ATTACHMENT O

LEVEL OF SERVICE MEASUREMENTS

LEVEL OF SERVICE ANALYSIS EXECUTIVE SUMMARY

On April 19, 2001, the City of Lancaster conducted a Level of Service (LOS) Analysis for Avenue H, Trevor Avenue, and Division Street in the vicinity of the proposed power generation plant. As can be seen in the attached analysis, the LOS for all street segments and intersections studied was LOS B or better. The additional traffic generated by the proposed project will have a negligible impact on the existing Level of Service.

HCS: Multilane Rural and Suburban Highways Release 3.2

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OPERATIONAL ANALYSIS

Highway: Ave H
Analyst:
From/To: Sierra to Division
Analysis Year: 2001
Length: 2640
Date: 4/19/01

FREE-FLOW SPEED

Direction	1	2
Free-Flow Speed:	Measured	Measured
FFS or FFSi	55.0 mph	55.0 mph
Median Type		
Median Type Adjustment, FM	0.0 mph	0.0 mph
Lane Width	12.0 ft	12.0 ft
Lane Width Adjustment, FLW	0.0 mph	0.0 mph
Lateral Clearance:		
Right Edge	6.0 ft	6.0 ft
Left Edge	6.0 ft	6.0 ft
Total Lateral Clearance	12.0 ft	12.0 ft
Lateral Clearance Adjustment, FLC	0.0 mph	0.0 mph
Access Points per Mile	0	0
Access Points Adjustment, FA	0.0 mph	0.0 mph
Adjusted Free-Flow Speed	55.0 mph	55.0 mph

VOLUME

Direction	1	2
Volume, V	205 vph	206 vph
Peak-Hour Factor, PHF	0.87	0.59
Peak 15-Minute Volume, v15	59	88
Number of Lanes	2	2
Terrain Type	Level	Level
Grade	0.00 %	0.00 %
Segment Length	0.00 mi	0.00 mi
Trucks and Buses	3 %	3 %
Trucks and Buses PCE, ET	1.5	1.5
Recreational Vehicles	1 %	1 %

Recreational Vehicles PCE, ER	1.2		1.2	
Heavy Vehicle Adjustment, fHV	0.98		0.98	
Driver Population Adjustment, fP	1.00		1.00	
Adjusted Flow Rate, vp	120	pcphpl	178	pcphpl

RESULTS

Direction	1		2	
Adjusted Flow Rate, vp	120	pcphpl	178	pcphpl
Adjusted Free-Flow Speed, FFS	55.0	mph	55.0	mph
Avg. Passenger-Car Travel Speed, S	55.0	mph	55.0	mph
Level of Service, LOS	A		A	
Density, D	2.2	pc/mi/ln	3.2	pc/mi/ln

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Trevor south of Ave H
ANALYST..... Alan
TIME OF ANALYSIS.....
DATE OF ANALYSIS..... 04-19-2001
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	14
PERCENTAGE OF BUSES.....	0
PERCENTAGE OF RECREATIONAL VEHICLES.....	4
DESIGN SPEED (MPH).....	60
PEAK HOUR FACTOR.....	1
DIRECTIONAL DISTRIBUTION (UP/DOWN).....	50 / 50
LANE WIDTH (FT).....	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	6
PERCENT NO PASSING ZONES.....	10

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	1	1	.84
B	2.2	2	2.5	1	1	.81
C	2.2	2	2.5	1	1	.81
D	2	1.6	1.6	1	1	.86
E	2	1.6	1.6	1	1	.86

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 40
ACTUAL FLOW RATE: 40

LOS	SERVICE FLOW RATE	V/C
A	354	.15
B	616	.27
C	980	.43
D	1540	.64
E	2405	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Division north of Ave H
ANALYST..... Alan
TIME OF ANALYSIS.....
DATE OF ANALYSIS..... 04-19-2001
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	14
PERCENTAGE OF BUSES.....	0
PERCENTAGE OF RECREATIONAL VEHICLES.....	4
DESIGN SPEED (MPH).....	60
PEAK HOUR FACTOR.....	1
DIRECTIONAL DISTRIBUTION (UP/DOWN).....	50 / 50
LANE WIDTH (FT).....	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	6
PERCENT NO PASSING ZONES.....	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	1	1	.84
B	2.2	2	2.5	1	1	.81
C	2.2	2	2.5	1	1	.81
D	2	1.6	1.6	1	1	.86
E	2	1.6	1.6	1	1	.86

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 209
ACTUAL FLOW RATE: 209

LOS	SERVICE FLOW RATE	V/C
A	283	.12
B	547	.24
C	889	.39
D	1491	.62
E	2405	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Division South of Ave H
ANALYST..... Alan
TIME OF ANALYSIS.....
DATE OF ANALYSIS..... 04-19-2001
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	14
PERCENTAGE OF BUSES.....	0
PERCENTAGE OF RECREATIONAL VEHICLES.....	4
DESIGN SPEED (MPH).....	60
PEAK HOUR FACTOR.....	1
DIRECTIONAL DISTRIBUTION (UP/DOWN).....	50 / 50
LANE WIDTH (FT).....	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	6
PERCENT NO PASSING ZONES.....	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	1	1	.84
B	2.2	2	2.5	1	1	.81
C	2.2	2	2.5	1	1	.81
D	2	1.6	1.6	1	1	.86
E	2	1.6	1.6	1	1	.86

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 498
ACTUAL FLOW RATE: 498

LOS	SERVICE FLOW RATE	V/C
A	283	.12
B	547	.24
C	889	.39
D	1491	.62
E	2405	1

LOS FOR GIVEN CONDITIONS: B

HCS: Unsignalized Intersections Release 3.2

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ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Intersection: Ave H and Division
City/State: Lancaster, CA
Analyst: Alan
Project No.:
Time period Analyzed:
Date: 4/19/01
East/West Street: Avenue H
North/South Street: Division Street

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	29	192	0	20	78	0	41	82	0	12	139	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	L	T	L	T	L	T	L	T
PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flow Rate	29	192	20	78	41	82	12	139
% Heavy Veh	0	0	0	0	0	0	0	0
No. Lanes	2		2		2		2	
Opposing-Lanes	2		2		2		2	
Conflicting-lanes	2		2		2		2	
Geometry group	5		5		5		5	

Duration, T 1.00 hrs.

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	29	192	20	78	41	82	12	139
Left-Turn	29	0	20	0	41	0	12	0
Right-Turn	0	0	0	0	0	0	0	0

Prop. Left-Turns	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0
Prop. Right-Turns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop. Heavy Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geometry Group	5		5		5		5	
Adjustments Table 10-40:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	
hHV-adj	1.7		1.7		1.7		1.7	
hadj, computed	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.0

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	29	192	20	78	41	82	12	139
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.03	0.17	0.02	0.07	0.04	0.07	0.01	0.12
hd, final value	5.54	5.34	5.67	5.47	5.71	5.51	5.68	5.48
x, final value	0.04	0.28	0.03	0.12	0.07	0.13	0.02	0.21
Move-up time, m	2.3		2.3		2.3		2.3	
Service Time	3.2	3.0	3.4	3.2	3.4	3.2	3.4	3.2

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	29	192	20	78	41	82	12	139
Service Time	3.2	3.0	3.4	3.2	3.4	3.2	3.4	3.2
Utilization, x	0.04	0.28	0.03	0.12	0.07	0.13	0.02	0.21
Dep. headway, hd	5.54	5.34	5.67	5.47	5.71	5.51	5.68	5.48
Capacity	279	442	270	328	291	332	262	389
Delay	8.50	10.17	8.56	8.91	8.80	9.00	8.49	9.64
LOS	A	B	A	A	A	A	A	A
Approach:								
Delay	9.95		8.84		8.93		9.55	
LOS	A		A		A		A	

Intersection Delay 9.45 Intersection LOS A

HCS: Unsignalized Intersections Release 3.2

TWO-WAY STOP CONTROL SUMMARY

Intersection: Ave H and Trevor
Analyst: Alan
Project No.:
Date: 4/19/01
East/West Street: Avenue H
North/South Street: Trevor Avenue
Intersection Orientation: EW Study period (hrs):

Vehicle Volumes and Adjustments

Major Street: Approach	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		219			144	147
Hourly Flow Rate, HFR		219			144	147
Percent Heavy Vehicles	--	--		0	--	--
Median Type	Undivided					
RT Channelized?						
Lanes		1			1	2
Configuration		T			L	T
Upstream Signal?		No			No	

Minor Street: Approach	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume		10			14	
Hourly Flow Rate, HFR		10			14	
Percent Heavy Vehicles		0			0	
Percent Grade (%)		0			0	
Median Storage 1						
Flared Approach: Exists?						
Storage						
RT Channelized?			No			
Lanes		1			1	
Configuration		L			R	

Delay, Queue Length, and Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Config		L	L		R			
v (vph)		144	10		14			
C(m) (vph)		1362	414		791			
v/c		0.11	0.02		0.02			
95% queue length		0.32	0.00		0.00			
Control Delay		8.0	13.9		9.6			
LOS		A	B		A			

Approach Delay	11.4
Approach LOS	B

HCS: Unsignalized Intersections Release 3.2

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TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Intersection: Ave H and Trevor
City/State: Lancaster, CA
Analyst: Alan
Project No.:
Time period Analyzed:
Date: 4/19/01
East/West Street: Avenue H
North/South Street: Trevor Avenue
Intersection Orientation: EW Study period (hrs):

Vehicle Volumes and Adjustments

Major Street Movements	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	219			144	147	
Peak-Hour Factor, PHF		1.00			1.00	1.00
Peak-15 Minute Volume		55			36	37
Hourly Flow Rate, HFR		219			144	147
Percent Heavy Vehicles		--	--	0	--	--
Median Type	Undivided					
RT Channelized?						
Lanes	1			1	2	
Configuration		T			L	T
Upstream Signal?		No			No	

Minor Street Movements	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	10			14		
Peak Hour Factor, PHF		1.00			1.00	
Peak-15 Minute Volume		2			4	
Hourly Flow Rate, HFR		10			14	
Percent Heavy Vehicles		0			0	
Percent Grade (%)			0			0
Median Storage	1					

Flared Approach: Exists?
- Storage
RT Channelized? No

Lanes	1	1
Configuration	L	R

Pedestrian Volumes and Adjustments

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn							
Through							
S5 Left-Turn							
Through							

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

	Movement 2	Movement 5
Shared ln volume, major th vehicles:		
Shared ln volume, major rt vehicles:		
Sat flow rate, major th vehicles:		
Sat flow rate, major rt vehicles:		
Number of major street through lanes:		

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
t(c,base)		4.1	7.5		6.9			
t(c,hv)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
P(hv)		0	0		0			
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Grade/100				0.00	0.00	0.00	0.00	0.00
t(3,lt)		0.00	0.70		0.00			
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage		4.1	6.8		6.9			

2-stage	4.1	5.8	6.9

Follow-Up Time Calculations

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
t(f,base)		2.20	3.50		3.30			
t(f,HV)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(HV)		0	0		0			
t(f)		2.2	3.5		3.3			

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
V prog				
Total Saturation Flow Rate, s (vph)				
Arrival Type				
Effective Green, g (sec)				
Cycle Length, C (sec)				
Rp (from table 9-2)				
Proportion vehicles arriving on green P				
g(q1)				
g(q2)				
g(q)				

Computation 2-Proportion of TWSC Intersection Time blocked

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha				
beta				
Travel time, t(a) (sec)				
Smoothing Factor, F				
Proportion of conflicting flow, f				
Max platooned flow, V(c,max)				
Min platooned flow, V(c,min)				
Duration of blocked period, t(p)				
Proportion time blocked, p		0.000		0.000

Computation 3-Platoon Event Periods		Result
p(2)	0.000	
p(5)	0.000	
p(dom)		
p(subo)		
Constrained or unconstrained?		

Proportion unblocked	(1)	(2)	(3)

for minor movements, p(x)	Single-stage Process	Two-Stage Process Stage I	Stage II
p(1)			
p(4)			
p(7)			
p(8)			
p(9)			
p(10)			
p(11)			
p(12)			

Computation 4 and 5

Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	219	580			219			
s								
Px								
V c,u,x								
C r,x								
C plat,x								

Two-Stage Process

	7		8		10		11	
	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2	Stage1	Stage2
V(c,x)	219	361						
s		3400						
P(x)								
V(c,u,x)								
C(r,x)								
C(plat,x)								

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	219	
Potential Capacity	791	
Pedestrian Impedance Factor	1.00	1.00
Movement Capacity	791	
Probability of Queue free St.	0.98	1.00

Step 2: LT from Major St.	4	1
Conflicting Flows	219	
Potential Capacity	1362	
Pedestrian Impedance Factor	1.00	1.00

Movement Capacity	1362	
Probability of Queue free St.	0.89	1.00
Maj L-Shared Prob Q free St.		

Step 3: TH from Minor St.	8	11

Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.89	0.89
Movement Capacity		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Conflicting Flows	580			
Potential Capacity	450			
Pedestrian Impedance Factor		1.00		1.00
Maj. L, Min T Impedance factor		0.89		0.89
Maj. L, Min T Adj. Imp Factor.		0.92		0.92
Cap. Adj. factor due to Impeding mvmnt		0.92		0.90
Movement Capacity		414		

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.	8	11

Part 1 - First Stage				
Conflicting Flows				
Potential Capacity	726		584	
Pedestrian Impedance Factor		1.00		1.00
Cap. Adj. factor due to Impeding mvmnt		1.00		0.89
Movement Capacity		726		522
Probability of Queue free St.		1.00		1.00

Part 2 - Second Stage				
Conflicting Flows				
Potential Capacity	584		726	
Pedestrian Impedance Factor		1.00		1.00
Cap. Adj. factor due to Impeding mvmnt		0.89		1.00
Movement Capacity		522		726

Part 3 - Single Stage		
Conflicting Flows		
Potential Capacity		
Pedestrian Impedance Factor	1.00	1.00
Cap. Adj. factor due to Impeding mvmnt	0.89	0.89
Movement Capacity		

Result for 2 stage process:		
a	0.00	0.00
y	0.00	0.00

C t		
Probability of Queue free St.	1.00	1.00

Step 4: LT from Minor St.	7	10

Part 1 - First Stage				
Conflicting Flows	219			
Potential Capacity	802		626	
Pedestrian Impedance Factor		1.00		1.00
Cap. Adj. factor due to Impeding mvmnt		1.00		0.89
Movement Capacity	802		560	

Part 2 - Second Stage				
Conflicting Flows	361			
Potential Capacity	682		796	
Pedestrian Impedance Factor		1.00		1.00
Cap. Adj. factor due to Impeding mvmnt		0.89		0.98
Movement Capacity	610		782	

Part 3 - Single Stage				
Conflicting Flows	580			
Potential Capacity	450			
Pedestrian Impedance Factor		1.00		1.00
Maj. L, Min T Impedance factor		0.89		0.89
Maj. L, Min T Adj. Imp Factor.		0.92		0.92
Cap. Adj. factor due to Impeding mvmnt		0.92		0.90
Movement Capacity	414			

Results for Two-stage process:		
a	0.00	0.00
y	0.00	0.00
C t	414	

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L T	R	L	T	R	
Volume (vph)	10		14			
Movement Capacity (vph)		414		791		
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7	8	9	10	11	12
	L T	R	L	T	R	
C sep	414		791			
Volume	10		14			
Delay						
Q sep						

Q sep +1
round (Qsep +1)

n max
C sh
SUM C sep
n
C act

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1	4	7	8	9	10	11	12
Lane Config		L	L		R			
v (vph)		144	10		14			
C(m) (vph)		1362	414		791			
v/c		0.11	0.02		0.02			
95% queue length		0.32	0.00		0.00			
Control Delay		8.0	13.9		9.6			
LOS		A	B		A			
Approach Delay				11.4				
Approach LOS				B				

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	0.89
v(il), Volume for stream 2 or 5		
v(i2), Volume for stream 3 or 6		
s(il), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6		
P*(oj)		
d(M,LT), Delay for stream 1 or 4		8.0
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		