	0	0	94	0	500
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	1659	31	414	2144	0	0	0	0	94	0	500
Added Vol:	0	0	2	2	0	0	0	0	0	34	0	34
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	1659	33	416	2144	0	0	0	0	128	0	534
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	1746	0	438	2257	0	0	0	0	135	0	562
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	1746	0	438	2257	0	0	0	0	135	0	562
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	1746	0	438	2257	0	0	0	0	135	0	562
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.85	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1805	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.48	0.00	0.24	0.63	0.00	0.00	0.00	0.00	0.07	0.00	0.20
Crit Moves:		****		****								****
Green/Cycle:	0.05	0.45	0.00	0.23	0.62	0.00	0.00	0.00	0.00	0.19	0.00	0.19
Volume/Cap:	0.02	1.07	0.00	1.07	1.00	0.00	0.00	0.00	0.00	0.40	0.00	1.07
Delay/Veh:	53.3	75.1	0.0	109.5	42.5	0.0	0.0	0.0	0.0	43.8	0.0	106.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.3	75.1	0.0	109.5	42.5	0.0	0.0	0.0	0.0	43.8	0.0	106.9
LOS by Move:	D	E	A	F	D	A	A	A	A	D	A	F
HCM2kAvgQ:	0	46	0	24	52	0	0	0	0	5	0	28

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 Jurupa / Acorn

Cycle (sec):	100	Critical Vol./Cap.(X):	0.490
Loss Time (sec):	8 (Y+R=4.0 sec)	Average Delay (sec/veh):	13.7
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	38	3	66	16	15	14	2	472	43	121	517	4
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	3	66	16	15	14	2	472	43	121	517	4
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	40	3	69	17	16	15	2	497	45	127	544	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	3	69	17	16	15	2	497	45	127	544	4
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	40	3	69	17	16	15	2	497	45	127	544	4
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.93	0.07	1.00	0.52	0.48	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	402	32	595	223	209	488	491	1088	589	512	1110	613
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.14	0.08	0.08	0.03	0.00	0.47	0.08	0.25	0.49	0.01
Crit Moves:			****		****			****			****	
Delay/Veh:	11.3	11.3	10.3	11.0	11.0	9.6	9.8	14.6	9.0	11.7	14.8	8.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.3	11.3	10.3	11.0	11.0	9.6	9.8	14.6	9.0	11.7	14.8	8.4
LOS by Move:	B	B	B	B	B	A	A	B	A	B	B	A
ApproachDel:		10.6			10.6			14.1			14.2	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		10.6			10.6			14.1			14.2	
LOS by Appr:		B			B			B			B	
AllWayAvgQ:	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.8	0.1	0.3	0.9	0.0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Jurupa / Acorn

Cycle (sec):	100	Critical Vol./Cap.(X):	0.526
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.9
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign Include			Stop Sign Include			Stop Sign Include			Stop Sign Include		
Rights:												
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	38	3	66	16	15	14	2	472	43	121	517	4
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	3	66	16	15	14	2	472	43	121	517	4
Added Vol:	0	0	0	29	0	68	5	0	0	0	0	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	38	3	66	45	15	82	7	472	43	121	517	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	40	3	69	47	16	86	7	497	45	127	544	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	3	69	47	16	86	7	497	45	127	544	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	40	3	69	47	16	86	7	497	45	127	544	6
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.93	0.07	1.00	0.75	0.25	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	382	30	476	318	106	485	459	998	543	478	1034	564
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.15	0.15	0.15	0.18	0.02	0.50	0.08	0.27	0.53	0.01
Crit Moves:			****			****		****			****	
Delay/Veh:	11.7	11.7	10.8	12.0	12.0	11.0	10.4	16.2	9.6	12.6	16.6	8.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.7	11.7	10.8	12.0	12.0	11.0	10.4	16.2	9.6	12.6	16.6	8.9
LOS by Move:	B	B	B	B	B	B	B	C	A	B	C	A
ApproachDel:	11.1			11.4			15.6			15.7		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	11.1			11.4			15.6			15.7		
LOS by Appr:	B			B			C			C		
AllWayAvgQ:	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.9	0.1	0.3	1.0	0.0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 Jurupa /Grand

Cycle (sec):	100	Critical Vol./Cap.(X):	0.582
Lost Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.3
Optimal Cycle:	56	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	6	241	153	22	332	76	121	422	3	290	313	24
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	241	153	22	332	76	121	422	3	290	313	24
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	6	254	161	23	349	80	127	444	3	305	329	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	254	161	23	349	80	127	444	3	305	329	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	254	161	23	349	80	127	444	3	305	329	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.07	0.10	0.01	0.10	0.05	0.07	0.12	0.00	0.17	0.09	0.02
Crit Moves:			****		****			****		****		
Green/Cycle:	0.17	0.17	0.17	0.17	0.17	0.17	0.22	0.21	0.21	0.29	0.28	0.28
Volume/Cap:	0.02	0.41	0.58	0.08	0.58	0.30	0.32	0.58	0.01	0.58	0.32	0.06
Delay/Veh:	34.5	37.4	41.3	35.3	39.9	37.2	33.3	36.6	31.2	31.9	28.5	26.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	37.4	41.3	35.3	39.9	37.2	33.3	36.6	31.2	31.9	28.5	26.1
LOS by Move:	C	D	D	D	D	D	C	D	C	C	C	C
HCM2kAvgQ:	0	4	8	1	6	2	3	7	0	9	4	1

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #2 Jurupa /Grand

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.592
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.4
Optimal Cycle:	56	Level Of Service:	D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	6	241	153	22	332	76	121	422	3	290	313	24
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	241	153	22	332	76	121	422	3	290	313	24
Added Vol:	0	0	0	0	0	0	0	29	0	0	2	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	241	153	22	332	76	121	451	3	290	315	24
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	6	254	161	23	349	80	127	475	3	305	332	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	254	161	23	349	80	127	475	3	305	332	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	254	161	23	349	80	127	475	3	305	332	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.07	0.10	0.01	0.10	0.05	0.07	0.13	0.00	0.17	0.09	0.02
Crit Moves:			****		****			****		****		
Green/Cycle:	0.17	0.17	0.17	0.16	0.16	0.16	0.22	0.22	0.22	0.29	0.29	0.29
Volume/Cap:	0.02	0.42	0.59	0.08	0.59	0.30	0.32	0.59	0.01	0.59	0.32	0.05
Delay/Veh:	34.7	37.6	41.9	35.5	40.3	37.5	33.1	36.0	30.3	32.5	28.1	25.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.7	37.6	41.9	35.5	40.3	37.5	33.1	36.0	30.3	32.5	28.1	25.9
LOS by Move:	C	D	D	D	D	D	C	D	C	C	C	C
HCM2kAvgQ:	0	4	5	1	5	2	3	8	0	9	4	1

****

Note: Queue reported is the number of cars per lane.

****

Intersection Level-of-Service Worksheets Future Baseline Conditions (Year 2009)

Riverside Power Plant Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Scenario Report

Scenario:	Future AM
Command:	Future AM
Volume:	AM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Future AM

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Turning Movement Report
AM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	0	1958	109	419	1746	0	0	0	0	66	0	385	4683
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1958	109	419	1746	0	0	0	0	66	0	385	4683
#2 Jurupa / Acorn													
Base	36	8	139	9	8	5	2	443	31	60	412	8	1164
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	36	8	139	9	8	5	2	443	31	60	412	8	1164
#3 Jurupa / Wilderness													
Base	8	13	20	10	2	18	46	436	7	3	421	28	1018
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	13	20	10	2	18	46	436	7	3	421	28	1018
#4 Jurupa /Grand													
Base	2	219	127	21	125	105	67	239	7	153	284	9	1358
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	219	127	21	125	105	67	239	7	153	284	9	1358

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/C	Future LOS	Future Del/ veh	Future V/C	Change in
# 1 Jurupa / Van Buren	E	65.3	1.105	E	65.3	1.105	+ 0.000 D/V
# 2 Jurupa / Acorn	B	12.6	0.426	B	12.6	0.426	+ 0.000 V/C
# 4 Jurupa /Grand	C	31.5	0.331	C	31.5	0.331	+ 0.000 D/V

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #1 Jurupa / Van Buren

****

Cycle (sec): 120 Critical Vol./Cap.(X): 1.105
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 65.3
Optimal Cycle: 180 Level Of Service: E

****

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Split Phase					Split Phase				
Rights:	Ignore					Include					Include					Include				
Min. Green:	7	7	7			7	7	7			7	7	7			7	7	7		
Lanes:	1	0	2	0	1	1	0	2	0	0	0	0	1	0	0	1	0	0	0	2
Volume Module:																				
Base Vol:	0	1883	105		403	1879		0			0		0		0	63		0		370
Growth Adj:	1.04	1.04	1.04		1.04	1.04		1.04			1.04		1.04		1.04	1.04		1.04		1.04
Initial Bse:	0	1958	109		419	1746		0			0		0		0	66		0		385
Added Vol:	0	0	0		0	0		0			0		0		0	0		0		0
PasserByVol:	0	0	0		0	0		0			0		0		0	0		0		0
Initial Fut:	0	1958	109		419	1746		0			0		0		0	66		0		385
User Adj:	1.00	1.00	0.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
PHF Adj:	0.95	0.95	0.00		0.95	0.95		0.95			0.95		0.95		0.95	0.95		0.95		0.95
PHF Volume:	0	2061	0		441	1838		0			0		0		0	69		0		405
Reduce Vol:	0	0	0		0	0		0			0		0		0	0		0		0
Reduced Vol:	0	2061	0		441	1838		0			0		0		0	69		0		405
PCE Adj:	1.00	1.00	0.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
MLF Adj:	1.00	1.00	0.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
FinalVolume:	0	2061	0		441	1838		0			0		0		0	69		0		405
Saturation Flow Module:																				
Sat/Lane:	1900	1900	1900		1900	1900		1900			1900		1900		1900	1900		1900		1900
Adjustment:	1.00	0.95	1.00		0.95	0.95		1.00			1.00		1.00		1.00	0.95		1.00		0.75
Lanes:	1.00	2.00	1.00		1.00	2.00		0.00			1.00		0.00		1.00	0.00		0.00		2.00
Final Sat.:	1900	3610	1900		1805	3610		0			0		1900		0	1805		0		2842
Capacity Analysis Module:																				
Vol/Sat:	0.00	0.57	0.00		0.24	0.51		0.00			0.00		0.00		0.00	0.04		0.00		0.14
Crit Moves:		****			****															****
Green/Cycle:	0.00	0.82	0.00		0.22	0.66		0.00			0.00		0.00		0.00	0.13		0.00		0.13
Volume/Cap:	0.00	1.11	0.00		1.11	0.77		0.00			0.00		0.00		0.00	0.30		0.00		1.11
Delay/Veh:	0.0	85.0	0.0		123.4	15.5		0.0			0.0		0.0		0.0	48.1		0.0		130.8
User DelAdj:	1.00	1.00	1.00		1.00	1.00		1.00			1.00		1.00		1.00	1.00		1.00		1.00
AdjDel/Veh:	0.0	85.0	0.0		123.4	15.5		0.0			0.0		0.0		0.0	48.1		0.0		130.8
LOS by Move:	A	F	A		F	B		A			A		A		A	D		A		F
HCM2kAvgQ:	0	56	0		25	25		0			0		0		0	2		0		15

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #2 Jurupa / Acorn

Cycle (sec):	100	Critical Vol./Cap.(X):	0.426
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	12.6
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign Include			Stop Sign Include			Stop Sign Include			Stop Sign Include		
Rights:												
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0	1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0 1
Volume Module:												
Base Vol:	35	8	134	9	8	5	2	426	30	58	396	8
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	36	8	139	9	8	5	2	443	31	60	412	8
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	36	8	139	9	8	5	2	443	31	60	412	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	38	9	147	10	9	5	2	466	33	63	434	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	9	147	10	9	5	2	466	33	63	434	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	9	147	10	9	5	2	466	33	63	434	9
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.81	0.19	1.00	0.53	0.47	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	379	87	547	234	208	501	502	1094	605	506	1095	605
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.27	0.04	0.04	0.01	0.00	0.43	0.05	0.13	0.40	0.01
Crit Moves:			****	****				****			****	
Delay/Veh:	10.8	10.8	11.0	10.5	10.5	9.3	9.6	13.6	8.7	10.5	13.0	8.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	10.8	10.8	11.0	10.5	10.5	9.3	9.6	13.6	8.7	10.5	13.0	8.5
LOS by Move:	B	B	B	B	B	A	A	B	A	B	B	A
ApproachDel:	10.9			10.2			13.2			12.6		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	10.9			10.2			13.2			12.6		
LOS by Appr:	B			B			B			B		
AllWayAvgQ:	0.1	0.1	0.3	0.0	0.0	0.0	0.0	0.7	0.1	0.7	0.6	0.0

Note: Queue reported is the number of cars per lane.

Trafix 7.9.0415 (c) 2007 Dowling Assoc. Licensed to KATZ OKITSU, MONTEREY PK

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Jurupa /Grand

Cycle (sec):	100	Critical Vol./Cap.(X):	0.331
Lost Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	31.5
Optimal Cycle:	44	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - U - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0 2	0 1		1 0 2	0 1		1 0 2	0 1		1 0 2	0 1	
Volume Module:												
Base Vol:	2	211	122	20	120	101	64	230	7	147	273	9
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	2	219	127	21	125	105	67	239	7	153	284	9
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	219	127	21	125	105	67	239	7	153	284	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	231	134	22	131	111	70	252	8	161	299	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	231	134	22	131	111	70	252	8	161	299	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	231	134	22	131	111	70	252	8	161	299	10
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.08	0.01	0.04	0.07	0.04	0.07	0.00	0.09	0.08	0.01
Crit Moves:			****		****			****		****		
Green/Cycle:	0.25	0.25	0.25	0.21	0.21	0.21	0.22	0.21	0.21	0.27	0.26	0.26
Volume/Cap:	0.00	0.26	0.33	0.06	0.18	0.33	0.18	0.33	0.02	0.33	0.32	0.02
Delay/Veh:	28.2	30.2	31.2	31.3	32.8	34.3	31.9	33.7	31.3	29.7	30.0	27.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.2	30.2	31.2	31.9	32.8	34.3	31.9	33.7	31.3	29.7	30.0	27.6
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	3	4	1	2	3	2	4	0	4	4	0

Note: Queue reported is the number of cars per lane.

Traffix 7.9.0415 (c) 2007 Dowling Assoc. Licensed to KATZ OKITSU, MONTEREY PK

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Scenario Report

Scenario:	Future PM
Command:	Future PM
Volume:	PM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Future PM

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Turning Movement Report
PM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	2	1725	32	431	2230	0	0	0	0	98	0	520	5038
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	1725	32	431	2230	0	0	0	0	98	0	520	5038
#2 Jurupa / Acorn													
Base	40	3	69	17	16	25	2	491	45	126	538	4	1363
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	40	3	69	17	16	25	2	491	45	126	538	4	1363
#3 Jurupa / Wildermese													
Base	14	7	14	66	34	78	22	496	22	9	469	14	1244
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	14	7	14	66	34	78	22	496	22	9	469	14	1244
#4 Jurupa /Grand													
Base	6	251	159	23	345	79	126	439	3	302	326	25	2083
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	251	159	23	345	79	126	439	3	302	326	25	2083

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Jurupa / van Buren	E	73.9	1.092	E	73.9	1.092	+ 0.000 D/V
# 2 Jurupa / Acorn	B	14.4	0.517	B	14.4	0.517	+ 0.000 V/C
# 4 Jurupa /Grand	D	35.7	0.605	D	35.7	0.605	+ 0.000 D/V

Riverside Power Plant Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Jurupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.092
Lost Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	73.9
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	1 0	0	1 0	0 0	2
Volume Module:												
Base Vol:	2	1659	31	414	2144	0	0	0	0	94	0	500
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	2	1725	32	431	2230	0	0	0	0	98	0	520
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	1816	0	453	2347	0	0	0	0	103	0	547
Reduce Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	1816	0	453	2347	0	0	0	0	103	0	547
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	1816	0	453	2347	0	0	0	0	103	0	547
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1805	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.50	0.00	0.25	0.65	0.00	0.00	0.00	0.00	0.06	0.00	0.19
Crit Moves:		****		****								****
Green/Cycle:	0.06	0.46	0.00	0.23	0.63	0.00	0.00	0.00	0.00	0.18	0.00	0.28
Volume/Cap:	0.02	1.09	0.00	1.09	1.03	0.00	0.00	0.00	0.00	0.32	0.00	1.09
Delay/Veh:	53.3	84.2	0.0	117.6	48.7	0.0	0.0	0.0	0.0	43.8	0.0	117.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.3	84.2	0.0	117.6	48.7	0.0	0.0	0.0	0.0	43.8	0.0	117.1
LOS by Move:	D	F	A	F	D	A	A	A	A	D	A	F
HCM2kAvgQ:	0	49	0	25	56	0	0	0	0	3	0	18

Note: Queue reported is the number of cars per lane.

Riverside Power Plant Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Jurupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.082
Loss Time (sec):	16 (Y-R=4.0 sec)	Average Delay (sec/veh):	73.9
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	3 0	0	0 0	0 0	2
Volume Module:												
Base Vol:	2	1858	31	414	2144	0	0	0	0	94	0	500
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	2	1725	32	431	2230	0	0	0	0	98	0	520
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	1725	32	431	2230	0	0	0	0	98	0	520
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	1816	0	453	2347	0	0	0	0	103	0	547
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	1816	0	453	2347	0	0	0	0	103	0	547
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	1816	0	453	2347	0	0	0	0	103	0	547
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1805	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.50	0.00	0.25	0.65	0.00	0.00	0.00	0.00	0.06	0.00	0.19
Crit Moves:		****		****								****
Green/Cycle:	0.06	0.46	0.00	0.23	0.63	0.00	0.00	0.00	0.00	0.18	0.00	0.18
Volume/Cap:	0.02	1.09	0.00	1.09	1.03	0.00	0.00	0.00	0.00	0.32	0.00	1.09
Delay/Veh:	53.3	84.2	0.0	117.6	48.7	0.0	0.0	0.0	0.0	43.8	0.0	117.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	53.3	84.2	0.0	117.6	48.7	0.0	0.0	0.0	0.0	43.8	0.0	117.1
LOS by Move:	D	F	A	F	D	A	A	A	A	D	A	F
HCM2kAvgQ:	0	49	0	25	56	0	0	0	0	3	0	18

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

****

Intersection #2 Jurupa / Acorn

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.517
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.4
Optimal Cycle:	0	Level Of Service:	B

****

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Min. Green:	7		7		7		7		7		7		7		7		7		7		7		7	
Lanes:	0	1	0	0	1		0	1	0	0	1		1	0	2	0	1		1	0	2	0	1	
Volume Module:																								
Base Vol:	38		3		66		16		15		14		2		472		43		121		517		4	
Growth Adj:	1.04	1.04		1.04			1.04	1.04		1.04			1.04	1.04		1.04			1.04	1.04		1.04		
Initial Bse:	40		3		69		17		16		15		2		491		45		126		538		4	
User Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
PHF Adj:	0.95	0.95		0.95			0.95	0.95		0.95			0.95	0.95		0.95			0.95	0.95		0.95		
PHF Volume:	42		3		72		18		16		15		2		517		47		132		566		4	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Reduced Vol:	42		3		72		18		16		15		2		517		47		132		566		4	
PCE Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
MLF Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
FinalVolume:	42		3		72		18		16		15		2		517		47		132		566		4	
Saturation Flow Module:																								
Adjustment:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
Lanes:	0.93	0.07		1.00			0.52	0.48		1.00			1.00	2.00		1.00			1.00	2.00		1.00		
Final Sat.:	397		31		498		220		206		480		485		1055		579		505		1095		603	
Capacity Analysis Module:																								
Vol/Sat:	0.10	0.10		0.15			0.08	0.08		0.03			0.00	0.49		0.08			0.26	0.52		0.01		
Crit Moves:				****			****							****						****				
Delay/Veh:	11.4	11.4		10.4			11.1	11.1		9.8			9.9	15.3		9.2			12.0	15.6		8.5		
Delay Adj:	1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00			1.00	1.00		1.00		
AdjDel/Veh:	11.4	11.4		10.4			11.1	11.1		9.8			9.9	15.3		9.2			12.0	15.6		8.5		
LOS by Move:	B	B		B			B	B		A			A	C		A			B	C		A		
ApproachDel:	10.8						10.7						14.8						14.9					
Delay Adj:	1.00						1.00						1.00						1.00					
ApprAdjDel:	10.8						10.7						14.8						14.9					
LOS by Appr:	B						B						B						B					
AllWayAvgQ:	0.1	0.1		0.1			0.1	0.1		0.0			0.0	0.9		0.1			0.3	1.0		0.0		

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

****

Intersection #2 Garupa / Acorn

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.517
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.4
Optimal Cycle:	0	Level Of Service:	B

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	38	3	66	16	15	14	2	472	43	121	517	4
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	40	3	69	17	16	15	2	491	45	126	538	4
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	3	69	17	16	15	2	491	45	126	538	4
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	42	3	72	18	16	15	2	517	47	132	566	4
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	3	72	18	16	15	2	517	47	132	566	4
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	3	72	18	16	15	2	517	47	132	566	4
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.93	0.07	1.00	0.39	0.48	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	397	31	498	220	206	483	485	1055	579	505	1035	503
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.15	0.08	0.08	0.03	0.00	0.49	0.08	0.26	0.52	0.01
Crit Moves:			****	****				****			****	
Delay/Veh:	11.4	11.4	10.4	11.1	11.1	9.8	9.9	15.3	9.2	12.0	15.6	8.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.4	11.4	10.4	11.1	11.1	9.8	9.9	15.3	9.2	12.0	15.6	8.5
LOS by Move:	B	B	B	B	B	A	A	C	A	B	C	A
ApproachDel:	10.8			10.7			14.8			14.9		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	10.8			10.7			14.8			14.9		
LOS by Appr:	B			B			B			B		
AllWayAvgQ:	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.9	0.1	0.3	1.0	0.0

****

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

****

Intersection #4 Tuscupa /Grand

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.605
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.7
Optimal Cycle:	58	Level Of Service:	D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	6	247	159	22	332	76	121	422	3	290	312	24
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	6	251	159	23	345	79	126	438	3	302	326	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	7	264	167	24	363	83	132	462	3	317	343	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	264	167	24	363	83	132	462	3	317	343	26
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	264	167	24	363	83	132	462	3	317	343	26
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
vol/Sat:	0.00	0.07	0.10	0.01	0.10	0.05	0.07	0.13	0.00	0.18	0.09	0.02
Crit Moves:			****		****			****		****		
Green/Cycle:	0.17	0.17	0.17	0.17	0.17	0.17	0.22	0.21	0.21	0.29	0.28	0.28
Volume/Cap:	0.02	0.43	0.61	0.08	0.61	0.31	0.34	0.61	0.01	0.61	0.34	0.06
Delay/Veh:	34.5	37.5	42.1	35.3	40.4	37.3	33.4	37.0	31.2	32.3	28.6	26.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	37.5	42.1	35.3	40.4	37.3	33.4	37.0	31.2	32.5	28.6	26.2
LOS by Move:	C	D	D	D	D	D	C	D	C	C	C	C
HCM2kAvgQ:	0	4	5	1	6	2	4	8	0	9	4	1

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITHOUT Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 Jurupa /Grand

Cycle (sec):	100	Critical Vol./Cap.(X):	0.605
Loss Time (sec):	18 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.7
Optimal Cycle:	58	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	6	241	153	22	332	76	121	422	3	290	313	24
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	6	251	159	23	345	79	126	439	3	302	326	25
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	251	159	23	345	79	126	439	3	302	326	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	7	264	167	24	363	83	132	462	3	317	343	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	264	167	24	363	83	132	462	3	317	343	26
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	7	264	167	24	363	83	132	462	3	317	343	26
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.07	0.10	0.01	0.10	0.05	0.07	0.13	0.00	0.18	0.09	0.02
Crit Moves:			****		****			****		****		
Green/Cycle:	0.17	0.17	0.17	0.17	0.17	0.17	0.22	0.21	0.21	0.29	0.28	0.28
Volume/Cap:	0.02	0.43	0.61	0.08	0.61	0.31	0.34	0.61	0.01	0.61	0.34	0.06
Delay/Veh:	34.5	37.5	42.1	35.3	40.4	37.3	33.4	37.0	31.2	32.5	28.6	26.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	37.5	42.1	35.3	40.4	37.3	33.4	37.0	31.2	32.5	28.6	26.2
LOS by Move:	C	D	D	D	D	D	C	D	C	C	C	C
HCM2kAvgQ:	0	4	6	1	6	2	4	8	0	9	4	1

Note: Queue reported is the number of cars per lane.

Intersection Level-of-Service Worksheets Future "With Project Construction" Conditions (Year 2009)

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Scenario Report

Scenario:	Future AM
Command:	Future AM
Volume:	AM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	AM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Future AM

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Trip Generation Report

Forecast for AM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Tots
1	Power Plant	1.00	Power Plant	9.00	7.00	9	7	16	100.0
	Zone 1 Subtotal					9	7	16	100.0
TOTAL						9	7	16	100.0

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Trip Distribution Report

Percent Of Trips All

Zone	To Gates 2	4	6
1	35.0	35.0	30.0

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Turning Movement Report
AM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	0	1958	109	419	1746	0	0	0	0	66	0	385	4683
Added	0	0	3	3	0	0	0	0	0	2	0	2	10
Total	0	1958	112	422	1746	0	0	0	0	68	0	387	4693
#2 Jurupa / Acorn													
Base	36	8	139	9	8	5	2	443	31	60	412	8	1164
Added	0	0	0	2	0	5	8	0	0	0	0	3	16
Total	36	8	139	11	8	10	8	443	31	60	412	11	1180
#3 Jurupa / Wilderness													
Base	8	19	20	10	2	18	46	436	7	3	421	28	1018
Added	0	0	0	0	0	0	0	2	0	0	3	0	5
Total	8	19	20	10	2	18	46	438	7	3	424	28	1023
#4 Jurupa /Grand													
Base	2	219	127	21	125	105	67	239	7	153	284	9	1358
Added	0	0	0	0	0	0	0	2	0	0	3	0	5
Total	2	219	127	21	125	105	67	241	7	153	287	9	1363

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Jurupa / Van Buren	E	65.3	1.105	E	66.1	1.108	+ 0.756 D/V
# 2 Jurupa / Acorn	B	12.6	0.426	B	12.6	0.429	+ 0.003 V/C
# 4 Jurupa /Grand	C	31.5	0.331	C	31.5	0.332	-0.013 D/V

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Jurupa / Van Buren

Cycle (sec):	120	Critical Vol./Cap.(X):	1.108
Loss Time (sec):	16 (YR=4.0 sec)	Average Delay (sec/veh):	66.1
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Ignore			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	0	0 0	1! 0	0	1 0	0 0	2
Volume Module:												
Base Vol:	0	1883	105	403	1679	0	0	0	0	63	0	370
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1958	109	419	1746	0	0	0	0	66	0	385
Added Vol:	0	0	3	3	0	0	0	0	0	2	0	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1958	112	422	1746	0	0	0	0	68	0	387
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	0	2061	0	444	1838	0	0	0	0	71	0	407
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2061	0	444	1838	0	0	0	0	71	0	407
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2061	0	444	1838	0	0	0	0	71	0	407
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	0.75
Lanes:	1.00	2.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Final Sat.:	1900	3610	1900	1805	3610	0	0	1900	0	1805	0	2842
Capacity Analysis Module:												
Vol/Sat:	0.00	0.57	0.00	0.25	0.51	0.00	0.00	0.00	0.00	0.04	0.00	0.14
Crit Moves:		****		****								****
Green/Cycle:	0.00	0.52	0.00	0.22	0.66	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Volume/Cap:	0.00	1.11	0.00	1.11	0.77	0.00	0.00	0.00	0.00	0.30	0.00	1.11
Delay/Veh:	0.0	86.2	0.0	124.2	15.6	0.0	0.0	0.0	0.0	48.1	0.0	131.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	86.2	0.0	124.2	15.6	0.0	0.0	0.0	0.0	48.1	0.0	131.7
LOS by Move:	A	F	A	F	B	A	A	A	A	D	A	F
HCM2kAvgQ:	0	55	0	25	25	0	0	0	0	3	0	15

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

****

Intersection #2 Jurupa / Acorn

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.429
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	12.6
Optimal Cycle:	0	Level Of Service:	B

****

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign				Stop Sign					Stop Sign					Stop Sign				
Rights:	Include				Include					Include					Include				
Min. Green:	7	7	7		7	7	7			7	7	7			7	7	7		
Lanes:	0	1	0	0	0	1	0	0	1	1	0	2	0	1	1	0	2	0	1
Volume Module:																			
Base Vol:	35	8	134		9	8	5			2	426		30		58	398		8	
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04			1.04	1.04		1.04		1.04	1.04		1.04	
Initial Bse:	36	8	139		9	8	5			2	443		31		60	412		8	
Added Vol:	0	0	0		2	0	5			6	0		0		0	0		3	
PasserByVol:	0	0	0		0	0	0			0	0		0		0	0		0	
Initial Fut:	36	8	139		11	8	10			8	443		31		60	412		11	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	
PHF Adj:	0.95	0.95	0.95		0.95	0.95	0.95			0.95	0.95		0.95		0.95	0.95		0.95	
PHF Volume:	38	9	147		12	9	11			9	466		33		63	434		12	
Reduct Vol:	0	0	0		0	0	0			0	0		0		0	0		0	
Reduced Vol:	38	9	147		12	9	11			9	466		33		63	434		12	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	
FinalVolume:	38	9	147		12	9	11			9	466		33		63	434		12	
Saturation Flow Module:																			
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	
Lanes:	0.81	0.19	1.00		0.58	0.42	1.00			1.00	2.00		1.00		1.00	2.00		1.00	
Final Sat.:	377	86	342		253	186	499			500	1087		600		501	1087		600	
Capacity Analysis Module:																			
Vol/Sat:	0.10	0.10	0.27		0.05	0.05	0.02			0.02	0.43		0.05		0.13	0.40		0.02	
Crit Moves:			****			****					****					****			
Delay/veh:	10.8	10.8	11.1		10.6	10.6	9.4			9.8	13.7		8.8		10.6	13.1		8.5	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	
AdjDel/Veh:	10.8	10.8	11.1		10.6	10.6	9.4			9.8	13.7		8.8		10.6	13.1		8.5	
LOS by Move:	B	B	B		B	B	A			A	B		A		B	B		A	
ApproachDel:	11.0				10.2					13.3					12.7				
Delay Adj:	1.00				1.00					1.00					1.00				
ApprAdjDel:	11.0				10.2					13.3					12.7				
LOS by Appr:	B				B					B					B				
AllWayAvgQ:	0.1	0.1	0.3		0.0	0.0	0.0			0.0	0.7		0.1		0.1	0.6		0.0	

****

Note: Queue reported is the number of cars per lane.

Traffix 7.9.0415 (c) 2007 Dowling Assoc. Licensed to KATZ OKITSU, MONTEREY PK

Riverside Power Plant - Construction Traffic Analysis
Future Conditions W/TL Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #4 Jurupa /Grand

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.332
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	31.5
Optimal Cycle:	44	Level Of Service:	C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	2	211	122	20	120	101	64	230	7	147	273	9
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	2	219	127	21	125	105	67	239	7	153	284	9
Added Vol:	0	0	0	0	0	0	0	2	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	219	127	21	125	105	67	241	7	153	287	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	2	231	134	22	131	111	70	254	8	161	302	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	231	134	22	131	111	70	254	8	161	302	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	231	134	22	131	111	70	254	8	161	302	10
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.85	0.85	0.95	0.95	0.85	0.95	0.85	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.08	0.01	0.04	0.07	0.04	0.07	0.00	0.09	0.08	0.01
Crit Moves:			****		****			****		****		
Green/Cycle:	0.25	0.25	0.25	0.21	0.21	0.21	0.22	0.21	0.21	0.27	0.26	0.26
Volume/Cap:	0.00	0.25	0.33	0.06	0.18	0.33	0.18	0.33	0.02	0.33	0.32	0.02
Delay/Veh:	28.2	30.3	31.2	31.9	32.8	34.4	31.9	33.6	31.2	29.8	29.9	27.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.2	30.3	31.2	31.9	32.8	34.4	31.9	33.6	31.2	29.8	29.9	27.4
LOS by Move:	C	C	C	C	C	C	C	C	C	C	C	C
HCM2kAvgQ:	0	3	4	1	2	3	2	4	0	4	4	0

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Scenario Report

Scenario:	Future PM
Command:	Future PM
Volume:	PM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	All
Paths:	Default Path
Routes:	Default Route
Configuration:	Future PM

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Trip Generation Report

Forecast for PM

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
1	Power Plant	1.00	Power Plant	7.00	97.00	7	97	104	100.0
	Zone 1 Subtotal					7	97	104	100.0
TOTAL						7	97	104	100.0

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Trip Distribution Report

Percent Of Trips All

Zone	To Gates 2	4	5
1	35.0	35.0	30.0

Riverside Power Plant - Construction Traffic Analysis
Future Conditions W_TI Project
PM Peak Hour

Turning Movement Report
PM

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Jurupa / Van Buren													
Base	2	1725	32	431	2230	0	0	0	0	98	0	520	5038
Added	0	0	2	2	0	0	0	0	0	34	0	34	72
Total	2	1725	34	433	2230	0	0	0	0	132	0	554	5110
#2 Jurupa / Acorn													
Base	40	3	69	17	16	15	2	481	45	126	538	4	1363
Added	0	0	0	29	0	68	5	0	0	0	0	2	104
Total	40	3	69	46	16	83	7	491	45	126	538	6	1467
#3 Jurupa / Wilderness													
Base	14	7	14	66	34	78	22	496	22	9	469	14	1244
Added	0	0	0	0	0	0	0	29	0	0	2	0	31
Total	14	7	14	66	34	78	22	525	22	9	471	14	1275
#4 Jurupa /Grand													
Base	6	251	159	23	345	79	126	439	3	302	326	25	2083
Added	0	0	0	0	0	0	0	29	0	0	2	0	31
Total	6	251	159	23	345	79	126	468	3	302	328	25	2114

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/C	Future LOS	Future Del/ Veh	Future V/C	Change in
# 1 Jurupa / Van Buren	E	73.9	1.092	E	79.6	1.108	+ 5.663 D/V
# 2 Jurupa / Acorn	B	14.4	0.517	C	15.6	0.555	+ 0.038 V/C
# 4 Jurupa /Grand	D	35.7	0.605	D	35.8	0.613	+ 0.088 D/V

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #1 Jurupa / Van Buren

****

Cycle (sec):	120	Critical Vol./Cap.(X):	1.108
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	79.6
Optimal Cycle:	120	Level Of Service:	F

****

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	-	R	L	-	T	-	R	L	-	T	-	R	L	T	-	R
Control:	Protected				Protected					Split Phase					Split Phase			
Rights:	Ignore				Include					Include					Include			
Min. Green:	7	7		7	7		7		7	7		7		7	7		7	7
Lanes:	1	0	2	0 1	1	0	2	0	0	0	0	1	0	0	1	0	0	0 2
Volume Module:																		
Base Vol:	2	1659		31	414	2144			0	0		0		0	94		0	600
Growth Adj:	1.04	1.04		1.04	1.04	1.04			1.04	1.04		1.04		1.04	1.04		1.04	1.04
Initial Bse:	2	1725		32	431	2230			0	0		0		0	98		0	520
Added Vol:	0	0		2	2	0			0	0		0		0	34		0	34
PasserByVol:	0	0		0	0	0			0	0		0		0	0		0	0
Initial Fut:	2	1725		34	433	2230			0	0		0		0	132		0	554
User Adj:	1.00	1.00		0.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	1.00
PHF Adj:	0.95	0.95		0.00	0.95	0.95			0.95	0.95		0.95		0.95	0.95		0.95	0.95
PHF Volume:	2	1816		0	455	2347			0	0		0		0	139		0	583
Reduct Vol:	0	0		0	0	0			0	0		0		0	0		0	0
Reduced Vol:	2	1816		0	455	2347			0	0		0		0	139		0	583
PCE Adj:	1.00	1.00		0.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	1.00
MLF Adj:	1.00	1.00		0.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	1.00
FinalVolume:	2	1816		0	455	2347			0	0		0		0	139		0	583
Saturation Flow Module:																		
Sat/Lane:	1900	1900		1900	1900	1900			1900	1900		1900		1900	1900		1900	1900
Adjustment:	0.95	0.95		1.00	0.95	0.95			1.00	1.00		1.00		1.00	0.95		1.00	0.75
Lanes:	1.00	2.00		1.00	1.00	2.00			0.00	0.00		1.00		0.00	1.00		0.00	2.00
Final Sat.:	1805	3610		1900	1805	3610			0	0		1900		0	1805		0	2842
Capacity Analysis Module:																		
Vol/Sat:	0.00	0.50		0.00	0.25	0.65			0.00	0.00		0.00		0.00	0.08		0.00	0.21
Crit Moves:		****			****													****
Green/Cycle:	0.06	0.45		0.00	0.23	0.62			0.00	0.00		0.00		0.00	0.19		0.00	0.19
Volume/Cap:	0.02	1.11		0.00	1.11	1.04			0.00	0.00		0.00		0.00	0.42		0.00	1.11
Delay/Veh:	53.3	90.9		0.0	123.4	54.0			0.0	0.0		0.0		0.0	44.0		0.0	121.2
User DelAdj:	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00		1.00	1.00		1.00	1.00
AdjDel/Veh:	53.3	90.9		0.0	123.4	54.0			0.0	0.0		0.0		0.0	44.0		0.0	121.2
LOS by Move:	D	F		A	F	D			A	A		A		A	D		A	F
HCM2kAvgQ:	0	50		0	26	57			0	0		0		0	5		0	20

****

Note: Queue reported is the number of cars per lane.

****

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WPH Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4 Way Stop Method (Future Volume Alternative)

Intersection #2 Jurupa / Acorn

Cycle (sec):	100	Critical Vol./Cap.(X):	0.555
Loss Time (sec):	6 (Y+R=4.0 sec)	Average Delay (sec/veh):	15.6
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	38	3	66	16	15	14	2	472	43	121	517	4
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	40	3	69	17	16	15	2	491	45	126	538	4
Added Vol:	0	0	0	29	0	68	5	0	0	0	0	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	3	69	46	16	83	7	491	45	126	538	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	42	3	72	48	16	87	7	517	47	132	566	6
Reduce Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	3	72	48	16	87	7	517	47	132	566	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	3	72	48	16	87	7	517	47	132	566	6
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.93	0.07	1.00	0.75	0.25	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	377	30	489	311	108	477	453	983	534	472	1020	555
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.15	0.15	0.15	0.18	0.02	0.53	0.09	0.28	0.55	0.01
Crit Moves:			****			****		****			****	
Delay/Veh:	11.9	11.9	11.0	12.2	12.2	11.1	10.5	17.1	9.7	12.9	17.6	9.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	11.9	11.9	11.0	12.2	12.2	11.1	10.5	17.1	9.7	12.9	17.6	9.0
LOS by Move:	B	B	B	B	B	B	B	C	A	B	C	A
ApproachDel:	11.3			11.6			16.4			16.6		
Delay Adj:	1.00			1.00			1.00			1.00		
ApprAdjDel:	11.3			11.6			16.4			16.6		
LOS by Appr:	B			B			C			C		
AllWayAvgQ:	0.1	0.1	0.2	0.2	0.2	0.2	0.0	1.0	0.1	0.4	1.1	0.0

Note: Queue reported is the number of cars per lane.

Riverside Power Plant - Construction Traffic Analysis
Future Conditions WITH Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #4 Jurupa /Grand

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.615
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	35.8
Optimal Cycle:	59	Level Of Service:	D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	7	7	7	7	7	7	7	7	7	7	7	7
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	6	241	153	22	332	76	121	422	3	290	313	24
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	6	251	159	23	345	79	126	439	3	302	326	25
Added Vol:	0	0	0	0	0	0	0	29	0	0	2	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	251	159	23	345	79	126	468	3	302	328	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	7	264	167	24	363	83	132	493	3	317	345	26
Reduce Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	264	167	24	363	83	132	493	3	317	345	26
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	264	167	24	363	83	132	493	3	317	345	26
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85	0.95	0.95	0.85
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1805	3610	1615	1805	3610	1615	1805	3610	1615	1805	3610	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.07	0.10	0.01	0.10	0.05	0.07	0.14	0.00	0.18	0.10	0.02
Crit Moves:			****		****			****		****		
Green/Cycle:	0.17	0.17	0.17	0.16	0.16	0.16	0.22	0.22	0.22	0.29	0.29	0.29
Volume/Cap:	0.02	0.43	0.62	0.08	0.62	0.31	0.33	0.62	0.01	0.62	0.33	0.06
Delay/Veh:	34.7	37.8	42.7	35.6	40.8	37.6	33.3	36.5	30.4	33.2	28.3	25.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.7	37.8	42.7	35.6	40.8	37.6	33.3	36.5	30.4	33.2	28.3	25.9
LOS by Move:	C	D	D	D	D	D	C	D	C	C	C	C
HCM2kAvgQ:	0	4	6	1	6	2	4	8	0	9	4	1

****

Note: Queue reported is the number of cars per lane.

****