BlueGreen CONSULTING

El Encanto Special Use Area

Landscape Architecture Specifications
May 7, 2012

Project Location
100 N. Old San Gabriel Canyon Road
Azusa, CA 91702

Prepared for
Watershed Conservation Authority
100 N. Old San Gabriel Canyon Road
Azusa, CA 91702

Prepared by
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Landscape Architect
Registered California #3607

EL ENCANTO SPECIAL USE AREA
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EL Encanto SPECIAL-USE AREA

River Wilderness Park

WATERSHED CONSERVATION AUTHORITY - AUGUST 2011

BlueGreen CONSULTING

Exhibit H - Plan Specifications for the Special Use Area

Exhibit H - Plan Specifications for the Special Use Area

EL Encanto
River Wilderness Park

SPECIAL-USE AREA | BRIDGE ELEVATION

DRAFT - JUNE 2011

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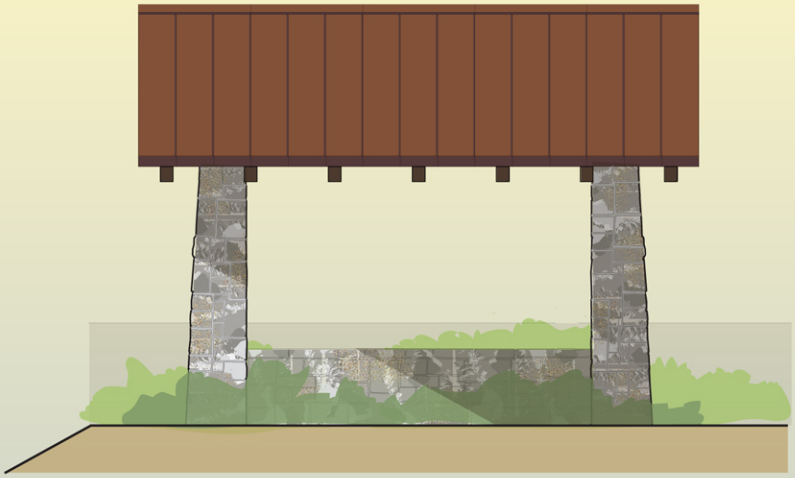
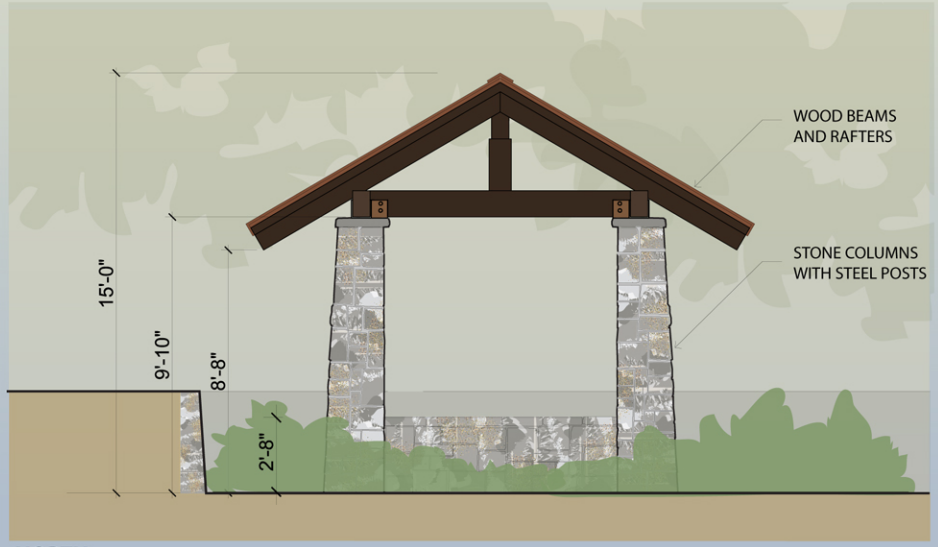
SOUTH



WEST



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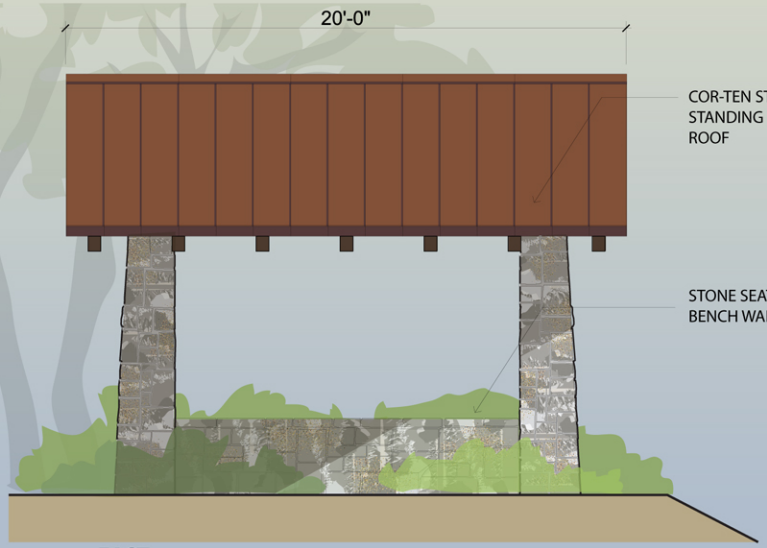


EAST

SCALE: 1/2" = 1'-0"

0 1 2 4 8

EL Encanto

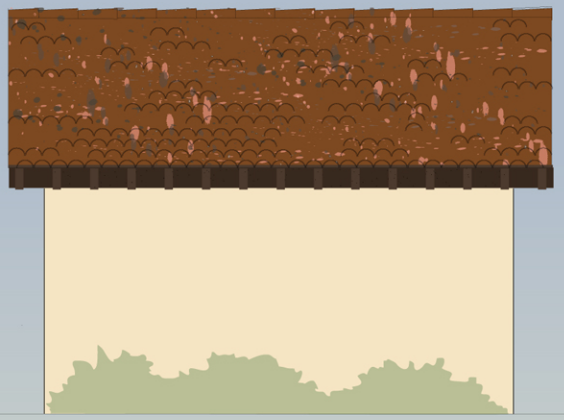
River Wilderness Park

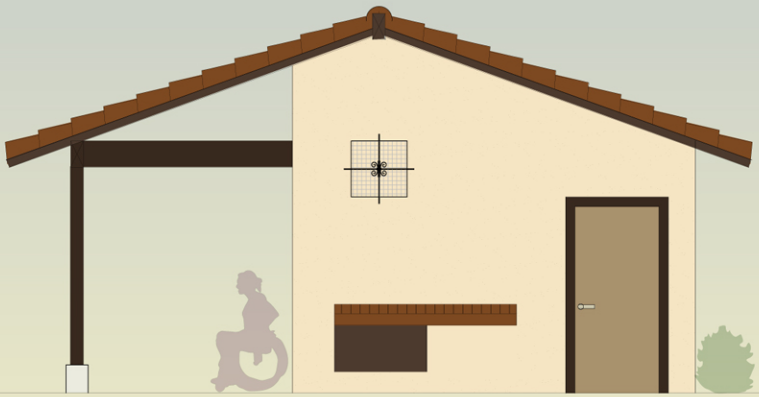
SPECIAL-USE AREA | PARK SHELTER ELEVATIONS

DRAFT - JUNE 2011

BlueGreen CONSULTING

Exhibit H - Plan Specifications for the Special Use Area





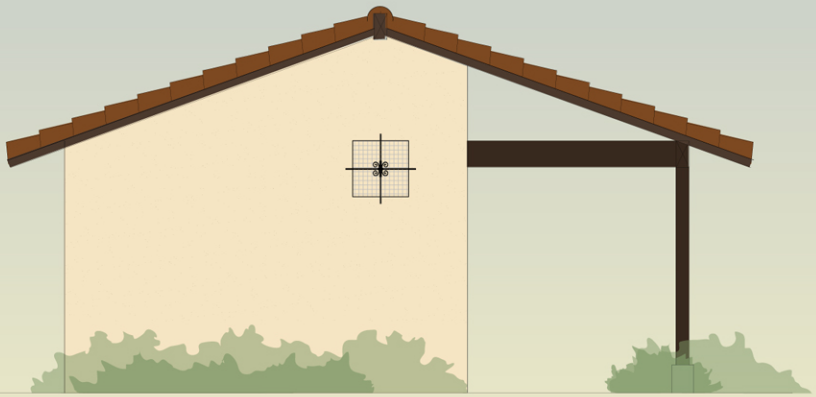


Exhibit H - Plan Specifications for the Special Use Area

SCALE: 1/2" = 1'-0"

0 1 2 4 8

EL Encanto
River Wilderness Park

SPECIAL-USE AREA | RESTROOM ELEVATIONS

DRAFT - JUNE 2011

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SECTION 00 01 15
LIST OF DRAWING SHEETS

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1.1 SECTION INCLUDES

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TP-1.00	Tree Protection Plan
D-1.00	Demolition Plan
C-1.00	General Notes
C-1.01	Grading Plan
C-1.02	Details - Arizona Crossings
C-1.03	Retaining Walls - Plans & Profiles
C-1.04	Retaining Walls - Plans & Profiles
C-1.05	Retaining Walls - Plans & Profiles
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C-1.07	Retaining Walls - Plans & Profiles
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SR-1.03	Stream Restoration - West Stream
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L-1.01	Site Sections
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L-1.50	Construction Details - Walls
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L-1.52	Amphitheater Details
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L-1.54	Ada Ramp Elevations
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L-1.56	Amenities Details
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A-2.01	Restroom Details
	Survey - *For Information Only*

END OF SECTION

SECTION 00 22 13
SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements, as well as any regulatory agency requirements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Mitigation requirements per CEQA Negative Declaration

C. Related Sections: All Divisions 00 - 32

1.2 SYSTEM DESCRIPTION

A. Contractor to comply with CEQA Negative Declaration mitigation requirements with respect to Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use, Noise, and Transportation/Traffic.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and all other regulatory agency requirements, except as modified herein.

B. Owner's Project Manager to monitor compliance with mitigation conditions as set forth in Mitigated Negative Declaration.

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 NOT APPLICABLE

PART 3 – EXECUTION

3.0 COMPLIANCE WITH REGULATORY REQUIREMENTS

A. Air Quality – Comply with the South Coast Air Quality Management District (SCAQMD) including Rule 402, the Nuisance Rule, and Rule 403, Fugitive Dust. Contractor is responsible for ensuring compliance with these regulations throughout project implementation. Mandatory measures set forth by these regulations include, but are not limited to, the following:

1. Sweep any dirt tracked from the project site onto public streets no less than once per day.
2. Particulate filters will be used on all diesel equipment.
3. Exposed surfaces will be watered a minimum of two times daily. If fugitive dust appears to be impacting adjacent residential land uses during times of high wind, additional watering will be conducted and/or grading activities will be halted.
4. All stockpiles of soil will be covered with tarps.
5. All trucks used to haul soil from the site will be covered with a tarp to reduce fugitive dust.
6. Implement the following schedule of minimum work days necessary for grading/excavation and/or export of spoil to ensure that local air quality for the on-site sensitive receptors is not significantly impacted.

Construction Activity	Minimum Number of total Days
Site Prep and/or Earthmoving	3
Export of Spoil and Demolition Debris*	3 (21)
Total minimum days is followed in parenthesis by the not-to-exceed number of one-way daily trips for haul trucks assuming a 30 cy truck capacity based on the LST model results	

B. Biological Resources – Any impacted special status vegetation types will be restored onsite. A re-vegetation program will be implemented in accordance with an appropriate agency approved landscape palette developed for the region on all graded areas not utilized for improvements or structures. Restoration will consist of seeding and planting containers of appropriate species. For those special status plants species that may be replanted, a pre-construction survey during the peak flowering period will be conducted by the project biologist. The limits of each plant or plant population location within the impact area will be clearly delineated with lath and brightly colored flagging. If a special status plant species is located in the impact area, the loss will be mitigated by seed and bulb collection if appropriate (depending on the growth type of the species), and re-vegetation into a suitable mitigation site in the vicinity.

If a potentially impacted species is state or federally listed as Threatened or Endangered, the CDFG and/or the USFWS will be consulted and a permit application will be submitted prior to initiation of construction activities. The requirements of the mitigations, as set forth by the appropriate agency permits(s), shall be implemented. At a minimum, the construction period will be scheduled to avoid the breeding season of such species, year-long residents shall be relocated if feasible, and loss of habitat will be replace at a minimum ration of 1:1.

To ensure compliance with the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Game Code, and to avoid any potential impacts to special status bird species that may occur in the project vicinity, construction activities shall be conducted outside the bird nesting season (March 15 to September 15) to avoid any potential disturbance of avian breeding activities.

If vegetation removal, clearing, and/or grading for the project is conducted during the bird nesting season (March 15 to September 15), the construction will be limited in the vicinity of any active nests per the recommendation so f a qualified Biologist. Three days prior to the onset of construction activities, a qualified Biologist shall survey disturbance for the presence of any active bird nests within the limits of the project. If no active nests are found, no further mitigation would be required. However, any active nest found during survey efforts shall be mapped on the construction plans, and an appropriate buffer area (typically 200 feet in every direction) shall be established around any active nest. Encroachment into the buffer area shall only be allowed if the proposed activity shall not disturb the nest occupants. Construction within the buffer area may resume after a qualified Biologist has determined that fledglings have left the nest.

C. Cultural Resources – If archeological resources are encountered during grading, construction activities in the area of the find shall be immediately suspended and the resource must be left in place until a qualified paleontologist can examine it and determine appropriate mitigation measures.

   If human remains are encountered during grading, construction activities in the area of the find must be immediately halted and the Los Angeles County coroner must be notified within 24 hours of the discovery (California Health and Safety Code 7050.5). If the coroner determines that the remains are not recent, the coroner shall notify the Native American Heritage Commission for consultation (Public Resources Code 5097.98). The NAHC will designate a Most Likely Descendent who will make recommendation s concerning the reassignment of the remains in consultation with the lead agency and Project Archaeologist.

D. Hazards and Hazardous Materials – Any and all transport and transfer of hazardous materials during construction, if encountered, shall be transported by a properly licensed waste hauler, who shall be in compliance with all applicable state and federal requirements, including the Department of Transportation regulations under title 49 CFR, Caltrans, and Occupational Safety and Health Administration (OSHA) standards.

   Renovation and construction activities at he building complex shall be performed in compliance with all applicable federal and state regulations regarding handling and disposal of materials containing lead and/or asbestos, including Cal/OSHA and SCAQMD Rule 1403 regulations and procedures.

   Prior to the onset of any construction work related to the exterior renovation of the former El Encanto Restaurant and associated structures, both a lead-based paint (LBP) assessment and complete asbestos survey shall be conducted. If either or both LBP or asbestos-containing materials (ACM) are present, they will be removed by appropriately licensed contractors and disposed of in accordance with all applicable regulations.

E. Hydrology and Water Quality – Prior to initiation of any construction activities, the project applicant shall obtain coverage under the NPDES General Storm Water Permit for Storm Water Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ). The contractor shall file a Notice of Intent, prepare a SWPPP, and submit the fees to the State Water Resource Control board, Division of Water Quality in order to obtain coverage for construction activities. Pursuant to the permit requirements, the project applicant shall minimize construction related pollutants in the site runoff through the implementation of Best Management Practices.

F. Noise – The contractor shall ensure that all construction activity shall be limited to the hours between 7:00 am and 6:00 pm Monday through Saturday, in accordance with the City of Azusa Municipal Code. No construction activities shall take place outside of these hours, or on Sundays or holidays, unless emergency measures are required and approval is granted by the City.

3.1 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 00 33 24.13
SITE HYDROLOGY REPORT

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Attached report from California Watershed Engineering

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

Azusa Wilderness Park

Prepared for:

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and

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November 24, 2010

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Appendix A Los Angeles County Department of Public Works Hydrology Manual Data Sheets

Appendix B Hydrologic Analysis Results for East Drainage Area

Appendix C Hydrologic Analysis Results for West Drainage Area

1.0 Introduction

The Azusa Wilderness Park is located along the Old San Gabriel Canyon Road in the City of Azusa, California. There are two steep unnamed canyons located east of the Watershed Conservation Authority's Headquarters that drain into the San Gabriel River. The proposed project improvements are located at the base of the two canyons on the north facing range of the San Gabriel Mountains. The area is within Debris Production Area (DPA) – 1 and has the potential to produce burned and bulked storm flows.

Figure 1-1 shows a project location map of the study area. Flow rates determined by this study will be used to develop proposed improvements including the stream section, streambank stabilization, Arizona crossings, and bridge within the wilderness park and its flow through the project site.

Figure 1-1 Project Location Map

2.0 Methodology

This hydrology was prepared in accordance with the Los Angeles County Department of Public Works (LACDPW) Hydrology Manual 2006 Edition. The County's Time of Concentration (T_c) calculator for small areas was used to calculate storm flows (clear and burned) generated for each of the two canyon watersheds. The LACDPW Sedimentation Manual 2006 – 2nd Edition (Sedimentation Manual) was used to generate the bulked storm flows generated from each of the two canyon watersheds. The detailed study output reports for the drainage areas are in Appendices B and C.

2.1 Existing Condition Drainage Boundary Delineation

The two canyons draining through the project site are labeled as the East and West Drainage Areas for purpose of this hydrology study. The existing condition tributary drainage boundary for the East and West Drainage Areas were determined by reviewing available USGS topographic information, aerial photographs, and site inspections. The study area lies within Sections 23 and 24 of Township 1 North, Range 10 West. Figure 2-1 depicts the existing condition drainage boundary for each of the drainage areas.

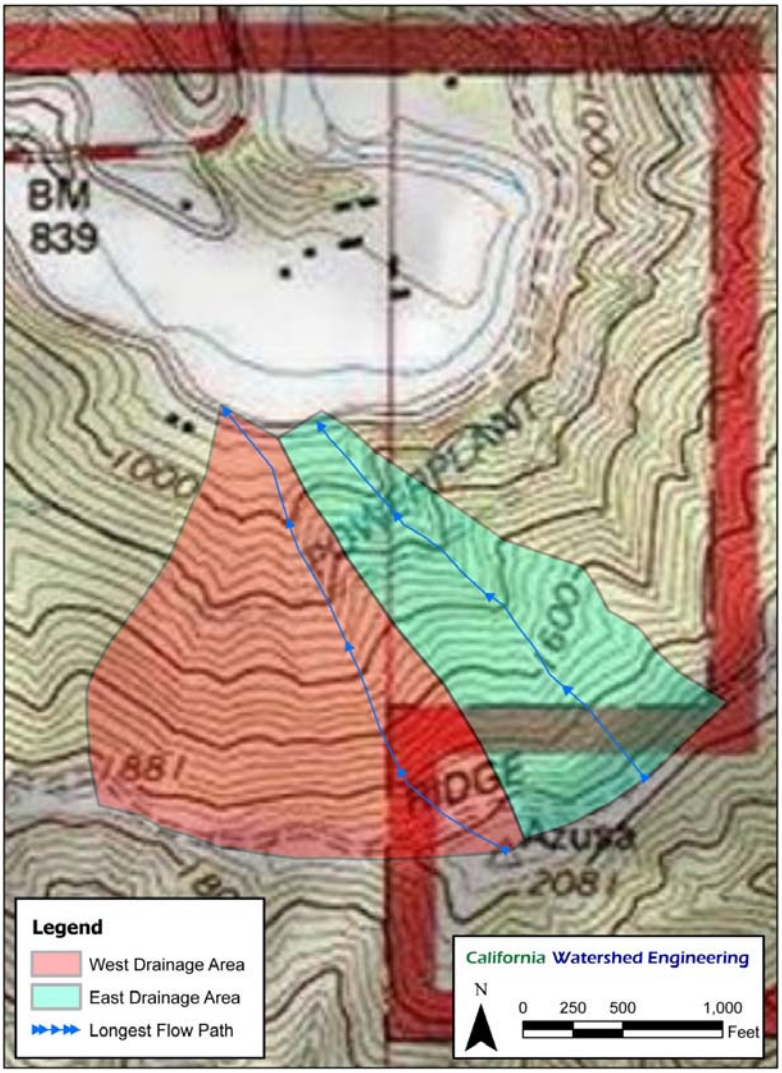


Figure 2-1 Existing Condition Drainage Boundary Delineation

2.2 Hydrologic Soil Type

Soil types were determined using the hydrologic soils group information contained in the LACDPW Hydrology Manual. The soil types are very detailed and are based on local soil characteristics for the County. The project area predominately has soil type 081, Upper San Gabriel River, which was used for the entire drainage. Soil type data used for the study is included in Appendix A.

2.3 Impervious Areas and Land Use

The study area predominantly includes steep and rugged natural canyons. Based on the LACDPW Hydrology Manual, the portion impervious for these areas is 1%. The foothill portion of the West Drainage Area housed a mobile home park. There are no mobile homes remaining at the site however, remnants of the concrete pads still exist.

2.4 Topography and Site Conditions

The study area topography consists of steep natural canyons with slopes exceeding 40 percent. The drainage areas generally slope in a northerly direction towards the San Gabriel River. Elevations for the upper portion of the drainages reach approximately 1,880 feet, whereas the San Gabriel River is at approximately 815 feet above mean sea level.

The existing drainage system for the West Drainage Area includes a drop structure connected to a 96-inch storm drain pipe which outlets to an existing Arizona crossing. The storm drain pipe is plugged with sediment and is not functional for all practical purposes.

2.5 Hydrology Input Data

Rainfall intensity data for the Capital Flood, 50-year storm event, was obtained from the LACDPW Hydrology Manual Isohyetal maps. The 50-year 24-hour isohyet map for the Azusa USGS Quadrangle (1-H1.31) was used to develop the rainfall characteristics.

The longest length of the watercourse was taken into account for calculation of the T_c. The overall slopes were calculated using the top and bottom elevations of each of the drainages over the longest length of travel.

2.6 Burned and Bulked Flows

Canyons and mountainous areas within the County of Los Angeles are subject to burning. The Capital Flood applies to all areas likely to remain in a natural state, regardless of size. The project area is subject to burning, therefore flow rates for each of the drainage areas were calculated as burned. Burned canyons and mountainous areas also add debris to the runoff and therefore require bulking of the burned flow calculations. Using the Peak Bulking Factors chart for the Los Angeles Basin, included in Appendix A, and the DPA-1 curve, a peak bulking factor was determined for the East and West Drainage Areas. Equation 3.4.1 for single undeveloped watersheds, in the Sedimentation Manual, was used to develop the bulked flow rates.

3.0 Summary and Conclusions

The East and West Drainage Areas are very steep and have the potential to produce burned and bulked flows therefore increasing the overall storm flows tremendously. The time of concentration is relatively short and the structures designed should allow for the passage of the peak burned and bulked flows.

A summary of the existing condition flow rates are presented below in Table 3-1.

Table 3-1 Summary of 50-Year Peak Discharge

Drainage Area	Area (Acres)	Flow Length (Feet)	Soil Type	Slope (%)	T_c (Min)	DPA	Bulking Factor	Clear Flow (cfs)	Burned Flow (cfs)	Bulked Flow (cfs)
East	42	2468	81	45	8	1	2.0	150	160	310
West	65	2738	81	45	9	1	2.0	210	230	450

4.0 References

Los Angeles County Department of Public Works. "TC_calc_vol" 2004.

Los Angeles County Department of Public Works. "Hydrology Manual." January 2006.

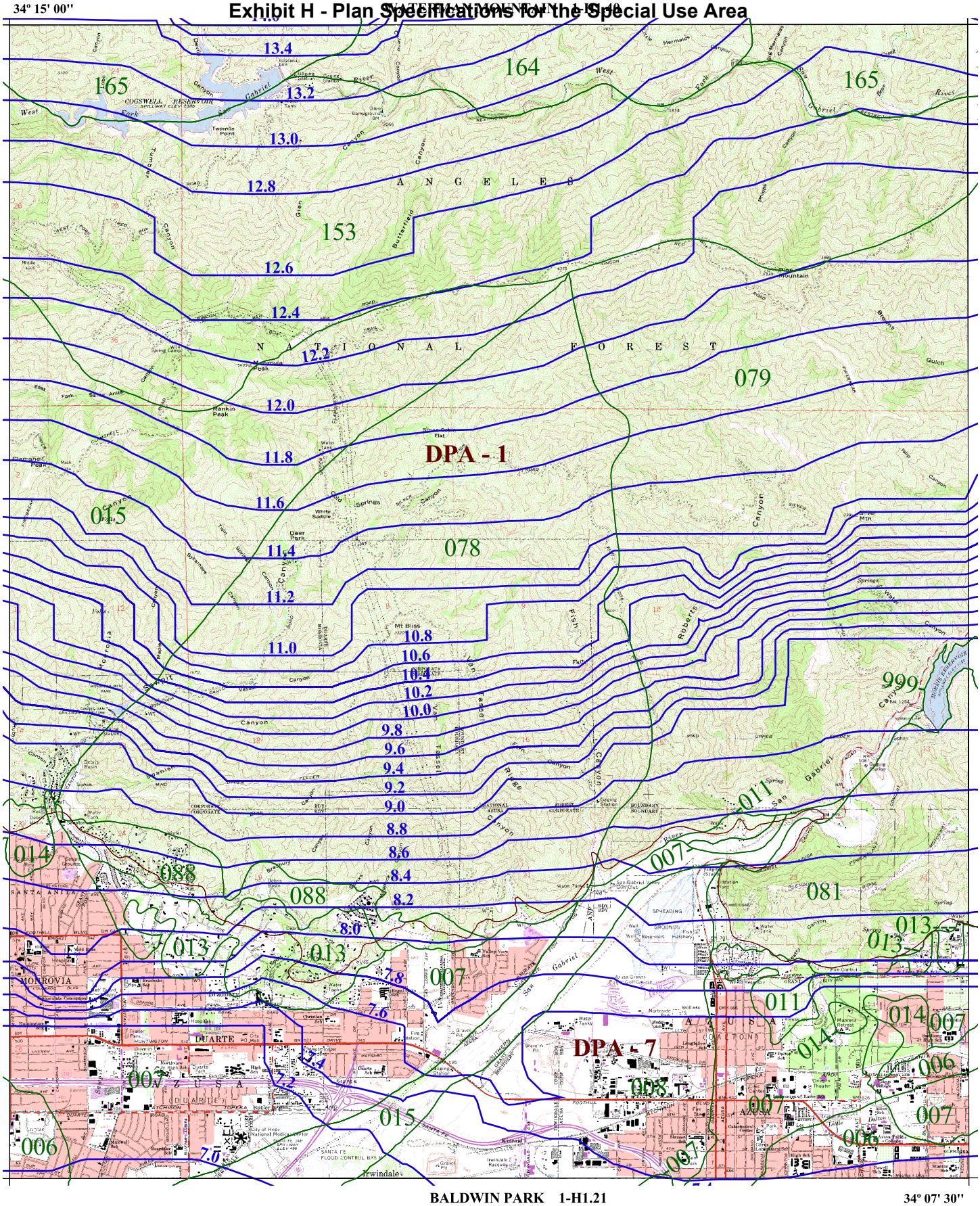
Los Angeles County Department of Public Works. "Sedimentation Manual - 2nd Edition." March 2006

U.S. Geological Survey. "USGS." http://www.usgs.gov/

APPENDIX A

Los Angeles County Department of Public Works Hydrology Manual Data Sheets

Exhibit H - Plan Specifications for the Special Use Area



25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

A Z U S A

50-YEAR 24-HOUR ISOHYET

1-H1.31

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 081

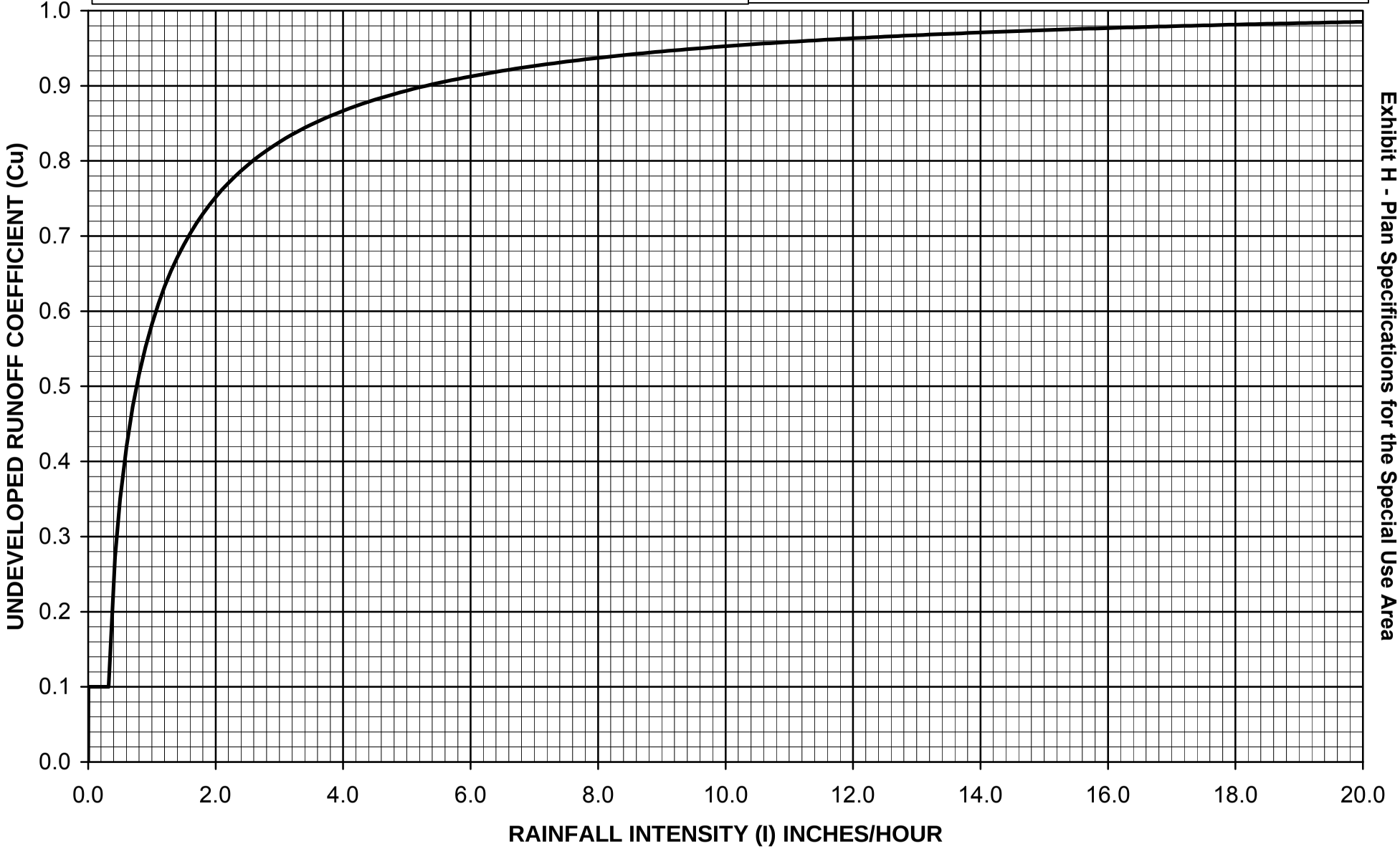
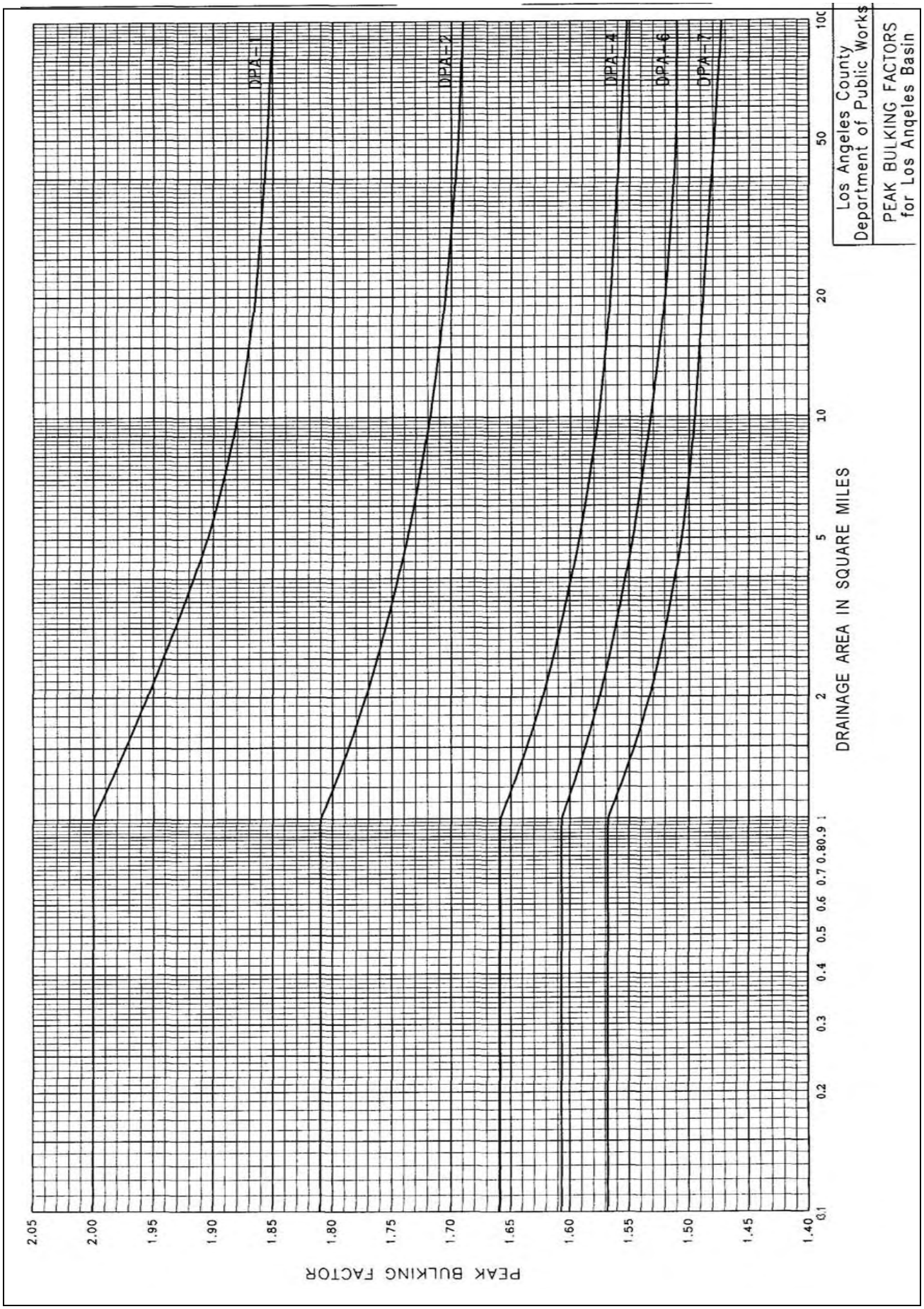


Exhibit H - Plan Specifications for the Special Use Area


DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
PEAK BULKING FACTOR
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
PEAK BULKING FACTORS
for Los Angeles Basin

APPENDIX B

Hydrologic Analysis Results for East Drainage Area

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
East	42.1	0	50	81	2468	0.45	8.28	1

Equation, given parameters above:
Undeveloped subarea coeff. (%imp=0):

bo= -0.507
b1= -0.519
b2= 0.483
b3= -0.135
0 0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0): bo= -0.507 b1= -0.519 b2= 0.483 b3= -0.135

Undeveloped subarea coeff. (0<%imp<.21): bo= -0.507 b1= -0.519 b2= 0.483 b3= -0.135

Developed subarea coeff. (.21<%imp<.68): bo= -0.507 b1= -0.519 b2= 0.483 b3= -0.135

Developed subarea coeff. (.68<%imp<1): bo= -0.507 b1= -0.519 b2= 0.483 b3= -0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.345
It=I1440*Ix/I1440: 3.917

Qd=Cd*I*A: 145.04
Qb=FF*((1-K)*((1-0.1*imp)*A*I-Qd))+Qd: 153.96
K=0.677*I^(-0.102): 0.59
Cb=FF*((1-K)*(1-Cu))+Cu: 0.92
Cba=(0.9*imp)+(1.0-imp)*Cb: 0.92
Qb=Cba*I*A: 153.96 no rounding

RESET RUN

Iterations	Tc estimate:	Tc calc:	Diff:	Cu	Cd	Ix=Cd*I	It
2	8.19	7.93	0.26	0.87	0.87	3.450	3.96

Interpolated value for I:	Tc high	Tc low	It/I1440 low	It/I1440 high	Interpolated It/I1440	(1440/Tc)^0.47
	9.00	8.00	10.86	11.48	11.36	11.35

Tolerance (min)
0.5

Use Tc value: 8.00 minutes

Intensity: 3.96 Cu: 0.87 Cd: 0.87 Flow rate: 145.04

Burned flow rate: 153.96

Exhibit H - Plan Specifications for the Special Use Area

APPENDIX C

Hydrologic Analysis Results for West Drainage Area

Tc Calculator

Subarea No.	Area (acres)	Imp. %	Frequency	Soil Type	Length	Slope	Isohyet	Fire Factor
West	65.5	0.01	50	81	2738	0.45	8.24	1

Equation, given parameters above:
Undeveloped subarea coeff. (0<%imp<.21):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135
0	0

Tc=(10)^-0.507*(Cd*I)^-0.519*(L)^0.483*(S)^-0.135

Undeveloped subarea coeff. (%imp=0):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Undeveloped subarea coeff. (0<%imp<.21):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.21<%imp<.68):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Developed subarea coeff. (.68<%imp<1):

bo=	-0.507
b1=	-0.519
b2=	0.483
b3=	-0.135

Equations for Tc: Tc=(10)^bo*(Cd*I)^b1*(L)^b2*(S)^b3

I1440=Isohyet/24hrs: 0.343
It=I1440*Ix/I1440: 3.770

Qd=Cd*I*A: 210.11
Qb=FF*((1-K)*((1-0.1*imp)*A*I-Qd))+Qd: 223.97
K=0.677*I^(-0.102): 0.59
Cb=FF*((1-K)*(1-Cu))+Cu: 0.92
Cba=(0.9*imp)+(1.0-imp)*Cb: 0.92
Qb=Cba*I*A: 224.03 no rounding

Iterations	Tc estimate:	Tc calc:	Diff:	Cu	Cd	Ix=Cd*I	It
2	8.80	8.65	0.14	0.86	0.86	3.210	3.73

RESET RUN

Tolerance (min)	Interpolated value for I:	Tc high	Tc low	It/I1440 low	It/I1440 high	Interpolated It/I1440	(1440/Tc)^0.47
0.5		9.00	8.00	10.86	11.48	10.99	10.98

Use Tc value: 9.00 minutes

Intensity: 3.73 Cu: 0.86 Cd: 0.86 Flow rate: 210.11

Burned flow rate: 223.97

Exhibit H - Plan Specifications for the Special Use Area

SECTION 00 33 24.14
STRUCTURAL CALCULATIONS FOR EL ENCANTO PARK SHELTER

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Attached report from California Watershed Engineering

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

STRUCTURAL CALCULATIONS
FOR

El Encanto Park Shelter

100 North Old San Gabriel Canyon Road
Azusa, CA 91702

August 22, 2011

California Watershed Engineering
2100 E. Howell Avenue, Suite 209
Anaheim, CA 92806-6003
(714) 385-2600

California Watershed Engineering

Date 08-20-2011

Project El Encanto Special Use Area – Park Shelter

Structure Weight

Roof Structure

4x4 Purlins	200'	3.5#/'	700#
6x8 Beams	133'	11.5#/'	1530#
Ridge Beam	20'	20#/'	400#
(2) King Post	6'	25#/'	150#
(2) 10' 10x12 Beam	20'	30#/'	600#
(2) 20' 10x12 Beam	40'	30#/'	1200#
Metal Deck	400sf	5psf	2000#
Total			6580#
			say 7,000#

Roof Live Load = 20 psf x 400 sf

= 8,000#

California Watershed Engineering Date 08-20-2011

Project El Encanto Special Use Area – Park Shelter

Seismic Load

Per enercalc output

$V = C_S W = 0.333(W)$

$W = 7{,}000^{\#}$

$V = 0.333(7{,}000) = 2331^{\#}$

Wind Load

Wind Pressure = 10 psf

Roof Area = 200 sf

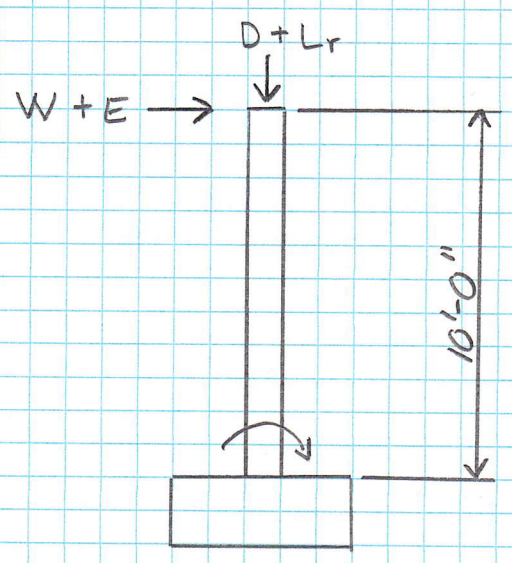
Load = $10 \times 200 = 2000^{\#}$

Seismic Load Governs

California Watershed Engineering Date 08-20-2011

Project El Encanto Special Use Area – Park Shelter

Column Loads



$W = 2000^{\#} / 4\,col = .5^{k}/col$

$E = 2331^{\#} / 4\,col = 0.58^{k}/col$

$M_W = .5^{k} \times 10' = 5^{k\text{-}ft}$

$M_E = 0.58^{k} \times 10 = 5.8^{k\text{-}ft}$

$P_D = 7000^{\#} / 4\,col = 1.75^{k}$

$P_{Lr} = 8000^{\#} / 4\,col = 2.00^{k}$

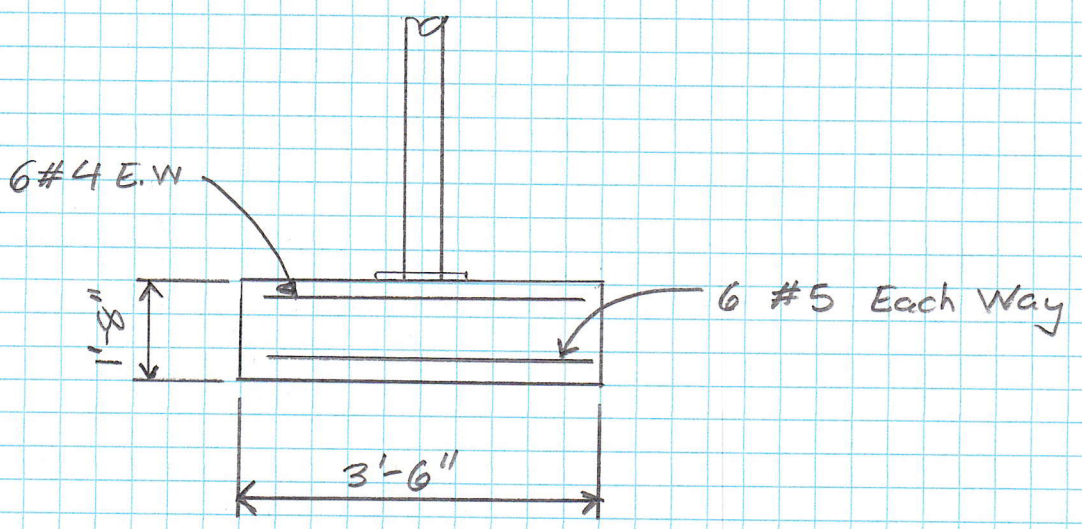
California Watershed Engineering

Date 08-20-2011

Project El Encanto Special Use Area – Park Shelter

Footing Design

Per enercalc output



Base Plate

12" x 12" x 3/4" tension in bolt = 4.265 k

Use simpsons 5/8" dia PAB or equivalent.

CWE Corp, Inc.
2100 E. Howell Avenue, Suite 209
Anaheim, CA 92806
Tel: (714) 385-2601
Fax: (714) 385-2605
vbapna@cwecorp.com

Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter
Designer : Vik Bapna
Project Desc.: Special Use Area

Job #

Project Notes :

Project Information

Project Title : El Encanto Park Shelter
Description : Special Use Area

I.D. :
Address : 100 North Old San Gabriel Canyon Road, Azusa, CA 91702

Project Leader : Vik Bapna
Phone : Fax : eMail :

Project Notes

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area
Project Notes :

ASCE 7-05 Seismic Factor Determination

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : --None--

Occupancy Category

Calculations per ASCE 7-05

Occupancy Category of Building or Other Struct "I" : Buildings and other structures that represent a low hazard to human life in the event of failure. — *ACSE 7-05, Page 3, Table 1-1*

Occupancy Importance Factor = 1 — *ACSE 7-05, Page 116, Table 11.5-1*

Ground Motion, Using USGS Database values

ASCE 7-05 9.4.1.1

Max. Ground Motions, 5% Damping

S_S = 2.403 g, 0.2 sec response
S_1 = 0.8825 g, 1.0 sec response

Longitude = 117.903 deg West
Latitude = 34.127 deg North
Location : AZUSA, CA 91702

Site Class, Site Coeff. and Design Category

Site Classificatio "D" : Shear Wave Velocity 600 to 1,200 ft/sec = **D** — *ASCE 7-05 Table 20.3-1*

Site Coefficients Fa & Fv — *ASCE 7-05 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table val
Fa = 1.00
Fv = 1.50

Maximum Considered Eartquake Acceleratic — *ASCE 7-05 Table 11.4-3*
S_{MS} = Fa * Ss = 2.403
S_{M1} = Fv * S1 = 1.324

Design Spectral Acceleration — *ASCE 7-05 Table 11.4-4*
$S_{DS} = S_{MS} * 2/3$ = 1.602
$S_{D1} = S_{M1} * 2/3$ = 0.883

Seismic Design Category = **E** *S1 >= 0.75* — *ASCE 7-05 Table 11.6-1*

Resisting System

ASCE 7-05 Table 12.2-1

Basic Seismic Force Resisting System : **Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems**
Steel Systems Not Specifically Detailed for Seismic Resistance (except cantilevers)

Response Modification Coefficient " I = 3.00
System Overstrength Factor " Wo " = 3.00
Deflection Amplification Factor " Cd " = 3.00

NOTE! See ASCE 7-05 for all applicable footnc

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Not Permitted
Category "E" Limit:	Not Permitted
Category "F" Limit:	Not Permitted

Redundancy Factor

ASCE 7-05 Section 12.3.4

Seismic Design Category of D, E, or F therefore Redundancy Factor " p " = 1.3

Lateral Force Procedure

ASCE 7-05 Section 12.8

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-05 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calcul: All Other Structural Systems

" Ct " value = 0.020
" x " value = 0.75
" hn " : Height from base to highest leve 15.0 ft

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.152 sec
"TL" : Long-period transition period per ASCE 7-05 Maps 22-15 -> 22-20 8.000 sec

Building Period " Ta " Calculated from Approximate Method sel = 0.152 sec

" Cs " Response Coefficient

ASCE 7-05 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	1.602	From Eq. 12.8-2, Preliminary Cs	=	0.333
" R " : Response Modification Factor	=	3.00	From Eq. 12.8-3 & 12.8-4 , Cs need not exce	=	1.930
" I " : Occupancy Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.147

User has selected ASCE 12.8.1.3 : Regular structure, Less than 5 Stories and with T <<= 0.5 sec, SO Ss <= 1.5 for Cs calcul

Cs : Seismic Response Coefficient = S_{DS} / (R/I) = 0.3333

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area

Project Notes :

ASCE 7-05 Seismic Factor Determination

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : --None--

Seismic Base Shear

Calculated for Strength Design Load Combinations *ASCE 7-05 Section 12.8.3*

Cs = 0.3333 from 12.8.1.1

Vertical Distribution of Seismic Forces

" k " : hx exponent based on Ta = 1.00

W (see Sum Wi below) = 0.00 k

Seismic Base Shear V = Cs * W = 0.00 k

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi) ^k	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment

Sum Wi = 0.00 k Sum Wi * Hi = 0.00 k-ft Total Base Shear = 0.00 k

Base Moment = 0.0 k-ft

Diaphragm Forces : Seismic Design Category "D", "

ASCE 7-05 9.5.2.6.4.4

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx

Wpx . . . . . Weight at level of diaphragm and other structure elements attached to it.
Fi . . . . . Design Lateral Force applied at the level.
Sum Fi . . . . . Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level . . . $0.20 * S_{DS} * I * Wpx$
MAX Req'd Force @ Level . . . $0.40 * S_{DS} * I * Wpx$
Fpx : Design Force @ Level . Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

Wall Anchorage

Concrete & Masonry Wall Normal Force : Minimum Force per ACSE 7-05

Minimum Factor : 0.40 * SDS * Importance * Weight = 0.6408 * Weight

Concrete & Masonry Wall Anchorage : Seismic Design Category "C" & "D" per ACSE

Actual Wall Weight Tributary to Anchor = lbs/ lin. ft

Fp : Anchorage Design Force . . .

Rigid Diaphragm Design Force = 0.40 * SDS * I * Trib. Weight = 0.00 lbs / foot

Flexible Diaphragm Design Force = 0.80 * SDS * I * Trib. Weight = 0.00 lbs / foot

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area

Project Notes :

ASCE 7-05 Sect 6.4, MWFRS:Simplified Forces

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : --None--

Analytical Values

Calculations per ASCE 7-05

V : Basic Wind Speed per Sect 6.5.4 & Figu	**85.0**	mph	
Roof Slope Angle	30 to 45	degrees	
Occupancy per Table 1-1	I		Buildings and other structures that represent a low hazard to human life in the event of failure.
Importance Factor per Sect. 6.5.5, & Table 6-1	**0.87**		
Exposure Category per 6.5.6.3, .4 & .5	Exposure B		
Mean Roof height	12.0	ft	
Lambda : per Figure 6.2, Pg 40	**1.00**		
Effective Wind Area of Component & Clad	10.0	ft^2	*Net design pressure from table 1609.9.2.1(2)&(3) interpolated by are*
Roof pitch for cladding pressure	0 to 7 degrees		
User specified minimum design pressure	10.0	psf	
Topographic Factor Kzt per 6.5.7.2	**1.00**		

Design Wind Pressures

num Additional Load Case per 6.4.2.1.1 = 10 PSF on entire vertical plane

Horizontal Pressures . . .

Load Case # 1 . . .

Zone: A =	11.22 psf		Zone: C =	10.00 psf	
Zone: B =	10.00 psf		Zone: D =	10.00 psf	

Load Case # 2 . . .

Zone: A =	11.22 psf		Zone: C =	10.00 psf	
Zone: B =	10.00 psf		Zone: D =	10.00 psf	

Vertical Pressures . . .

Load Case # 1 . . .

Zone: E =	-10.00 psf		Zone: G =	10.00 psf	
Zone: F =	-10.00 psf		Zone: H =	-10.00 psf	

Load Case # 2 . . .

Zone: E =	-10.00 psf		Zone: G =	10.00 psf	
Zone: F =	-10.00 psf		Zone: H =	-10.00 psf	

Overhangs . . .

Load Case # 1 . . .

Zone: Eoh =	-10.00 psf		Zone: Goh =	-10.00 psf	

Load Case # 2 . . .

Zone: Eoh =	-10.00 psf		Zone: Goh =	-10.00 psf	

Component & Cladding Design Wind Pressu

num Additional Load Case per 6.4.2.1.1 = 10 PSF on entire vertical plane

*Design Wind Pressure = Lambda * Kzt * Importance * Ps30 per ASCE 7-05 6.4.2.1 Eq 6-1*

Roof Zone 1 :	Positive :	10.000 psf
	Negative :	-11.310 psf
Roof Zone 2 :	Positive :	10.000 psf
	Negative :	-18.966 psf
Roof Zone 3 :	Positive :	10.000 psf
	Negative :	-28.536 psf
Wall Zone 4 :	Positive :	11.310 psf
	Negative :	-12.267 psf
Wall Zone 5 :	Positive :	11.310 psf
	Negative :	-15.138 psf
Roof Overhang Zone 2:		-18.270 psf
Roof Overhang Zone 3:		-30.102 psf

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area

Project Notes :

Steel Column

File: Y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Shelter Pipe Columns

General Information

Calculations per AISC 360-05, IBC 2009, CBC 2010, ASCE 7-05

Steel Section Name	Pipe5 Std	Overall Column Height	10.0 ft
Analysis Metho	2006 IBC & ASCE 7-05	Top & Bottom Fixity	Top Pinned, Bottom Fixed
Steel Stress Grade			
Fy : Steel Yield	36.0 ksi	Brace condition for deflection (buckling) along	
E : Elastic Bending Modul	29,000.0 ksi	X-X (width) axis	Fully braced against buckling along X-X Axis
Load Combinati	Allowable Stress	Y-Y (depth) axis	Fully braced against buckling along Y-Y Axis

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 146.0 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 1.750, LR = 2.0 k
BENDING LOADS . . .
Lat. Point Load at 10.0 ft creating Mx-x, W = 0.50, E = 0.60 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.04485** : 1

Load Combination	+D+Lr+H
Location of max.above base	0.0 ft
At maximum location values are . . .	
Pu : Axial	3.896 k
Pn / Omega : Allowabl	86.874 k
Mu-x : Applied	0.0 k-ft
Mn-x / Omega : Allowable	12.269 k-ft
Mu-y : Applied	0.0 k-ft
Mn-y / Omega : Allowable	12.269 k-ft

PASS Maximum Shear Stress Rati **0.01919** : 1

Load Combination	+D+W+H
Location of max.above base	10.0 ft
At maximum location values are . . .	
Vu : Applied	0.50 k
Vn / Omega : Allowable	26.062 k

Maximum SERVICE Load Reactions . .

Top along X-X	0.0 k
Bottom along X-)	0.0 k
Top along Y-Y	0.60 k
Bottom along Y-`	0.0 k

Maximum SERVICE Load Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above bas
for load combination :

Along X-X 0.0 in at 0.0 ft above base
for load combination :

Load Combination Results

	Maximum Axial + Bending Stress Ratio			Maximum Shear Ratios		
Load Combination	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D	0.022	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.045	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.039	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+W+H	0.022	PASS	0.00 ft	0.019	PASS	10.00 ft
+D+0.70E+H	0.022	PASS	0.00 ft	0.016	PASS	10.00 ft
+D+0.750Lr+0.750L+0.750W+H	0.039	PASS	0.00 ft	0.014	PASS	10.00 ft
+D+0.750L+0.750S+0.750W+H	0.022	PASS	0.00 ft	0.014	PASS	10.00 ft
+D+0.750Lr+0.750L+0.5250E+H	0.039	PASS	0.00 ft	0.012	PASS	10.00 ft
+D+0.750L+0.750S+0.5250E+H	0.022	PASS	0.00 ft	0.012	PASS	10.00 ft
+0.60D+W+H	0.013	PASS	0.00 ft	0.019	PASS	10.00 ft
+0.60D+0.70E+H	0.013	PASS	0.00 ft	0.016	PASS	10.00 ft

Maximum Reactions - Unfactored

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base
D Only	k		k		1.896 k
Lr Only	k		k		2.000 k
W Only	k		-0.500 k		k
E Only	k		-0.600 k		k
D+Lr	k		k		3.896 k

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr : Vik Bapna
Project Desc: Special Use Area

Project Notes :

Steel Column

File: Y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6

Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Shelter Pipe Columns

Maximum Reactions - Unfactored

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
D+W		k		-0.500 k	1.896 k
D+Lr+W		k		-0.500 k	3.896 k
D+E		k		-0.600 k	1.896 k
D+Lr+E		k		-0.600 k	3.896 k

Maximum Deflections for Load Combinations - Unfactore

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
D+W	0.0000 in	0.000 ft	0.000 in	0.000 ft
D+Lr+W	0.0000 in	0.000 ft	0.000 in	0.000 ft
D+E	0.0000 in	0.000 ft	0.000 in	0.000 ft
D+Lr+E	0.0000 in	0.000 ft	0.000 in	0.000 ft

Steel Section Propertie Pipe5 Std

Depth	=	5.563 in	I xx	=	14.30 in^4	J	=	28.600 in^4
Web Thick	=	0.000 in	S xx	=	5.14 in^3			
Flange Width	=	5.563 in	R xx	=	1.880 in			
Flange Thick	=	0.259 in						
Area	=	4.030 in^2	I yy	=	14.300 in^4			
Weight	=	14.600 plf	S yy	=	5.140 in^3			
			R yy	=	1.880 in			
Ycg	=	0.000 in						

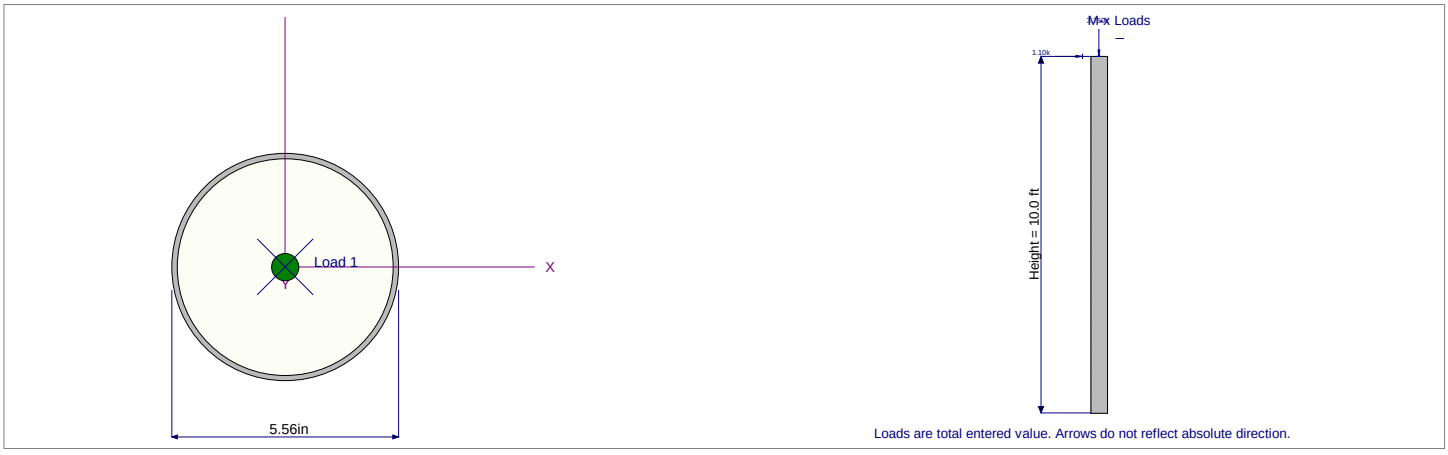

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Design : Vik Bapna
Project Desc: Special Use Area

Project Notes :

General Footing

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6

Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Steel Pipe Column Footing

General Information

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

Material Properties

f'c : Concrete 28 day streng	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modu	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	0.00140
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Fac	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressur	:	Yes
Use ftg wt for stability, moments &	:	Yes
Include Pedestal Weight as	:	No

Soil Design Values

Allowable Soil Beari	=	2.0 ksf
Increase Bearing By Footing W	=	No
Soil Passive Resistance (for Slic	=	250.0 pcf
Soil/Concrete Friction Coef	=	0.30

Increases based on footing Depth

Footing base depth below soil surfa	=	ft
Allowable pressure increase per foo	=	ksf
when footing base is belov	=	ft

Increases based on footing plan dimens

Allowable pressure increase per foo	=	ksf
when maximum length or width is	=	ft

Dimensions

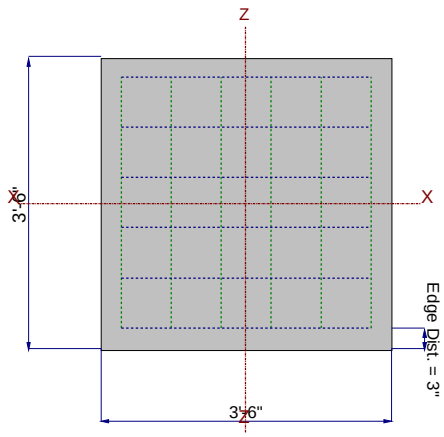
Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axi	=	3.50 ft
Footing Thickr	=	20.0 in

Pedestal dimensions

px : parallel to X-X Ax	=	in
pz : parallel to Z-Z Ax	=	in
Height	=	in

Rebar Centerline to Edge of Co

at Bottom of footing	=	3.0 in

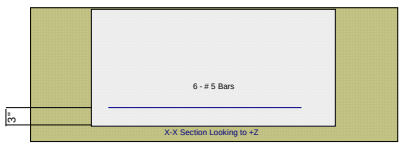


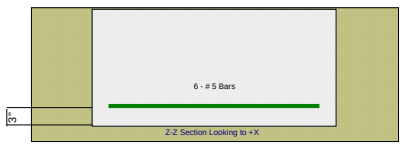
Reinforcing

Bars parallel to X-X Ax	=	
Number of Bars		6.0
Reinforcing Bar Si	=	# 5
Bars parallel to Z-Z Axis		
Number of Bars	=	6.0
Reinforcing Bar	=	# 5

Bandwidth Distribution Check (ACI 15.

Direction Requiring Closer Sep	n/a
# Bars required within zone	n/a
# Bars required on each side o	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.750	2.0						k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=					2.50	6.0		k-ft
V-x	=								k
V-z	=								k

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area

Project Notes :

General Footing

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6

Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Steel Pipe Column Footing

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.990	Soil Bearing	1.980 ksf	2.0 ksf	+0.60D+0.70E+H
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	1.178	Overturning - Z-Z	4.20 k-ft	4.946 k-ft	0.6D+0.7E
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.03503	Z Flexure (+X)	1.380 k-ft	39.408 k-ft	+0.90D+E+1.60H
PASS	0.01681	Z Flexure (-X)	0.6624 k-ft	39.408 k-ft	+1.20D+1.60Lr+0.50L
PASS	0.01681	X Flexure (+Z)	0.6624 k-ft	39.408 k-ft	+1.20D+1.60Lr+0.50L
PASS	0.01681	X Flexure (-Z)	0.6624 k-ft	39.408 k-ft	+1.20D+1.60Lr+0.50L
PASS	0.008433	1-way Shear (+X)	0.6928 psi	82.158 psi	+1.20D+1.60Lr+0.80W
PASS	0.008433	1-way Shear (-X)	0.6928 psi	82.158 psi	+1.20D+1.60Lr+0.80W
PASS	0.008433	1-way Shear (+Z)	0.6928 psi	82.158 psi	+1.20D+1.60Lr+0.50L
PASS	0.008433	1-way Shear (-Z)	0.6928 psi	82.158 psi	+1.20D+1.60Lr+0.50L
PASS	0.02314	2-way Punching	3.801 psi	164.32 psi	+1.20D+1.60Lr+0.50L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress +Z	+Z	-X	-X	Actual / Allowable Ratio
X-X, +D	2.0	n/a	0.0	0.3845	0.3845	n/a	n/a	0.192
X-X, +D+Lr+H	2.0	n/a	0.0	0.5478	0.5478	n/a	n/a	0.274
X-X, +D+0.750Lr+0.750L+H	2.0	n/a	0.0	0.5070	0.5070	n/a	n/a	0.254
X-X, +D+W+H	2.0	n/a	0.0	0.3845	0.3845	n/a	n/a	0.192
X-X, +D+0.70E+H	2.0	n/a	0.0	0.3845	0.3845	n/a	n/a	0.192
X-X, +D+0.750Lr+0.750L+0.750W	2.0	n/a	0.0	0.5070	0.5070	n/a	n/a	0.254
X-X, +D+0.750L+0.750S+0.750W	2.0	n/a	0.0	0.3845	0.3845	n/a	n/a	0.192
X-X, +D+0.750Lr+0.750L+0.5250I	2.0	n/a	0.0	0.5070	0.5070	n/a	n/a	0.254
X-X, +D+0.750L+0.750S+0.5250E	2.0	n/a	0.0	0.3845	0.3845	n/a	n/a	0.192
X-X, +0.60D+W+H	2.0	n/a	0.0	0.2307	0.2307	n/a	n/a	0.115
X-X, +0.60D+0.70E+H	2.0	n/a	0.0	0.2307	0.2307	n/a	n/a	0.115
Z-Z, +D	2.0	0.0	n/a	n/a	n/a	0.3845	0.3845	0.192
Z-Z, +D+Lr+H	2.0	0.0	n/a	n/a	n/a	0.5478	0.5478	0.274
Z-Z, +D+0.750Lr+0.750L+H	2.0	0.0	n/a	n/a	n/a	0.5070	0.5070	0.254
Z-Z, +D+W+H	2.0	6.369	n/a	n/a	n/a	0.03933	0.7297	0.365
Z-Z, +D+0.70E+H	2.0	10.70	n/a	n/a	n/a	0.0	1.036	0.518
Z-Z, +D+0.750Lr+0.750L+0.750W	2.0	3.623	n/a	n/a	n/a	0.2481	0.7659	0.383
Z-Z, +D+0.750L+0.750S+0.750W	2.0	4.777	n/a	n/a	n/a	0.1256	0.6434	0.322
Z-Z, +D+0.750Lr+0.750L+0.5250I	2.0	6.087	n/a	n/a	n/a	0.07203	0.9419	0.471
Z-Z, +D+0.750L+0.750S+0.5250E	2.0	8.025	n/a	n/a	n/a	0.0	0.8238	0.412
Z-Z, +0.60D+W+H	2.0	10.615	n/a	n/a	n/a	0.0	0.6164	0.308
Z-Z, +0.60D+0.70E+H	2.0	17.833	n/a	n/a	n/a	0.0	1.980	0.990

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D	None	0.0 k-ft	Infinity	OK
X-X, D+Lr	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+W	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+0.7E	None	0.0 k-ft	Infinity	OK
Z-Z, D	None	0.0 k-ft	Infinity	OK
Z-Z, D+Lr	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W	2.50 k-ft	4.946 k-ft	1.978	OK
Z-Z, 0.6D+0.7E	4.20 k-ft	4.946 k-ft	1.178	OK

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status

Footing Has NO Sliding

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter
Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area

Project Notes :

General Footing

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097
Licensee : PD ENGINEERING, INC.

Description : Steel Pipe Column Footing

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mr k-ft	Status
X-X, +1.40D	0.3062	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.40D	0.3062	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3874	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3874	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60Lr+0.50L	0.6624	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60Lr+0.50L	0.6624	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60Lr+0.80W	0.6624	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60Lr+0.80W	0.6624	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60S+0.80W	0.2625	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+1.60S+0.80W	0.2625	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.3874	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.3874	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50L+0.50S+1.60W	0.2625	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50L+0.50S+1.60W	0.2625	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50L+0.20S+E	0.2625	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +1.20D+0.50L+0.20S+E	0.2625	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +0.90D+1.60W+1.60H	0.1968	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +0.90D+1.60W+1.60H	0.1968	-Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +0.90D+E+1.60H	0.1968	+Z	Bottom	0.43	Bending	0.53	39.408	OK
X-X, +0.90D+E+1.60H	0.1968	-Z	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.40D	0.3062	-X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.40D	0.3062	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.3874	-X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.3874	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60Lr+0.50L	0.6624	-X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60Lr+0.50L	0.6624	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60Lr+0.80W	0.3767	-X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60Lr+0.80W	0.948	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60S+0.80W	0.02321	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+1.60S+0.80W	0.5481	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	0.1837	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50Lr+0.50L+1.60W	0.959	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.3003	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.8424	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50L+0.20S+E	0.4401	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +1.20D+0.50L+0.20S+E	1.274	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +0.90D+1.60W+1.60H	0.3123	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +0.90D+1.60W+1.60H	0.8304	+X	Bottom	0.43	Bending	0.53	39.408	OK
Z-Z, +0.90D+E+1.60H	0.333	-X	Top	0.43	Bending	0.53	39.408	OK
Z-Z, +0.90D+E+1.60H	1.38	+X	Bottom	0.43	Bending	0.53	39.408	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.3203 psi	0.3203 psi	0.3203 psi	0.3203 psi	0.3203 psi	82.158 psi	0.003898	OK
+1.20D+0.50Lr+1.60L+1.60H	0.4052 psi	0.4052 psi	0.4052 psi	0.4052 psi	0.4052 psi	82.158 psi	0.004932	OK
+1.20D+1.60Lr+0.50L	0.6928 psi	0.6928 psi	0.6928 psi	0.6928 psi	0.6928 psi	82.158 psi	0.008433	OK
+1.20D+1.60Lr+0.80W	0.6928 psi	0.6928 psi	0.6928 psi	0.6928 psi	0.6928 psi	82.158 psi	0.008433	OK
+1.20D+1.60S+0.80W	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	82.158 psi	0.003341	OK
+1.20D+0.50Lr+0.50L+1.60W	0.4052 psi	0.4052 psi	0.4052 psi	0.4052 psi	0.4052 psi	82.158 psi	0.004932	OK
+1.20D+0.50L+0.50S+1.60W	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	82.158 psi	0.003341	OK
+1.20D+0.50L+0.20S+E	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	0.2745 psi	82.158 psi	0.003341	OK
+0.90D+1.60W+1.60H	0.2059 psi	0.2059 psi	0.2059 psi	0.2059 psi	0.2059 psi	82.158 psi	0.002506	OK
+0.90D+E+1.60H	0.2056 psi	0.2056 psi	0.2059 psi	0.2059 psi	0.2059 psi	82.158 psi	0.002506	OK

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	1.757 psi	164.32psi	0.0107	OK
+1.20D+0.50Lr+1.60L+1.60H	2.224 psi	164.32psi	0.01353	OK
+1.20D+1.60Lr+0.50L	3.801 psi	164.32psi	0.02314	OK
+1.20D+1.60Lr+0.80W	3.801 psi	164.32psi	0.02314	OK
+1.20D+1.60S+0.80W	1.506 psi	164.32psi	0.009167	OK
+1.20D+0.50Lr+0.50L+1.60W	2.224 psi	164.32psi	0.01353	OK
+1.20D+0.50L+0.50S+1.60W	1.518 psi	164.32psi	0.009239	OK

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter
Job #
Designer : VK Bapna
Project Desc.: Special Use Area
Project Notes :

General Footing

File: y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6

Lic. # : KW-06008097 — Licensee : PD ENGINEERING, INC.

Description : Steel Pipe Column Footing

Punching Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.20D+0.50L+0.20S+E	1.83 psi	164.32psi	0.01114	OK
+0.90D+1.60W+1.60H	1.254 psi	164.32psi	0.007631	OK
+0.90D+E+1.60H	1.754 psi	164.32psi	0.01068	OK

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Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: Vik Bapna
Project Desc: Special Use Area
Project Notes :

Steel Base Plate

File: Y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Pipe Column Base Plate

General Information

Calculations per AISC 360-05 & Dsgn Guide # 1, IBC 2009, CBC 2010, ASCE 7-05

Material Properties

AISC Design Method: Load Resistance Factor Design
Steel Plate Fy = 36.0 ksi
Concrete Support f'c = 3.0 ksi
Assumed Bearing Area: Full Bearing

Φ c : LRFD Resistance Fac: 0.60

Allowable Bearing Fp per J8: 2.550 ksi

Column & Plate

Column Properties

Steel Sectic: Pipe5 Std

Depth	5.563	in	Area	4.03	in^2
Width	5.563	in	Ixx		in^4
Flange Thickne	0.241	in	Iyy		in^4
Web Thickne		in			

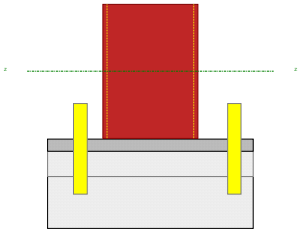
Plate Dimensions

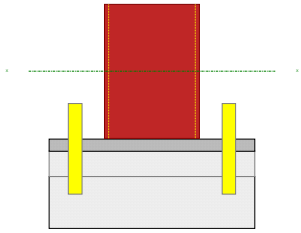
N : Length	12.0	in
B : Width	12.0	in
Thickness	0.750	in

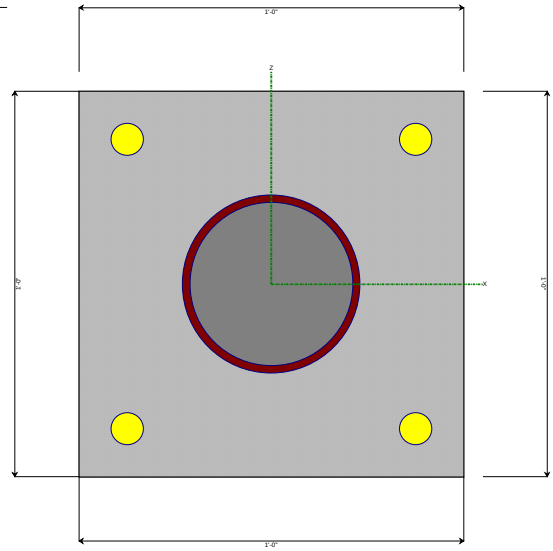
Support Dimensions

Width along "X"	12.0	in
Length along "Z'	12.0	in

Column assumed welded to base



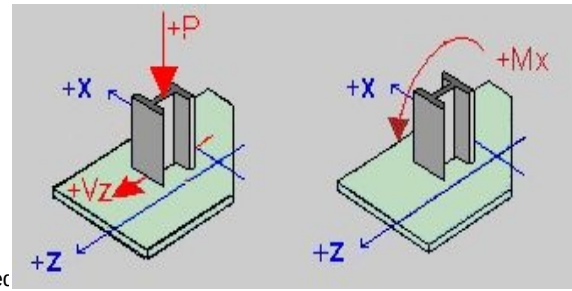




Applied Loads

	P-Y	V-Z	M-X
D : Dead Load	1.896 k	k	k-ft
L : Live	k	k	k-ft
Lr : Roof Live	2.0 k	k	k-ft
S : Snow	k	k	k-ft
W : Wind	k	k	5.0 k-ft
E : Earthquake	k	k	6.0 k-ft
H : Lateral Earth	k	k	k-ft

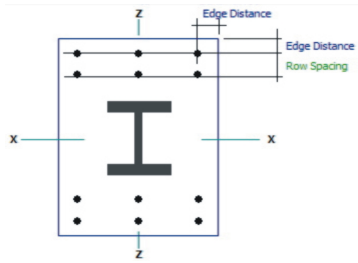
" P " = Gravity load, "+" sign is downward "+" Moments create higher soil pressure at +Z ed
"+" Shears push plate towards +Z edge



Anchor Bolts

Anchor Bolt or Rod Description: 5/8" Dia Anchor Bolt

Max of Tension or Pullout Capacity.....	6.80	k
Shear Capacity.....	5.0	k
Edge distance : bolt to plate.....	1.50	in
Number of Bolts in each Row.....	2.0	
Number of Bolt Rows.....	1.0	



CWE Corp, Inc.
2100 E. Howell Avenue, Suite 209
Anaheim, CA 92806
Tel: (714) 385-2601
Fax: (714) 385-2605
vbapna@cwecorp.com

Exhibit H - Plan Specifications for the Special Use Area

Title : El Encanto Park Shelter Job #
Dsgnr: V.K. Bapna
Project Desc: Special Use Area

Project Notes :

Steel Base Plate

File: Y:\Dropbox\Projects\CWE\El Encanto Park Shelter\el encanto park shelter.ec6
ENERCALC, INC. 1983-2011, Build:6.11.7.6, Ver:6.11.7.6
Lic. # : KW-06008097 Licensee : PD ENGINEERING, INC.

Description : Pipe Column Base Plate

GOVERNING DESIGN LOAD CASE SUMM

Plate Design Summary

Design Method	Load Resistance Factor Design
Governing Load Combinat	Overall Results
Governing Load Case Typ	----------
Design Plate Size	**1'-0" x 1'-0" x 0 -3/4"**
Pu : Axial	0.000 k
Mu : Moment	0.000 k-ft

fv : Actual	0.000 ksi
Fv : Allowable = 0.60 * Fy * 0.90 (per C	0.000 ksi
Shear Stress Ratio	0.000

Shear Stress OK

Mu : Max. Moment	0.000 k-in
fb : Max. Bending Stress	0.000 ksi
Fb : Allowable :	0.000 ksi
Fy * Phi	
Bending Stress Rati	0.000

Bending Stress OK

fu : Max. Plate Bearing Stress	0.000 ksi
Fp : Allowable :	0.000 ksi
min(0.85*f'c*sqrt(A2/A1), 1.7* f'c)*Phi	
Bearing Stress Ratio	0.000

Bearing Stress OK

SECTION 00 33 24.15
GEOTECHNICAL ENGINEERING INVESTIGATION

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Attached report from Geotechnologies, Inc.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

Geotechnologies, Inc.
Consulting Geotechnical Engineers
Celebrating 40 Years of Service
1971-2011

February 18, 2011
File No. 20092

BlueGreen Consulting
570 West Avenue 26, Suite 700
Los Angeles, California 90065

Attention: Martin Kammerer, Ph.D.

Subject: Geotechnical Engineering Investigation
Proposed Improvements to El Encanto Park
100 North Old San Gabriel Road, Azusa, California

Dear Mr. Kammerer:

This letter transmits the Geotechnical Engineering Investigation for the subject site prepared by Geotechnologies, Inc. This report provides geotechnical recommendations for the development of the site, including earthwork, seismic design, temporary excavations, foundations, floor slabs, and pavements. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

The validity of the recommendations presented herein is dependant upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL A. CAZENEUVE
No. 71490
Exp. 12/31/11
CIVIL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
MICHAEL A. CAZENEUVE
NO. 2546
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

MICHAEL A. CAZENEUVE
R.C.E. 71490 / C.E.G. 2546

Distribution: (6) Addressee

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GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED IMPROVEMENTS TO EL ENCANTO PARK
100 NORTH OLD SAN GABRIEL CANYON ROAD
AZUSA, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical engineering investigation performed on the subject property. The purpose of this investigation was to identify the distribution and engineering properties of the earth materials underlying the site, and to provide geotechnical recommendations for the design of the proposed development.

This investigation included excavation of one exploratory boring and six test pits, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information, and the preparation of this report. The site location is shown on the enclosed Vicinity Map, and the exploratory boring and test pit locations are shown on the enclosed Survey Plan / Geologic Map and the enclosed Plot Plan. The results of the exploration and the laboratory testing are presented in the Appendix of this report.

PROPOSED DEVELOPMENT

Information concerning the proposed development was furnished by the client. The proposed project consists of the construction of an outdoor park area. The project primarily consists of grading in order to re-contour the existing site. In part, the grading is intended to restore an existing stream channel that has become blocked with debris. The proposed grading will include cutting and filling throughout the site in order to achieve the desired site elevations. In general, the eastern portion of

the site will be cut up to approximately 10 feet, and the western portion of the site will receive up to approximately 10 feet of fill. Permanent cut and fill slopes up to a maximum gradient of 2:1 (h:v) and a maximum height of approximately 25 feet will be incorporated into the project. The proposed grading is shown on the enclosed Plot Plan and Cross Sections A-A' through E-E'.

Subsequent to the proposed grading, several miscellaneous structures will be constructed on the site. The structures are expected to include an outside amphitheater, a restroom structure, an access ramp, retaining walls, a shade structure, and miscellaneous paving and flatwork. A small bridge structure will be constructed above the re-graded stream channel to allow drainage away from the site. Arizona crossings will be constructed at the northeast and northwest portions of the site in order to allow drainage across a small unpaved access road that bounds the site to the north.

Columns loads are not expected to exceed 30 kips. Wall loads are estimated to range between 1 and 4 kips per lineal foot. In addition to the grading described above, grading will consist of removal and recompaction of existing unsuitable soils prior to placement of additional fill or construction of miscellaneous structures. The proposed grading and miscellaneous site improvements are shown on the enclosed Plot Plan and Cross Sections A-A' through E-E'.

Any changes in the design of the project or location of any structure, as outlined in this report, should be reviewed by this office. The recommendations contained in this report should not be considered valid until reviewed and modified or reaffirmed, in writing, subsequent to such review.

SITE CONDITIONS

The subject site is located at 100 North Old San Gabriel Canyon Road, in the City of Azusa, California. At the time of exploration, the site was occupied by an abandoned trailer park that is

terraced into the lower portion of an existing hillside. The trailer park consists of miscellaneous concrete and asphalt pavements, retaining walls, water tanks, a storage structure, and various utility connections. The site is bounded to the north by an unpaved access road, descending slope (described below), and the San Gabriel River. It is bounded to the south by an ascending slope (described below), to the east by a drainage course, and to the west by the existing Watershed Conservation Authority Office Building (1-story, at-grade). The existing site conditions and topography are shown on the enclosed Survey Plan / Geologic Map, which is based on the Topographic Survey Map, by B& E Engineers, dated April 21, 2010.

The subject site ascends to the south. Total topographic relief across the site is on the order of 140 feet, with an elevation of approximately 850 feet at the northern perimeter of the site and 990 feet at the southeast corner. Terracing on the site is accomplished through the use of multiple retaining walls that are on the order of 2 to 5 feet in height. The remainder of the topographic relief is accommodated with slopes.

Slopes on the developed (trailer park) portion of the site are predominantly 4:1 (h:v) in gradient, or less. An isolated, 6 foot high, 1:1 (h:v) slope exists near the proposed shade structure. Near vertical slopes are present on portions of the northern and eastern site boundaries. Slopes on the southern portion of the site ascend offsite at gradients between 1.5:1 and 1:1 (h:v). An approximate 1.5:1 to 1:1 slope descends on the order of 35 feet offsite towards the north and the San Gabriel River.

The site is bounded to the east by a natural drainage course that flows from the San Gabriel Mountains to the San Gabriel River. A similar drainage course is located on the western central portion of the site. At the time of exploration, water was observed running in the western central drainage course. Drainage on the site appears to occur by sheet flow along existing contours towards these drainage courses and the San Gabriel River.

Vegetation on the site consists of grasses, bushes, and trees. The surrounding area is predominantly undeveloped. Limited developments in the area include the existing Watershed Conservation Authority Building and associated residential structures. An equestrian facility is located to the north of the site.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on January 11, 12, and 18, 2011 by excavating one exploratory boring and six test pits. The boring was conducted with the aid of a truck-mounted drilling rig using 8-inch diameter hollow-stem augers. The boring was advanced to a depth of 40 feet, where refusal occurred. The test pits were excavated by hand and were approximately 30-inches square to depths between 5 and 11 feet. Soil samples were collected in the boring and test pits and transported to our office for laboratory testing. The exploration locations are shown on the enclosed Survey Plan / Geologic Map and the enclosed Plot Plan. The geologic materials encountered are logged on Plates A-1 through A-7.

GEOLOGIC MATERIALS

Earth materials encountered in the borings and test pits consist of artificial fill materials, natural colluvium, and natural alluvium. Detailed descriptions of the earth materials encountered may be obtained from the individual boring and test pit logs. Other earth materials observed on the the site include debris deposits, talus deposits, and quartz diorite bedrock. The distribution of geologic materials is shown on the enclosed Survey Plan / Geologic Map and Cross Sections A-A' through E-E'.

Artificial Fill (af)

Fill materials encountered on the subject site consist of silty sands. The fill materials were found to be dark brown, moist, dense, and fine to coarse grained with varying amounts of sub-angular to angular rock fragments (gravel to boulder sized). Rock fragments consisted of quartz diorite and were up to approximately 2 feet in diameter. Between 1 and 8 feet of fill was encountered in the majority of the borings and test pits. Test pits TP5 and TP6 did not penetrate the fill and were terminated at depths of 10 and 5 feet, respectively, due to caving.

Colluvium (Qc)

Native colluvium was encountered below the fill in the majority of the explorations. The colluvium consists of silty sands to sands, which are medium to dark brown, moist, medium dense to dense, and fine to coarse grained, with generally abundant sub-angular to angular rock fragments (gravel to boulder sized). Rock fragments consisted of quartz diorite and were up to approximately 2 feet in diameter.

The colluvial soils consist of soil and rock materials deposited on slopes by a combination of rainwash, sheetwash, and downslope creep.

Alluvium (Qa)

Native alluvium was encountered in boring B1 at a depth of 36 feet. The alluvium consists of sands, which are dark to medium brown, moist, dense and fine grained.

The alluvial soils consist of detrital sediments deposited by river and stream action.

Debris Deposits (Qdebris)

Debris deposits were observed in the drainage course located on the western central portion the subject site. The debris consists of silty sands and sands that have accumulated in the clogged drainage course. The soils are brown to medium brown, wet, and fine to coarse grained, with abundant gravel to boulder sized rock fragments. Miscellaneous debris including (but not limited to) vegetation, tree fragments, timber, and rubber tires were observed in the debris deposits.

Talus Deposits (Qtalus)

Talus deposits were observed at the base of the near vertical slope on the northern portion of the site. The talus is derived from the silty sands to sands that make up the colluvium. The talus deposits have accumulated from periodic degradation of the slope.

Bedrock (qd)

Mesozoic bedrock consisting of quartz diorite is the primary bedrock in the vicinity of the subject site and this area of the San Gabriel Mountains. Bedrock outcrops on the upper southern portion of the subject site. The rock is generally gray to grayish brown, moist, highly weathered, massive and hard. It is estimated bedrock was encountered in boring B1 at a depth of 40 feet, where refusal occurred.

GROUNDWATER AND CAVING

Groundwater was not encountered during exploration to a maximum depth of 40 feet below the ground surface. According to the Seismic Hazard Zone Report of the Azusa 7½-Minute Quadrangle

(CDMG, 1998, Revised 2006), the historic high groundwater level is not well defined in the vicinity of the site. This is likely due to the presence of poor water bearing bedrock material. A copy of the map "Historically Highest Groundwater Levels" is provided in the Appendix of this report.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving could not be directly observed in the boring excavated with the drilling machine because the borehole was cased during drilling, and caving was not possible. Raveling occurred in the existing fill and colluvium in all of the test pit excavations. Caving of fill materials occurred in test pits TP5 and TP6.

LOCAL GEOLOGY

The subject site is situated near the mouth of the San Gabriel Canyon, which is located north of Azusa, California. It is situated on a north facing slope near the base of the San Gabriel Mountains and above the San Gabriel River. Geology of the area has largely been shaped by the San Gabriel River. Over time, the river has gradually eroded downward through the San Gabriel Mountains, exposing relatively steep slopes comprised of quartz diorite, and occasionally leaving behind remnant alluvial deposits on stream terraces perched above the canyon floor.

According to the published geologic map (CDMG, 1973) the bottom of the San Gabriel Canyon consists of Quaternary alluvial sediments deposited by the San Gabriel River. The canyon walls primarily consist of quartz diorite. Older alluvial deposits exist perched above the base of the canyon. As is the case of the subject site, some of the canyon walls have developed relatively thick

layers of colluvial deposits. Multiple landslides have been mapped in the vicinity of the site. Landsliding is likely the result of over steepening of the canyon walls and ongoing weathering of the bedrock materials. A copy of the geologic map provided in (CDMG, 1973) is enclosed in the Appendix. Although beyond the limits of the Local Geologic Map provided herein, the Sierra Madre Fault is located approximately three-quarters of a mile south of the subject site.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject property is located in the Transverse Ranges Geomorphic Province. The Transverse Ranges are characterized by roughly east-west trending mountains and the northern and southern boundaries are formed by reverse fault scarps. The convergent deformational features of the Transverse Ranges are a result of north-south shortening due to plate tectonics. This has resulted in local folding and uplift of the mountains along with the propagation of thrust faults (including blind thrusts). The intervening valleys have been filled with sediments derived from the bordering mountains.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey(CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of

surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

The enclosed Southern California Fault Map shows the location of many mapped faults in the Southern California area. Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude, is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

Two major buried thrust fault structures in the Los Angeles area are the Elysian Park fold and thrust belt and the Torrance-Wilmington fold and thrust belt. It is postulated that the Elysian Park structure was responsible for the magnitude 5.9, October 1, 1987 Whittier Narrows earthquake, and that the Torrance-Wilmington structure was responsible for the magnitude 5.0, January 19, 1989 Malibu earthquake. The magnitude 6.7, January 17, 1994 Northridge earthquake was caused by a buried thrust fault located beneath the San Fernando Valley.

SEISMIC DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. Design of the proposed development in accordance with the provisions of the 2010 California Building Code (2010 CBC), or most current applicable building code, is intended to minimize the potential effects of ground shaking. The

potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

2010 CBC Seismic Parameters

Based on Table 1613.5.2 of the 2010 CBC, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile. The following table outlines the Mapped Spectral Accelerations and Site Coefficients per the 2010 CBC and may be used by the structural engineer for the seismic design and analysis of structures on the site. The values below were obtained from the USGS Ground Motion Parameter Calculator (Version 5.1.0) using the site latitude and longitude coordinates (USGS, 2011).

2010 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	2.604g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	2.604g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.736g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.977g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.465g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.977g

Deaggregated Seismic Source Parameters

The peak ground acceleration (PGA) and modal magnitude were obtained from the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). The results are based on a 10 percent in 50 years ground motion (475 year return period). A published shear wave velocity, consistent with coarse grained Holocene sediment, of 320 meters per second was utilized for Vs30 (Tinsley and Fumal, 1985). The deaggregation program indicates a PGA of 0.54g and a modal magnitude of 7.03 for the site.

OTHER SEISMIC HAZARDS

Surface Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines "active" and "potentially active" faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Ground rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature and results of site reconnaissance, no known active or potentially active faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these considerations, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The Seismic Hazards Zone Map of the Azusa Quadrangle by the State of California (CDMG, 1999), indicates that the subject site is not located within an area designated as "Liquefiable." However, The area located immediately north of the site is located in an area designated as "Liquefiable." This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map is provided in the Appendix.

Groundwater was not encountered during exploration to a maximum depth of 40 feet below the ground surface. According to the Seismic Hazard Zone Report of the Azusa 7½-Minute Quadrangle

(CDMG, 1998, Revised 2006), the historic high groundwater level is not well defined in the vicinity of the site. This is likely due to the presence of poor water bearing bedrock material. Based on these considerations, the potential for liquefaction at the site is considered remote. However, in order to conservatively estimate the potential for liquefaction at the site, a liquefaction analysis was performed using a water level 5 feet below the ground surface.

A site-specific liquefaction analysis was performed following the Recommended Procedures for Implementation of CDMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California (Martin and Lew, 1999). The enclosed liquefaction analysis was performed using the spreadsheet template LIQ2_30.WQ1 developed by Thomas F. Blake (Blake, 1996). This program utilizes the 1996 NCEER method of analysis. This semi-empirical method is based on a correlation between measured values of SPT resistance and field performance data.

According to Section 1803.5.12 of the 2010 CBC, the PGA utilized for liquefaction analysis may be taken as S_{DS} divided by 2.5 in the absence of a site specific seismic study. Based on the seismic coefficients provided herein, this corresponds to a PGA of 0.69g. The USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008) indicates a PGA of 0.54g (10 percent in 50 years ground motion) and a modal magnitude of 7.03 for the site. Therefore, the liquefaction potential evaluation was performed by utilizing a magnitude 7.03 earthquake and a peak horizontal acceleration of 0.69g.

The enclosed "Empirical Estimation of Liquefaction Potential" is based on Boring B1. Standard Penetration Test (SPT) data were collected at 5-foot intervals. Samples of the collected materials were conveyed to the laboratory for testing and analysis. Based on the adjusted blow count data, the liquefaction analysis indicates that the soils underlying the site would not be prone to liquefaction.

Dynamic Dry Settlement

Seismically-induced settlement or compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Seismic dry sand settlements were calculated utilizing Tokimatsu and Seed's procedure for the soils encountered in boring B1 (Tokimatsu and Seed, 1987). Similar to the liquefaction analysis provided herein, the dry settlement calculation was performed using a magnitude 7.03 earthquake and a peak horizontal ground acceleration of 0.69g. The calculation was performed to a depth of 40 feet, where refusal was encountered.

Based on these parameters, the total seismically-induced dry sand settlement was calculated to be 0.11 inches. Differential dynamic dry settlement would not be expected to exceed two-thirds of the total dynamic settlement, or 0.07 inches. The calculated settlements are expected to be within the tolerance of structures designed based on current building codes.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. Review of the County of Los Angeles Flood and Inundation Hazards Map, (Leighton, 1990), indicates the site does not lie within the mapped tsunami inundation boundaries.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the County of Los Angeles Flood and Inundation

Hazards Map, (Leighton, 1990), indicates the site is in close proximity to the mapped inundation boundaries of the San Gabriel Dam and the Morris Dam. A determination of whether a higher site elevation would remove the site from the potential inundation zones is beyond the scope of this investigation.

Landsliding

Based on a review of the published geologic maps by (CDMG, 1973, USGS, 1987, and Dibblee, 1998) no existing landslides are mapped on the subject site or immediately up-gradient from the subject site. The Landslide Inventory Map provided in the Seismic Hazard Zone Report (CDMG, 1998, Revised 2006) indicates there are no mapped landslides on the subject site or immediately up-gradient from the site. However, multiple landslides have been mapped towards the east and west of the site, and fewer landslides have been mapped to the south of the site. Landslides mapped to the south occur beyond the ridge-top above the subject site. Copies of these maps are provided in the Appendix.

According to the Seismic Hazards Maps by the State of California (CDMG, 1999), most of the subject site is not located within an "Earthquake Induced Landslide" zone. However, the slope that ascends offsite to the south is located in a designated zone. A copy of this map is provided in the Appendix.

Evidence of landslides was not observed on the site or up-slope from the site during exploration conducted by this firm. The subject site exhibits minor signs of surficial creep, particularly near the top of the slope located on the northern perimeter of the site (i.e. trees leaning slightly down gradient). The observed onsite structures appear relatively plumb. However, some erosion and

down slope migration of surficial soils has slightly undermined some of the existing improvements, particularly at the downslope edges of concrete slabs.

At this time, it is the opinion of this firm there is insufficient geotechnical and geological data to adequately complete a stability analysis of the entire subject site and/or hillside that ascends above the site. Such an analysis would require extensive and deep subsurface exploration on and off the subject site, additional laboratory testing, offsite geologic mapping, and additional topographic information. Based on the uninhabited nature of the proposed park development, slope stability analysis of the entire site might typically be considered unwarranted. In either case, the client and owner should be aware that substantial landslides do exist in the vicinity of the site and have occurred in materials similar in origin to those underlying the site.

Based on research of published geologic maps and observations of the subject site and site vicinity, it is anticipated that localized slope failures on and adjacent to the subject site are possible. Surficial slope instability may also affect the site, as discussed below. Recommendations provided herein include trimming of these existing slopes to a gradient of 2:1 (h:v), or flatter. In addition, the proposed grading will include fill slopes at gradients approaching 2:1 (h:v). Therefore, slope stability analyses of these slopes are provided in the following section.

SLOPE STABILITY

General

The enclosed Survey Plan / Geologic Map and Plot Plan were utilized for the preparation of Cross Sections A-A' and E-E'. The locations of the sections were chosen because they represent the most

critical sections with respect to the proposed permanent cut and fill slope heights, slope gradient, and proximity of miscellaneous structures. The stability analyses assume the grading recommendations provided herein will be implemented during construction of the proposed cut and fill slopes. Stability analyses of portions of Cross Sections A-A' and E-E' are enclosed herein, and the results are discussed below.

The stability of the slopes was evaluated using the slope stability program, GSTABL7 (Version 2.002). All stability calculations were performed using saturated soil shear strength properties. Saturated shear strength parameters are based on laboratory tests performed on the weakest sampled materials.

Groundwater was not encountered in the exploratory boring and test pits. No seepage or wet conditions were observed on the site during exploration. In addition, the proposed fill slope will be fitted with a subdrainage system and surface drainage will be directed to acceptable locations. Therefore, groundwater is not expected to be present in the proposed slopes. However, to most conservatively model the presence of water, a phreatic surface was included in each analysis at the ground surface

It is the opinion of this firm that these analyzed parameters represent the most conservative estimate of stability.

Findings

The recommended cut and fill slope configurations shown on Cross Sections A-A' and E-E' have been analyzed for both static and pseudo-static deep seated stability utilizing the Modified Bishop Method. A boundary load of 200 pounds per square foot was applied in Section A-A' to simulate

potential surcharge loads from the proposed amphitheater. A horizontal ground acceleration of 0.15g was utilized for the pseudo-static slope stability analyses.

The cut and fill slopes shown on Cross Sections A-A' and E-E' have been calculated to be grossly stable in the static and pseudo-static conditions. A total of 2000 trial surfaces were analyzed for each of the conditions. Copies of the program printouts are attached to this report. The results are summarized in the following table.

Results Of Stability Analysis			
Cross Section	Analysis	Seismic Condition	Computed Factor of Safety
Section A-A'	Modified Bishop Method (Circular Failures)	Static	1.82
		Pseudo-Static	1.33
Section E-E'	Modified Bishop Method (Circular Failures)	Static	2.21
		Pseudo-Static	1.45

For permanent slopes, minimum factors of safety of 1.5 (static condition) and 1.1 (pseudo-static condition) are widely accepted under industry standards. Therefore, the analyzed cut and fill slopes have been calculated to be grossly stable for deep seated stability.

Surficial Stability

Surficial stability calculations were performed for the 1:1 (h:v) slope that ascends to the south of the site and also for the proposed 2:1 (h:v) cut and fill slopes. The calculations assume a colluvium covered slope ascending above the site. Saturated shear parameters expected to be consistent with

compacted fill were utilized in the calculation of the proposed cut and fill slopes. The calculations indicate factors of safety of 1.62 and 1.88 for the 1:1 and 2:1 (h:v) slopes, respectively. This exceeds the generally accepted minimum safety factor of 1.5 for surficial stability. The calculations are based upon saturated shear tests of the weakest samples of soils expected on the slope faces A saturated thickness of 4 feet was assumed.

The method of analysis used in the surficial stability analysis is based on the "parallel seepage model" recommended by the ASCE. The assumptions upon which the "parallel seepage model" method is based are: a uniform planar slope; uniform soil density and shear strength; and uniform seepage parallel to the slope. As with any analysis method, the validity of the analysis is determined in part by how closely the assumptions model the field conditions. In the case of surficial soils overlying slopes, it is the opinion of this firm that the assumptions of the "parallel seepage model" are not completely satisfied. Therefore, mitigating measures such as the use of proper drainage devices and planting of slope faces is recommended.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of this firm that construction of the proposed development is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

Between 1 and 8 feet of existing fill was encountered during exploration conducted on the subject site. The existing fill materials and any existing talus or debris deposits are considered to be unsuitable for support of the proposed foundations, floor slabs, or additional fill.

The existing slopes on the north and east perimeters of the subject site are nearly vertical and in close proximity to some of the proposed improvements and grading. Due to the steep gradient and proximity of the slopes to the subject site, proposed improvements, and proposed grading, it is recommended these slopes be trimmed to a maximum gradient of 2:1 (h:v), or flatter. Recommendations for cut slopes are provided below.

Although the slope stability analyses provided herein indicate the proposed and existing slopes are surficially stable, the slopes will continue to be exposed to weathering elements. Therefore, erosion, slope degradation, and development of slope debris should be expected to occur over time. In addition, surficial creep of the sloped surfaces should be expected to continue. Based on these considerations, it is recommended measures be implemented to protect slopes and proposed development from generation of soil debris. Where possible, it is recommended slopes be properly planted to minimize surficial erosion and equipped with drainage devices.

The following statement is made in regard to Los Angeles County Code Sections 110 and 111: It is the opinion of the undersigned based on the findings of this investigation, that provided the recommendations presented in this report are followed, the proposed development and grading will be safe for its intended use against hazard from landsliding, settlement or slippage. The proposed development will have no adverse effect on the stability of the site or adjoining properties.

PROPOSED MISCELLANEOUS STRUCTURES

It is recommended the proposed miscellaneous structures be supported on conventional spread footings bearing in competent native soils and/or properly compacted fill. Where foundations bear in compacted fill, the newly compacted fill shall extend beyond the edge of foundations for a distance equal to the depth of new fill below the foundations.

In the areas of the proposed miscellaneous structures, all existing fill should be completely removed and recompacted prior to foundation excavation. At this time, it is anticipated the proposed grading will remove the majority of existing fill materials in the vicinity of the proposed amphitheater and retaining walls that will support the driveway bridge. Any existing fill remaining after excavation to the proposed subgrade should be completely removed and recompacted. In the vicinity of the proposed restroom, access ramp, and shade structure, removal and recompaction of existing fill materials should be expected.

Due to the limited exploration in the area of the proposed restroom and access ramp, it is recommended additional exploration be conducted prior to construction in order to identify the depth of existing fill materials.

Recommendations for subgrade preparation for support pavements and concrete flatwork are provided in later sections of this report.

PROPOSED CUT AND FILL SLOPES

Cut slopes on the order of 25 feet in height, or less, are expected on the north and east portions of the subject site. The cut slopes are expected to expose colluvial soils. Permanent cut slopes up to 25 feet in height made in colluvium should be trimmed to a maximum slope gradient of 2:1 (h:v), or flatter. The toe of the recommended cut slope on the eastern portion of the site should be expected to be subjected to scouring action from water flow through the natural drainage course. It is recommended the toe of the slope be protected from scouring through the use of rip-rap, gabions, or other acceptable methods.

Fill slopes up to approximately 25 feet in height, with gradients between approximately 2½:1 and 2:1 (h:v), are expected on the western portion of the site. Permanent fill slopes up to 25 feet in height should be constructed at a slope gradient of 2:1 (h:v), or flatter. All fill should be placed in horizontal lifts and should be benched into competent colluvial soils. Where fill slopes are constructed on an existing surface that is steeper than 5:1 (h:v), the fill slope shall be constructed in accordance with the drainage, benching, keying, and compaction requirements provided in the "Hillside Grading Section" of this report.

FILL SOILS, TALUS AND DEBRIS DEPOSITS

Between 1 and 8 feet of existing fill was encountered during exploration conducted on the subject site. Talus and debris deposits were also observed on the subject site. The existing fill, talus, and debris deposits are considered to be unsuitable for support of the proposed foundations, floor slabs, or additional fill. In the area of the proposed structures or grading, these material and any disturbed soils or fill generated during demolition should be removed and recompacted as controlled fill prior to foundation excavation or placement of additional fill.

EXPANSIVE SOILS

The site soils are in the very low expansion range. The Expansion Index was found to range between 3 and 7 for representative samples of the site soils. Recommended reinforcing is provided in the "Foundation Design" and "Slabs on Grade" sections of this report.

WATER-SOLUBLE SULFATES

The portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually the two most common sources of exposure are from soil and marine environments. The source of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with the exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite materials was determined to be less than 0.10 percentage by weight, for representative samples tested. Based on the 2010 CBC and American Concrete Institute - (ACI 318), Table 4.3.1, the sulfate exposure is considered to be negligible for soils with less than 0.10 percentage by weight, and Type I cement may be utilized for all concrete in contact with the site soils.

GRADING GUIDELINES

The following guidelines may be used in preparation of the grading plan and job specifications for any areas where fill or recompaction may be required.

Site Preparation

All vegetation, existing fill, talus, debris deposits, and soft or disturbed earth materials should be removed from the areas to receive controlled fill. The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Where compacted fill is utilized for support of miscellaneous foundations, all existing fill or unsuitable soils should be completely removed and recompacted. The newly placed fill should extend beyond the edge of foundations for a distance equal to the depth of compacted fill beneath the foundation.

It is very important that the positions of the proposed improvements are accurately located so that the limits of the graded areas are accurate and the grading operation proceeds efficiently.

Any vegetation or associated root system located within the area to be graded should be removed during grading. Any existing or abandoned structures or utilities located within the area to be graded should be removed or relocated as appropriate. All fill materials and disturbed earth materials resulting from grading operations should be removed and properly recompacted prior to foundation excavation or placement of additional fill.

Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.

Compaction

Fill, consisting of soil approved by a representative of this firm shall be placed in loose lifts not more than 8 inches in thickness. The loose materials shall be compacted with suitable compaction equipment. Once a layer has been adequately compacted, the next loose lift may be placed.

Fill materials shall be moisture conditioned to within 3 percent of optimum moisture content and sufficiently blended prior to placement as controlled fill. Materials larger than 6 inches in maximum dimension shall not be used in the fill.

All fill shall be compacted to at least 90 percent of the maximum laboratory density. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using test method ASTM D 1557-07 or equivalent.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until a minimum of 90 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed. When excavated, the onsite soils should be expected to contain cobble to boulder sized rock fragments. Processing of the oversized materials will be required prior to placement as fill. Processing should be expected to include removal and/or crushing of rocks larger than 6 inches in maximum dimension.

Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import

materials should consist of soils with an expansion index of less than 50. The water-soluble sulfate content of the import materials should be less than 0.10 percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Hillside Grading Issues

Fill slopes should have a key placed at the toe of the proposed fill slope. The key should be cut a minimum of 3 feet into competent colluvial soils. The width of the key should be at least 12 feet, or one-half the height of the slope, whichever is greater. The base of the key shall be sloped back into the hill. Where fill slopes are constructed on an existing surface that is steeper than 5:1 (h:v), horizontal benches shall be cut into colluvial soils in order to provide both lateral and vertical stability.

Sidehill fills shall have backdrains installed at the contact between the compacted fill and colluvium to prevent future porewater pressure buildup. The drains shall consist of 4 inch perforated pipes; placed with perforations down. The pipe should be encased with at least 1 foot of gravel and wrapped with filter fabric. The minimum cover on the pipe should be 1 foot. The gravel should consist of ¾ to 1 inch crushed rock.

The first drain shall be placed no higher than 3 feet above the front cut of the key excavation. If necessary, additional backdrains shall be placed at intervals roughly equivalent to 12 feet of vertical rise in elevation or where considered necessary by the representative of this firm.

Each drain shall be placed into a trench excavated along the back of a horizontal bench at the contact between fill and colluvium. The trench bottom shall slope downward to each exit drain with a minimum gradient of 2 percent. The exit pipe shall consist of a four inch diameter non-perforated pipe. This pipe need not be encased in gravel. It shall exit at a minimum gradient of 2 percent. The drainage should be directed to an acceptable location. Drainage should not be allowed to flow on to unprotected slope faces. A cutoff wall consisting of concrete or soil cement shall be placed at the junction of the perforated pipe and the exit drains to stop seepage and force the water being removed into the exit pipe.

A minimum compaction of 90 percent out to the finish face of fill slopes will be required. Compaction on slopes may be achieved by over building the slope and cutting back to the compacted core or by direct compaction of the slope face with suitable equipment. Direct compaction on the slope faces shall be accomplished by back-rolling the slopes in three foot to four foot increments of elevation gain.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between approximately 10 and 20 percent should be anticipated when excavating and recompacting the existing fill and upper native earth materials on the site to an average comparative compaction of 92 percent.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted

to 90 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with ASTM D-1556-07 or ASTM D-6938-08.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by

this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

FOUNDATION DESIGN

It is recommended the proposed miscellaneous structures be supported on conventional spread footings bearing in competent native soils and/or properly compacted fill. Where foundations bear in compacted fill, the newly compacted fill shall extend beyond the edge of foundations for a distance equal to the depth of new fill below the foundations.

Continuous wall foundations may be designed for a bearing value of 2,500 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material. Isolated pad foundations may be designed for a bearing value of 2,500 pounds per square foot, and should be a minimum of 24 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

The bearing value increase for each additional foot of width is 300 pounds per square foot. The bearing value increase for each additional foot of embedment depth is 600 pounds per square foot. The maximum recommended bearing value is 4,000 pounds per square foot.

Foundations General

The bearing values indicated above are for the total of dead and frequently applied live loads, and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Since the recommended bearing value is a net value, the weight of concrete in the foundations may be taken as 50 pounds per cubic foot and the weight of the soil backfill may be neglected when determining the downward load on the foundations.

All continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundation, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure. An allowable coefficient of friction of 0.40 may be used with the dead load forces.

Passive earth pressure for the sides of foundations poured against undisturbed or recompacted soil may be computed as an equivalent fluid having a density of 300 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot. When combining passive and friction for lateral resistance, the passive component should be reduced by one third. A one-third increase in the passive value may be used for wind or seismic loads.

Foundation Settlement

Settlement of foundations is expected to occur on initial application of loading. The maximum settlement is expected to be 1 inch and occur below the heaviest loaded elements. Differential settlement is not expected to exceed 1/4 inch.

Foundation and Building Setback Requirements

In accordance with section 1808.7 of the 2010 CBC, the following setback requirements shall be observed. Footings situated near the top of, or within, descending slopes shall be setback from the face of the slope a minimum of one third the height of the slope, but need not exceed 40 feet.

Structures shall be setback horizontally from the toe of slopes or retaining walls at the toe of adjacent ascending slopes for a distance equal to one half the height of the slope, but need not exceed 15 feet.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory earth materials, if necessary.

Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

It is anticipated that retaining walls between approximately 3 and 15 feet in height will be incorporated into the proposed development. The proposed bridge structure to be constructed above the re-graded stream channel may or may not be designed as restrained walls. Recommendations for cantilever and restrained walls are provided below.

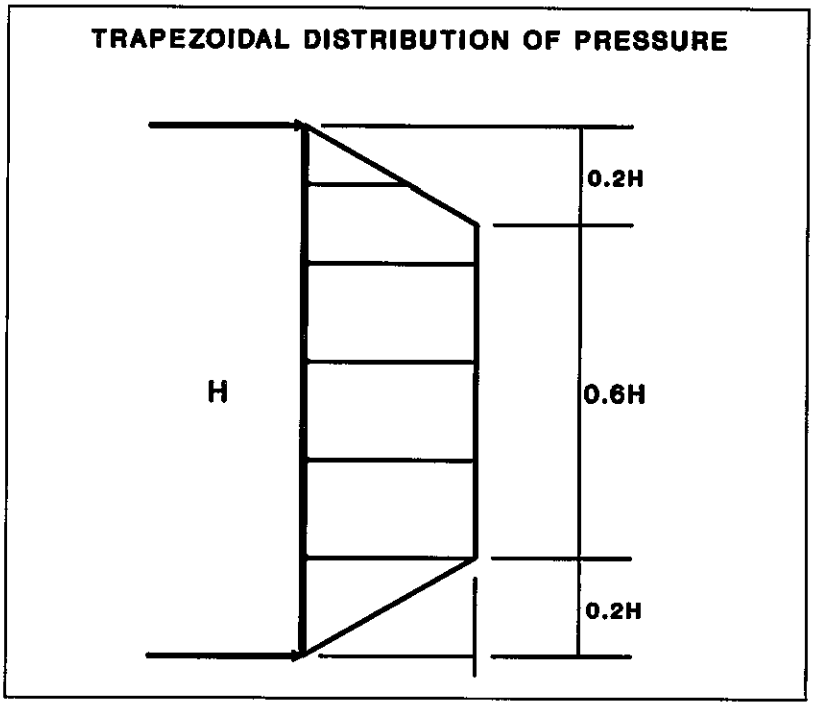
Additional active pressure should be added for any additional surcharge conditions, such as sloping ground, or adjacent traffic and structures. Foundations may be designed using the allowable bearing, friction, and passive earth pressure found in the "Foundation Design" section above.

Cantilever Retaining Walls

Cantilever retaining walls up to 15 feet in height supporting a level back slope may be designed utilizing a triangular distribution of pressure, and an equivalent fluid pressure of 30 pounds per square foot per foot of depth. Cantilever walls up to 15 feet in height supporting inclined backslopes up to a maximum gradient of 2:1 (h:v) may be designed using an equivalent fluid pressure of 45 pounds per square foot per foot of depth. For these equivalent fluid pressures to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made.

Restrained Retaining Walls

Restrained retaining walls may be designed to resist a trapezoidal pressure distribution of at rest pressure as indicated in the diagram below.



HEIGHT OF WALL "H" (feet)	DESIGN WALL FOR (Where H is the height of the wall in feet)
Up to 15 feet	38H psf

Traffic Surcharge

In addition to the recommended earth pressure, the upper ten feet of the retaining wall adjacent to streets, driveways or parking areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal street traffic. If the traffic is kept back at least ten feet from the retaining walls, the traffic surcharge may be neglected.

Seismic Loads on Retaining Walls

Retaining walls greater than 12 feet in heigh shall be designed to resist the additional earth pressure caused by seismic ground shaking. An inverse triangular pressure distribution should be utilized for seismic loads, with an equivalent fluid pressure of 29 pounds per cubic foot. Utilizing this inverse triangular pressure distribution, the earthquake load would be zero at the base of the wall, and would increase linearly to a maximum of 29(H) pounds per square foot at the top of the wall, where H is the height of the retaining wall in feet.

Waterproofing

Moisture affecting retaining walls is one of the most common post-construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Drainage

Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. Certain types of subdrain pipe are not acceptable to the various municipal agencies. It is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

The earth pressures recommended herein for retaining walls assume that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. If a drainage system is not provided, the walls should be designed to resist the indicated earth pressure plus the full hydrostatic pressure, based on a water level to the backfill surface elevation.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 percent of the maximum density obtainable by the ASTM Designation D 1557-07 method of compaction. Flooding should not be permitted. Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to a structure.

Slough Protection

Retaining walls surcharged by a slope should be provided with a minimum of two feet of freeboard for slough protection. A concrete "V" drain or brow ditch at least 2 feet in width should be placed behind the wall so that all flowing water is directed around the wall to an acceptable disposal area.

TEMPORARY EXCAVATIONS

Temporary excavations up to approximately 8 feet in height are anticipated for removal and recompaction operations during construction. Temporary excavations on the order of 15 feet are anticipated for construction of the proposed bridge structure and retaining walls. The excavations are expected to expose fill and native soils, which are suitable for vertical excavations up to 5 feet where not surcharged by adjacent traffic or structures. Surcharged excavations should be shored.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 slope gradient from top to bottom up to a maximum height of 15 feet. A uniform sloped excavation does not have a vertical component. Sloped excavations with vertical cuts at the toe of the slope are not recommended.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are strongly recommended along the tops of the slopes to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Excavation Observations

It is critical that the soils exposed in the excavations are observed by a representative of this office during excavation so that modifications can be made if variations in the earth material conditions occur. Many building officials require that temporary excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

SLABS ON GRADE

Building floor slabs on grade and outdoor concrete flatwork should be a minimum of 4 inches in thickness an should be reinforced with a minimum of #3 steel bars on 24-inch centers each way. The slabs may be cast over undisturbed natural earth materials or properly controlled fill materials. Any earth materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent of the maximum dry density.

Design Of Slabs That Receive Moisture-Sensitive Floor Coverings

In any areas where dampness would be objectionable, it is recommended that the floor slab should be supported on a vapor retarder. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection for concrete slabs-on-grade. The design of the slab and the installation of the vapor retarder should comply with ASTM E 1643-98 and ASTM E 1745-97 (Reapproved 2004). Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be covered with a layer of trimmable, compactible, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

For standard crack control maximum expansion joint spacing of 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork such as walkways or patio areas, is not required, however, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to 90 percent relative compaction.

ASPHALT AND CONCRETE PAVEMENTS

It is recommended that the existing fill materials be removed and recompacted for the support of asphalt and concrete pavements. The client should be aware that removal of all existing fill in the

area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. In any case, it is recommended that a minimum of 12 inches below the existing grade, or 12 inches below the proposed sub-grade, whichever is greater, be moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum density as determined by ASTM D 1557-07.

The following pavement sections are recommended:

Vehicular Service - Assumed Traffic Index	Asphalt Pavement Thickness (inches)	Thickness of Base (inches)
Passenger Cars	3	4
Moderate Trucks	4	7

Concrete paving subject to vehicular traffic shall be a minimum of 6 inches in thickness and reinforced with a minimum of #3 steel bars on 24-inch centers each way. The concrete pavement should be underlain by 4 inches of base. A subgrade modulus of 150 pounds per cubic inch may be assumed for design of concrete paving.

Base materials may consist of aggregate base or crushed miscellaneous base and should be compacted to a minimum of 95 percent of the ASTM D 1557-07 laboratory maximum dry density. Base materials should conform with Sections 200-2.2 or 200-2.4 of the "Standard Specifications for Public Works Construction", (Green Book), current edition.

The performance of pavement is highly dependant upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade

materials and subsequent pavement distress. It is recommended perimeter curbs should extend a minimum of 12 inches below the bottom of the aggregate base.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage should be collected and transferred to an acceptable location in non-erosive drainage devices. Structures should be provided with roof drainage. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Planters located adjacent to a structure should be sealed to prevent moisture intrusion into the underlying soils. Irrigation in the planter areas around the proposed development should be properly controlled. Excessive irrigation may saturate the underlying soils and adversely affect the proposed development.

The client should be aware that the existing slopes and drainage courses to the south of the site of the site will drain towards the subject site. This additional drainage should be directed around or through the proposed developed and should be considered during design. Cut off walls and methods of scour prevention should be implemented where necessary to prevent erosion

STORMWATER DISPOSAL

Recently, regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. This requirement goes against prudent

engineering practice. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

Due to the sloping nature of the subject site, it is the opinion of this firm that stormwater infiltration at the site could reduce the stability of existing and proposed slopes on and in the vicinity of the subject site. Therefore, stormwater infiltration is not recommended on the subject site.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein is satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. Therefore, it is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify this office immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those

who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The scope of the geotechnical services provided did not include any environmental site assessment for the presence or absence of organic substances, hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

Corrosion testing was not conducted as part of this investigation. However, if corrosion sensitive improvements are planned, it is recommended that a comprehensive corrosion study should be commissioned. The study would develop recommendations to avoid premature corrosion of buried pipes in direct contact with the soils.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification System. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System. Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the boring logs.

Samples of the earth materials encountered in the borings were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Unless noted on the boring logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound automatic trip hammer. Samples collected in test pits are obtained by driving a thin-walled sampler by hand. In either case, the soil is retained in brass rings of 2.50 inches inside diameter and 1.00 inches in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples noted on the boring logs as SPT samples are obtained in accordance with ASTM D 1586-08. An automatic trip hammer was utilized to obtain SPT samples. Samples are retained for 30 days after the date of the geotechnical report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by ASTM D 4959-07 or ASTM D 4643-08. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the "Boring Logs", A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by ASTM D 3080-04 with a strain controlled, direct shear machine manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are

generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagrams," B-Plates.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests ASTM D 2435-04. The consolidation apparatus is designed to receive a single one-inch high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the ASTM D4829-08. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hours or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height, and multiplied by 1,000.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined by use of ASTM D 1557-07. A soil at a selected moisture content is placed in five layers into as mold of given dimensions, with each layer compacted by 25 blows of a 10 pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted, represent a curvilinear relationship know as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve.

REFERENCES

Blake, T.F., 1994-1996, LIQ2_30.WQ1 - A QUATTRO-PRO Spreadsheet Computer Program for the determination of liquefaction potential using the NCEER (1996) semi-empirical method.

California Department of Conservation, Division of Mines and Geology, 1973, "Geology of Parts of the Azusa and Mount Wilson Quadrangles, San Gabriel Mountains, Los Angeles County, California," Special Report 105.

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California Department of Conservation, Division of Mines and Geology, 1998 (Revised 2008), Seismic Hazard Zone Report for the Azusa 7 ½-Minute Quadrangle, Los Angeles County, California., C.D.M.G. Seismic Hazard Zone Report 021, map scale 1:24,000.

Dibblee, T.W.. Jr., 1998, Geologic Map of the Mt. Wilson and Azusa Quadrangles, DF Map #DF-67, Map Scale 1:24,000.

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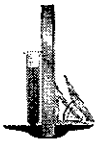
Tinsley, J.C., and Fumal, T.E., 1985, Mapping quaternary Sedimentary Deposits for Areal Variations in Shaking Response, in Evaluation Earthquake Hazards in the Los Angeles Region- An Earth Science Perspective, U.S. Geological Survey Professional Paper 1360, Ziony, J.I. ed., pp 101-125.

Tokimatsu, K. and Seed, H. B., 1987, Evaluation of Settlements in Sands Due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, Vol. 113, No. 8.

United States Geological Survey, 1987, "Recent Reverse Faulting in the Transverse Ranges, California," U.S. Geological Survey Professional Paper 1339.



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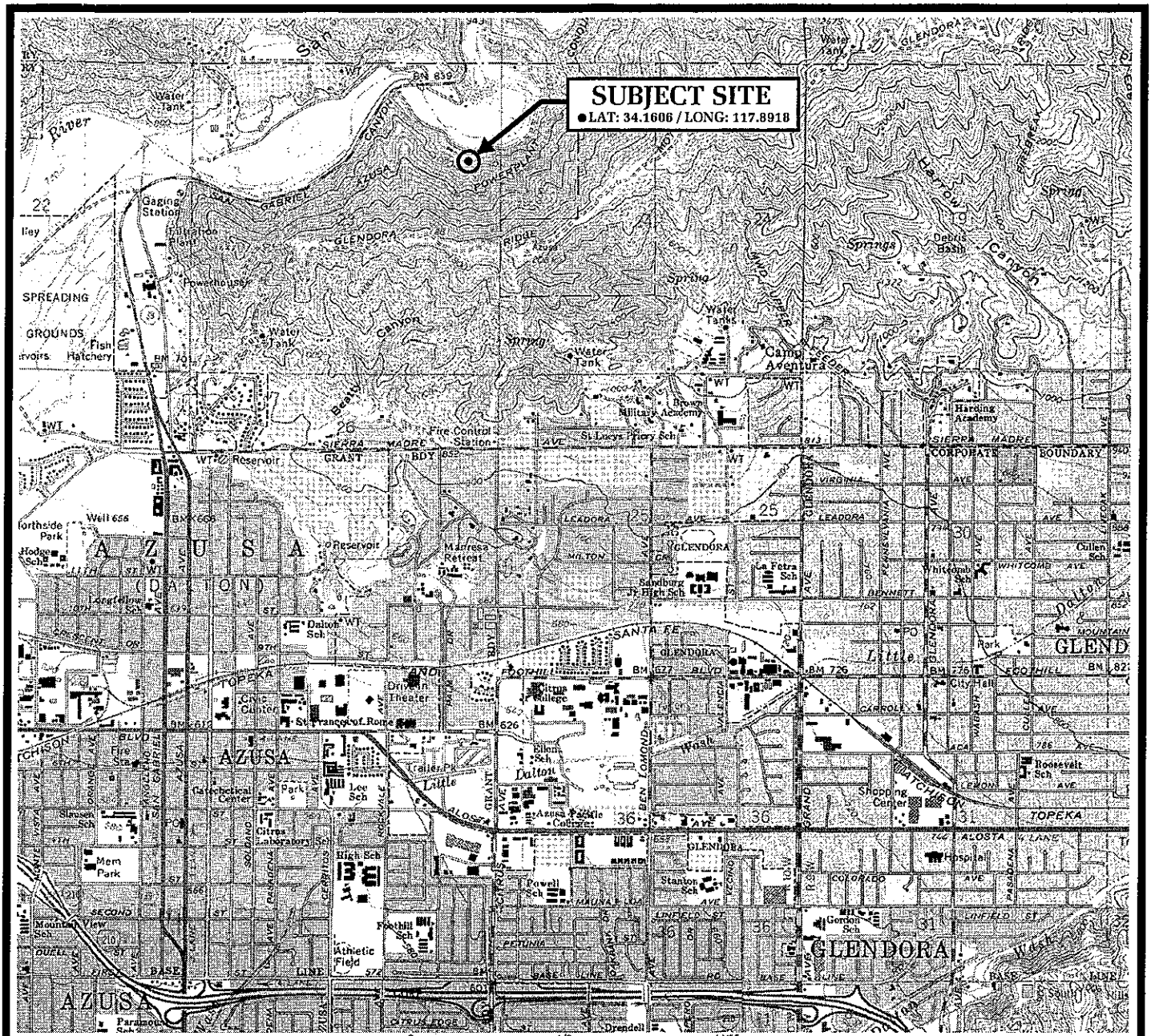
United States Geological Survey, 2008, U.S.G.S. Interactive Deaggregation Program. http://eqint.cr.usgs.gov/deaggint/2008/index.php.

United States Geological Survey, 2011, U.S.G.S. Ground Motion Parameter Calculator (Version 5.1.0). http://earthquake.usgs.gov/hazards/designmaps/



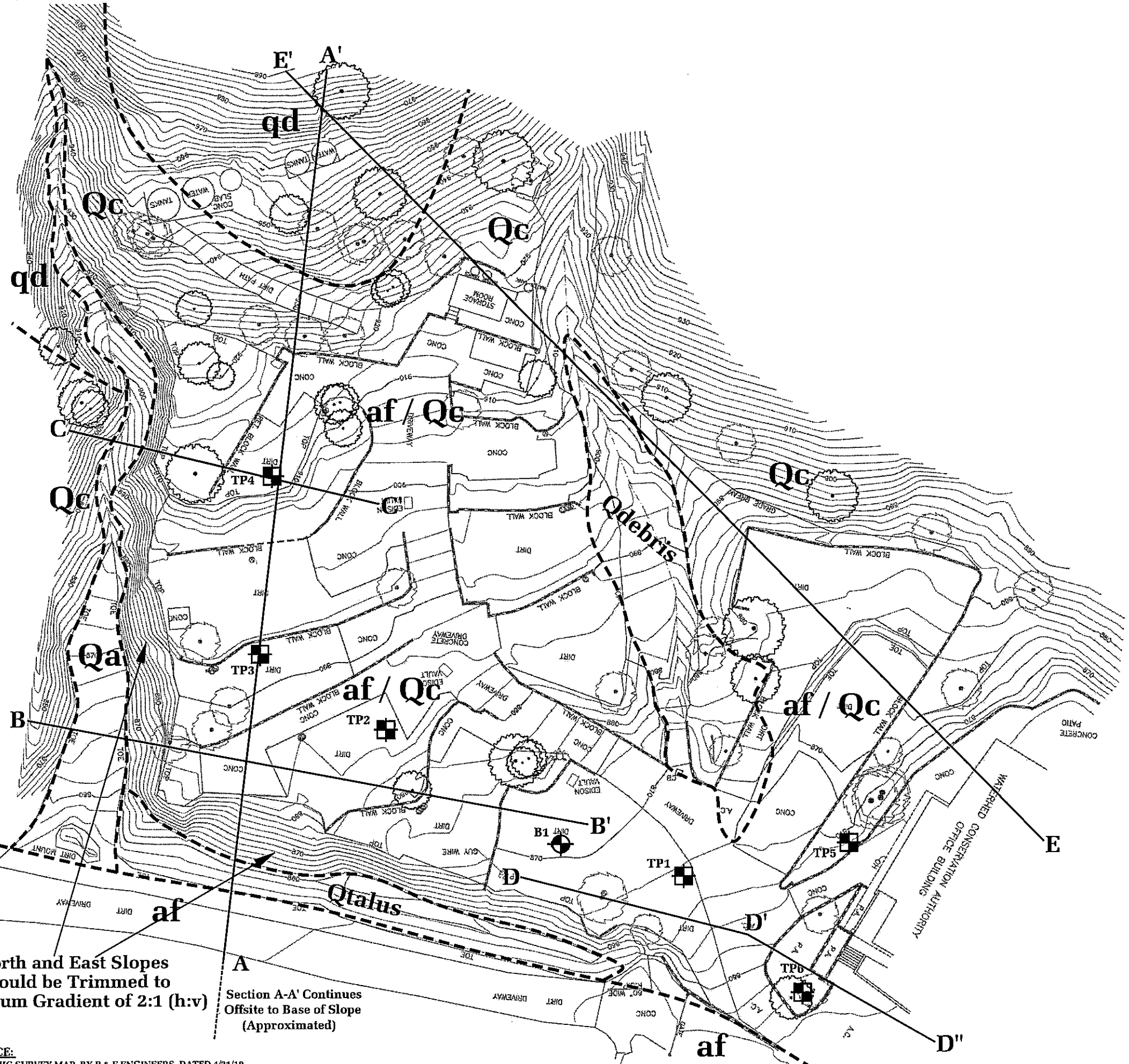
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES, AZUSA, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092



REFERENCE:
TOPOGRAPHIC SURVEY MAP, BY B & E ENGINEERS, DATED 4/21/10.

SCALE IN FEET
0 20 40 80

LEGEND

- B1 — LOCATION & NUMBER OF BORING
- TP6 — LOCATION & NUMBER OF TEST PIT
- **af:** Artificial Fill
- **Qdebris:** Recent Debris Flows
- **Qtalus:** Recent Talus Deposits
- **Qa:** Recent Alluvial Soils
- **af / Qc:** Colluvium - Locally Covered with Artificial Fill
- **qd:** Bedrock - Quartz Diorite
- Geologic Contact
- E——E' Cross Section Line

SURVEY PLAN / GEOLOGIC MAP

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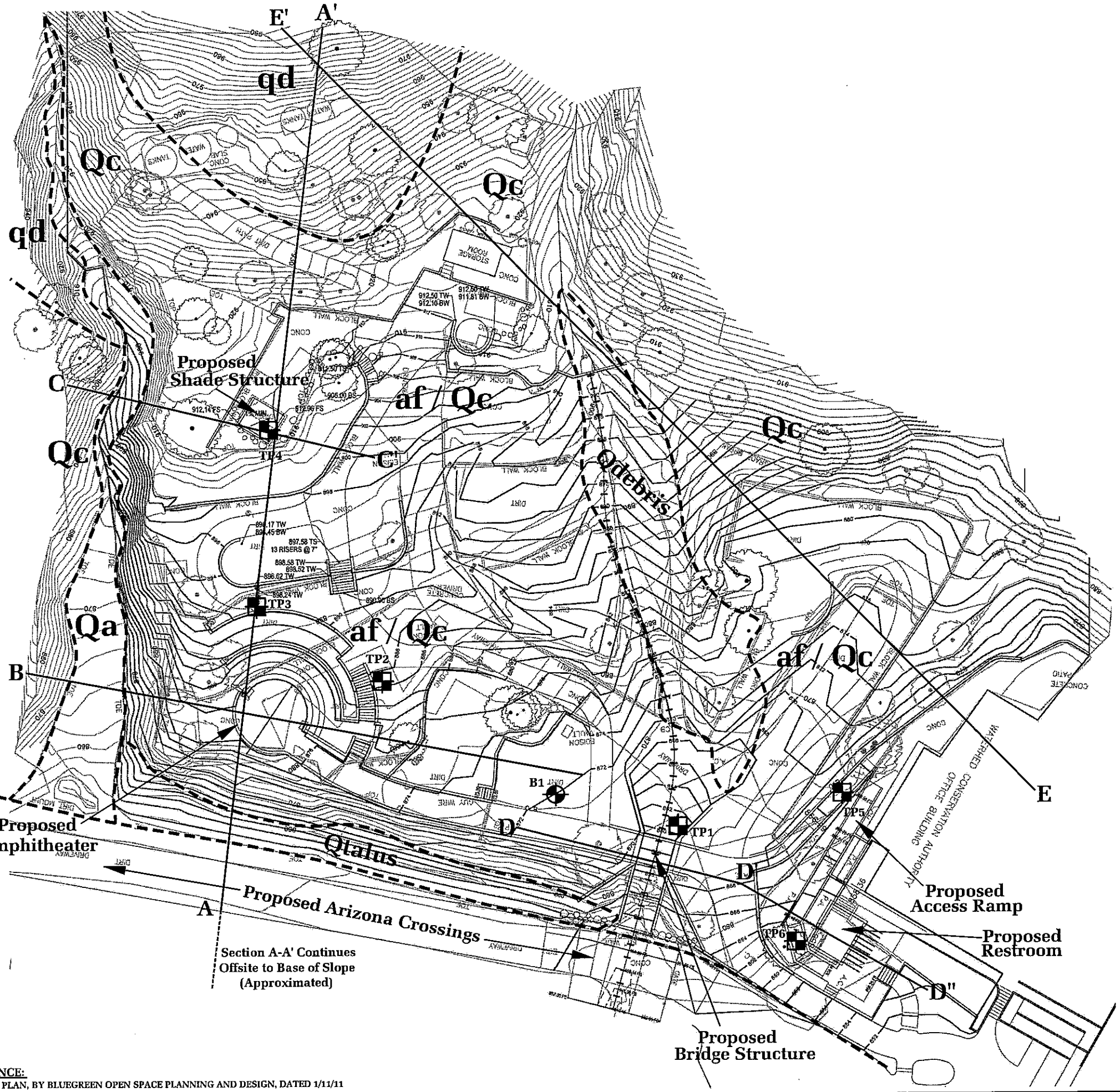
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE No. 20092

Exhibit H - Plan Specifications for the Special Use Area



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0 20 40 80

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- Geologic Contact
- E——E' Cross Section Line

REFERENCE:
GRADING PLAN, BY BLUEGREEN OPEN SPACE PLANNING AND DESIGN, DATED 1/11/11

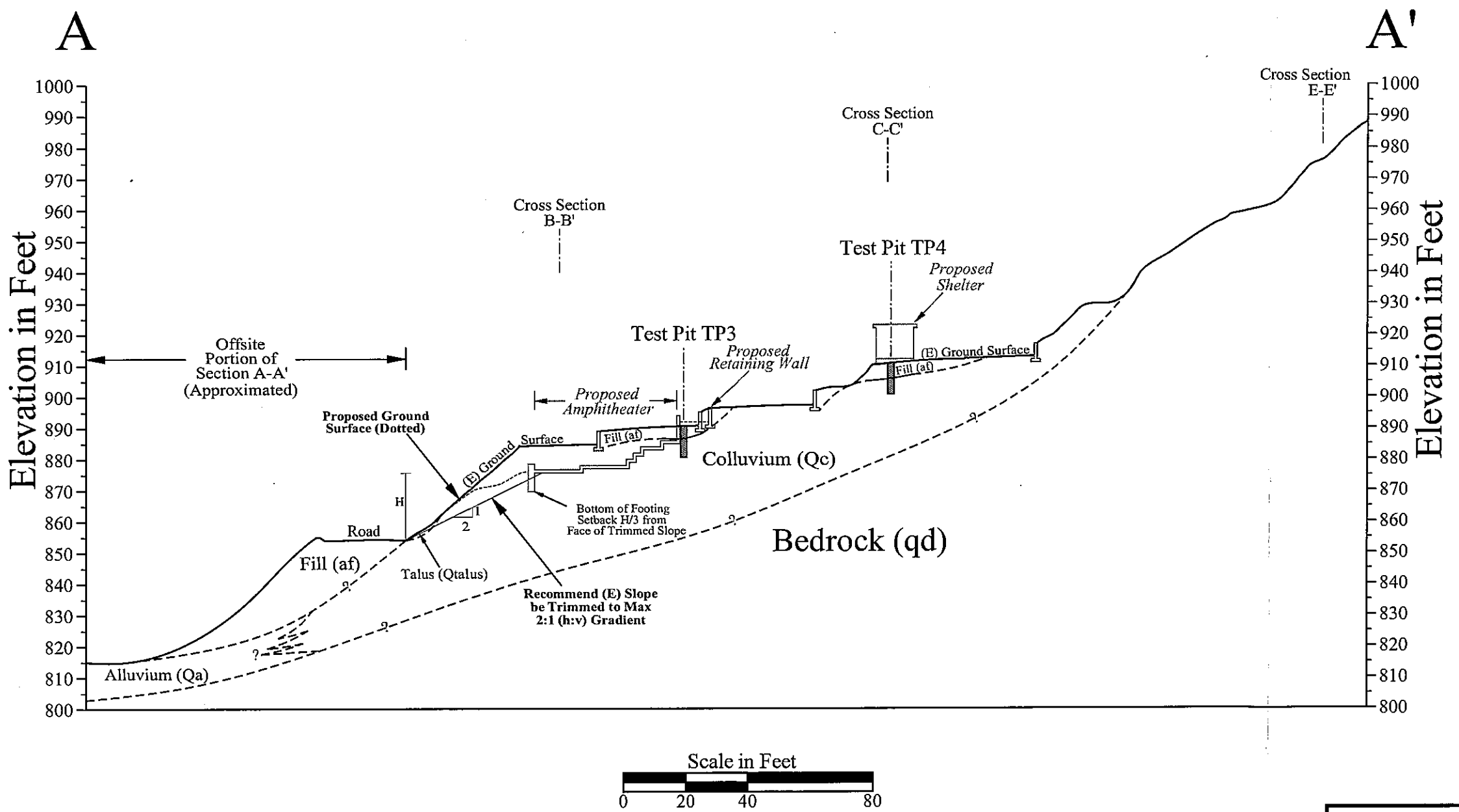
PLOT PLAN

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE No. 20092

Exhibit H - Plan Specifications for the Special Use Area



CROSS SECTION A-A'

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Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE No. 20092

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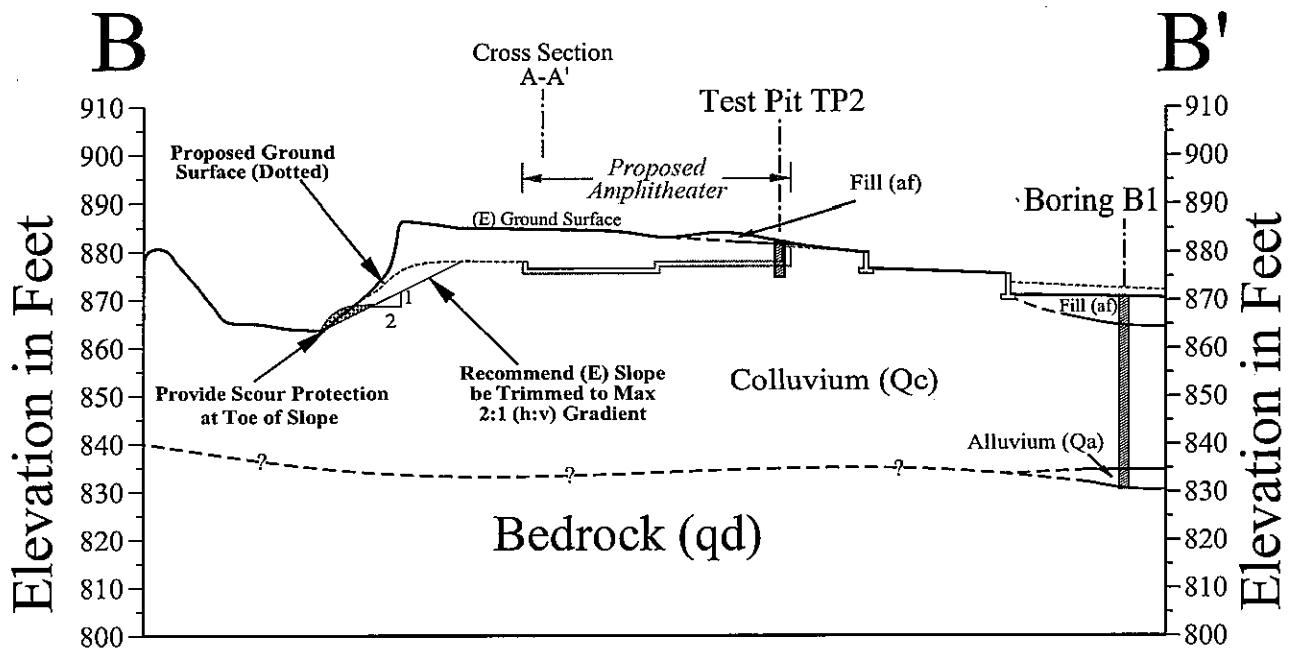

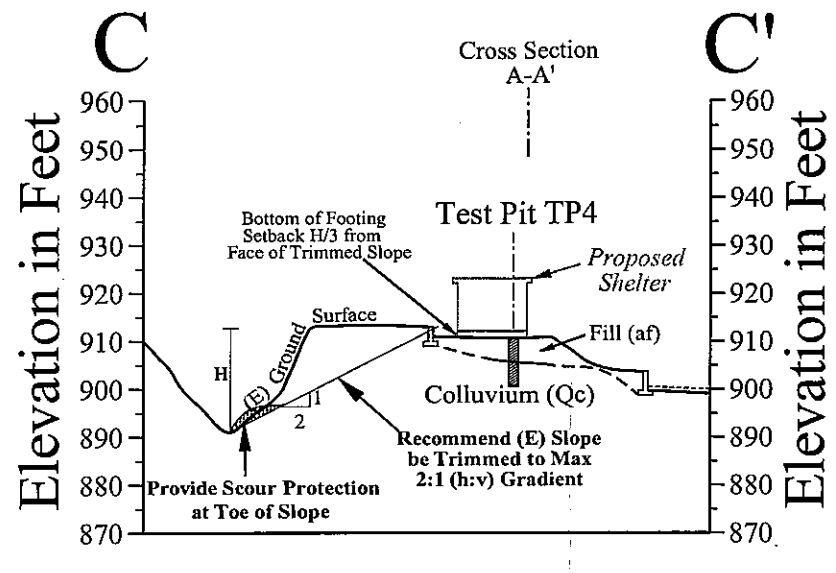

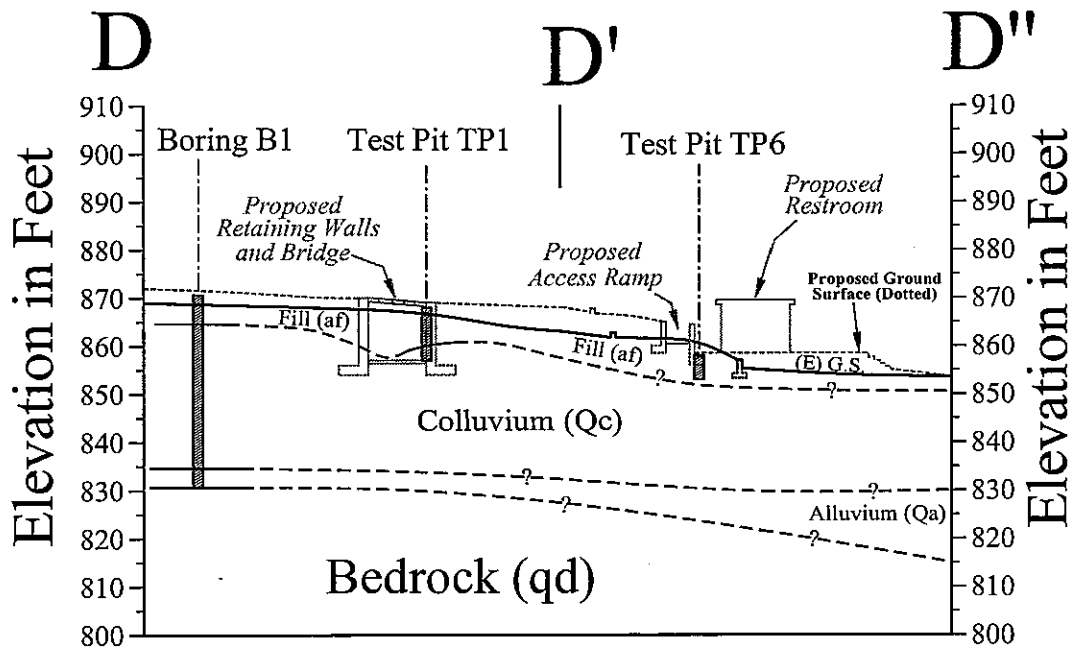

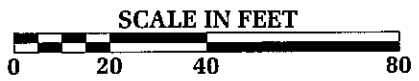

CROSS SECTIONS B-B', C-C', AND D-D'

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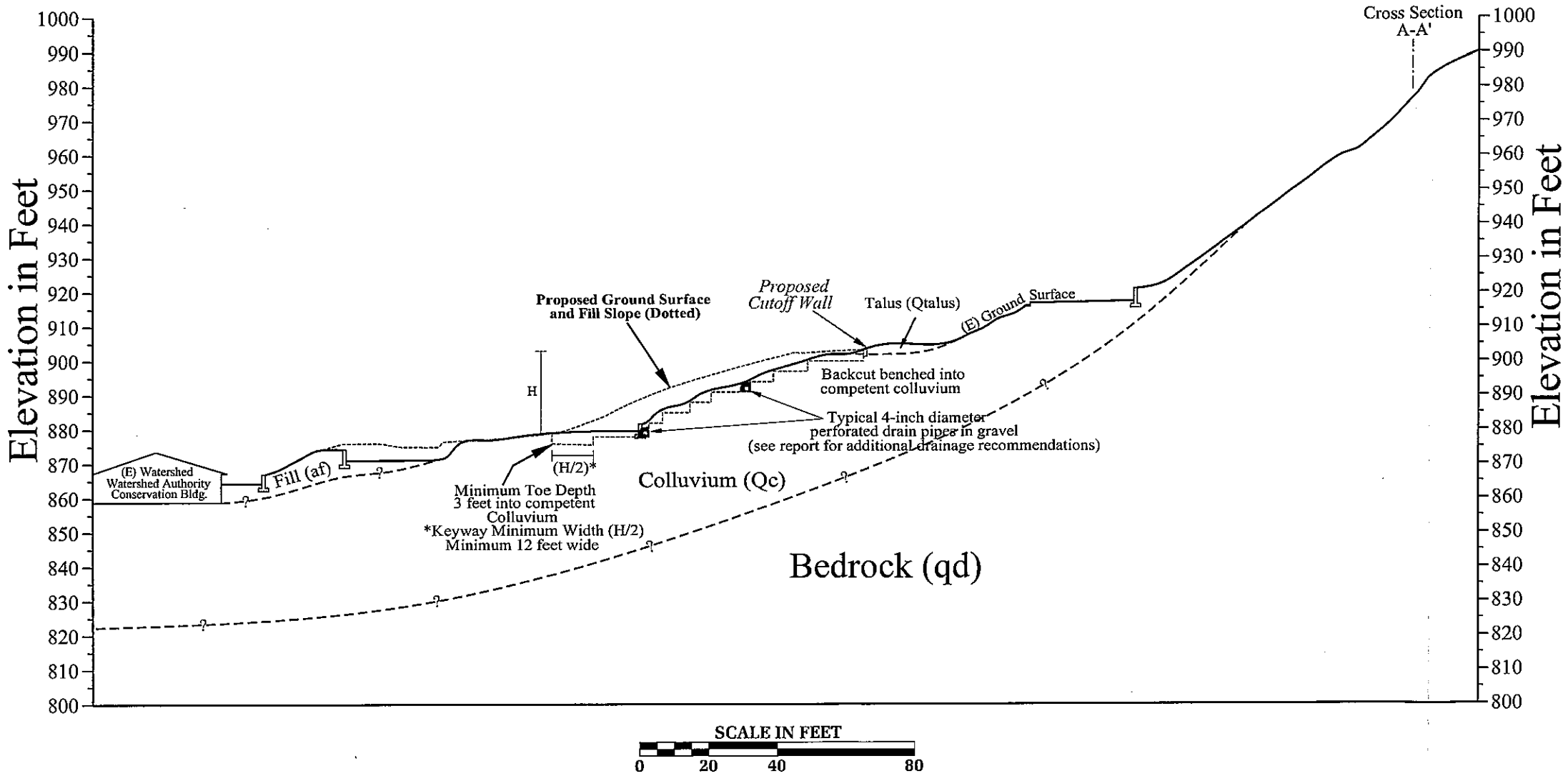
FILE No. 20092

Exhibit H - Plan Specifications for the Special Use Area



CROSS SECTION E-E'

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FILE No. 20092

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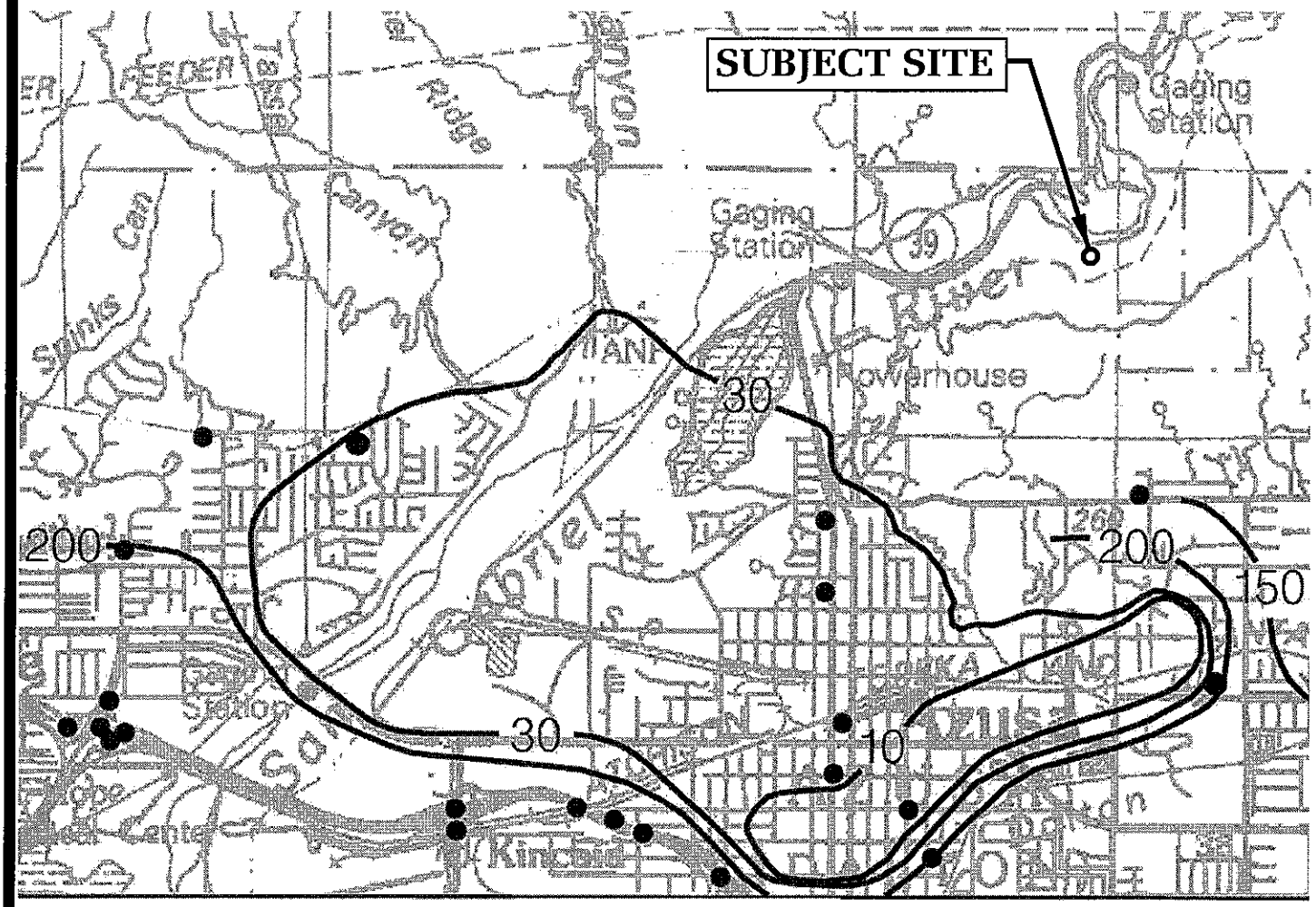

20 Depth to groundwater in feet

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 021
AZUSA 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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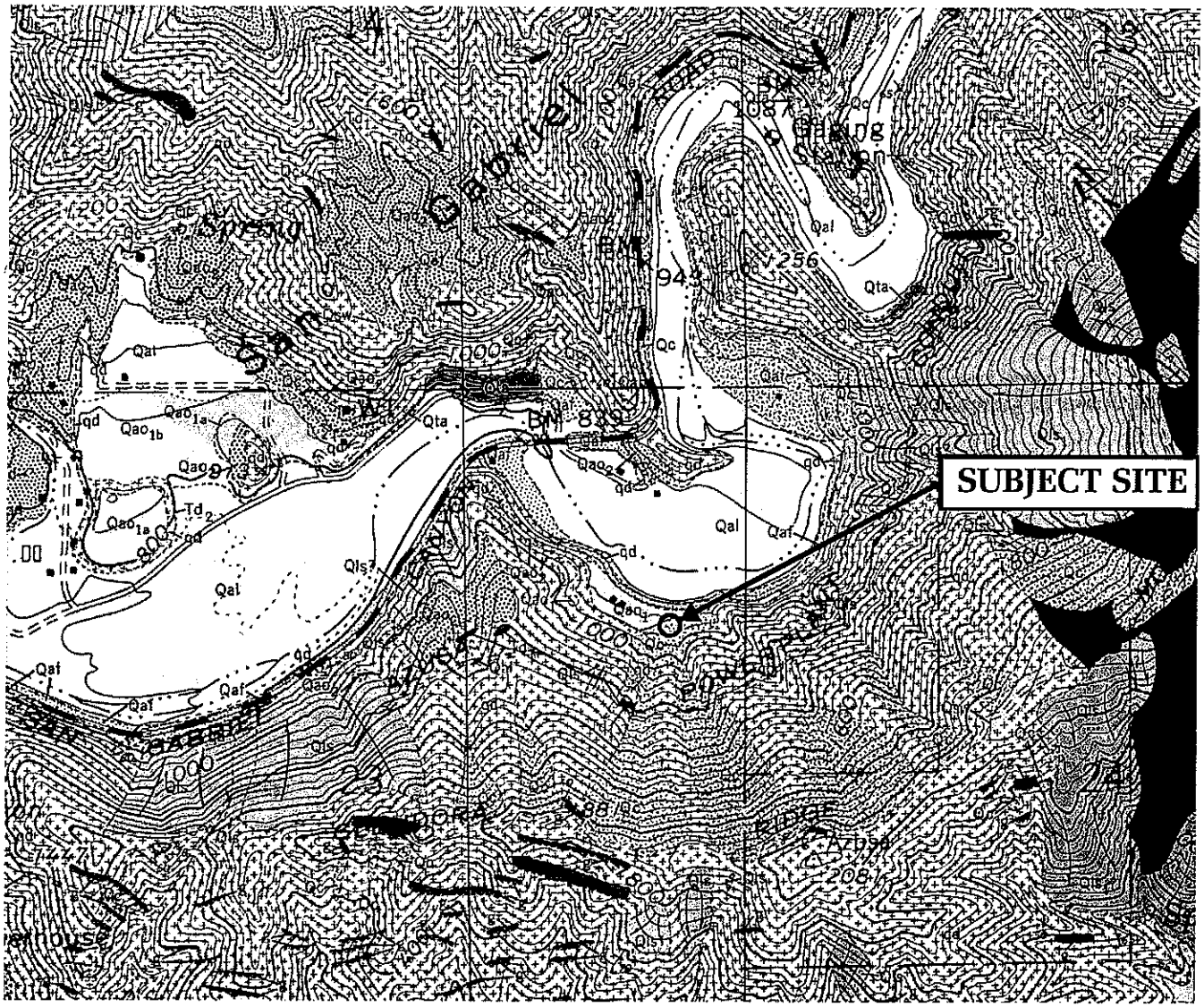

LEGEND

SCALE IN FEET

0 1000 2000

Qaf: Artificial Fill - Fill which is compacted and/or uncompacted and is mainly locally obtained.

Qa: Alluvium - Unconsolidated, generally grayish alluvium on canyon floors within the mountains. San Gabriel River channel alluvium.

Qc: Colluvial debris - Includes, on ridge tops, decomposed rock which in large part may be in situ.

Qls: Landslide debris - Landslides that appear to have resulted from primarily slump-type failure (rotational) and that possess relatively well defined scarp areas and slump block(s) are designated Qls1. Landslide deposits fromed essentially by rock fall accumulations of angular rock fragments and blocks on or at the bases of steep slopes are designated Qls4. Deposits of inferred landslide origin are queried.

Qao2: Older alluvial deposits

Qao1: Older stream deposits - Where two adjacent terrace deposits are of different ages, the older (topographically higher) deposit is designated Qoa1a; the younger is designated Qoa1b.

Td: Dikes - (Td1) Hypabyssal dikes basic to intermediate in composition. (Td2) Leucocratic hypabyssal dikes.

qd: Quartz diorite - Mostly quartz diorite; grades into granodiorite, quartz monzonite, and diorite.

N

REFERNCE: CDMG, 1973, Geology of Parts of the Azusa and Mount Wilson Quadrangles, San Gabriel Mountains, Los Angeles County, Special Report 105.

LOCAL GEOLOGIC MAP, CDMG 1973

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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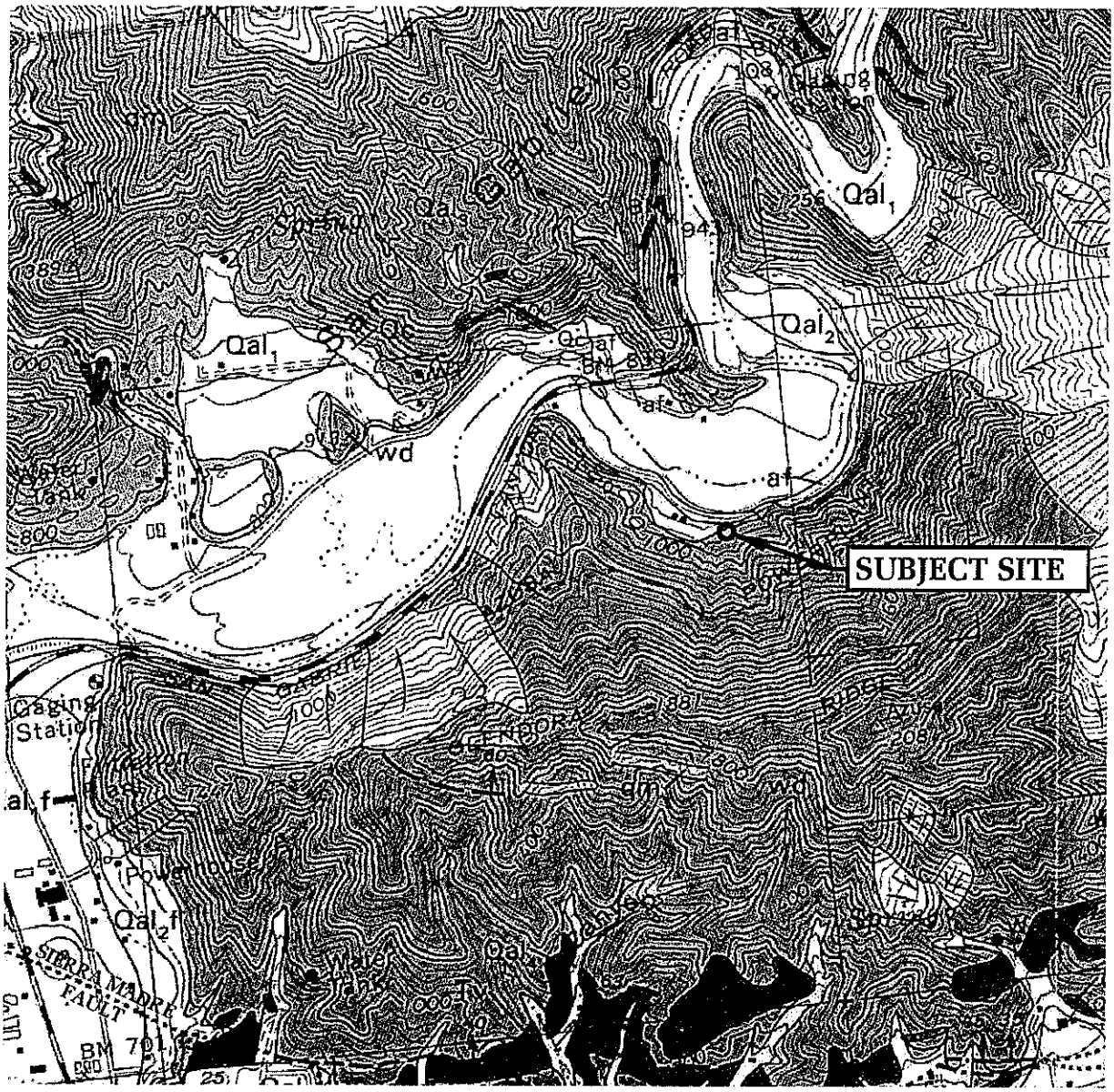
FILE NO. 20092



SCALE IN FEET

0 500 1000 2000

LEGEND

- **af:** Artificial fill
- **Qc:** Colluvium (Holocene) - Talus and slope wash
- **Qal1:** Alluvium Unit 1 (Holocene) - Sand and gravel containing abundant cobbles and boulders; includes deposits of present stream channels, flood plains, and alluvial fans
- **Qal2:** Alluvium Unit 2 (Holocene) - Sand and gravel containing abundant cobbles and boulders; includes deposits of present stream channels, recently abandoned flood plains, and alluvial fans with incipient soil
- **Qal3:** Alluvium Unit 3 (pleistocene) - Sand and gravel containing abundant cobbles and boulders and highly weathered diorite clasts; includes stream terraces and moderately dissected alluvial fans with poorly to moderately developed soils
- **qm:** Quartz Monzonite and Granodiorite - Fine to medium grained intrusive rocks
- **wd:** Wilson Diorite of Miller - Hornebl ende-biotite-quartz diorite

N

REFERNCE: USGS, 1987, RECENT REVERSE FAULTING IN THE TRANSVERSE RANGES, CALIFORNIA, PROFESSIONAL PAPER 1339.

LOCAL GEOLOGIC MAP, USGS 1987

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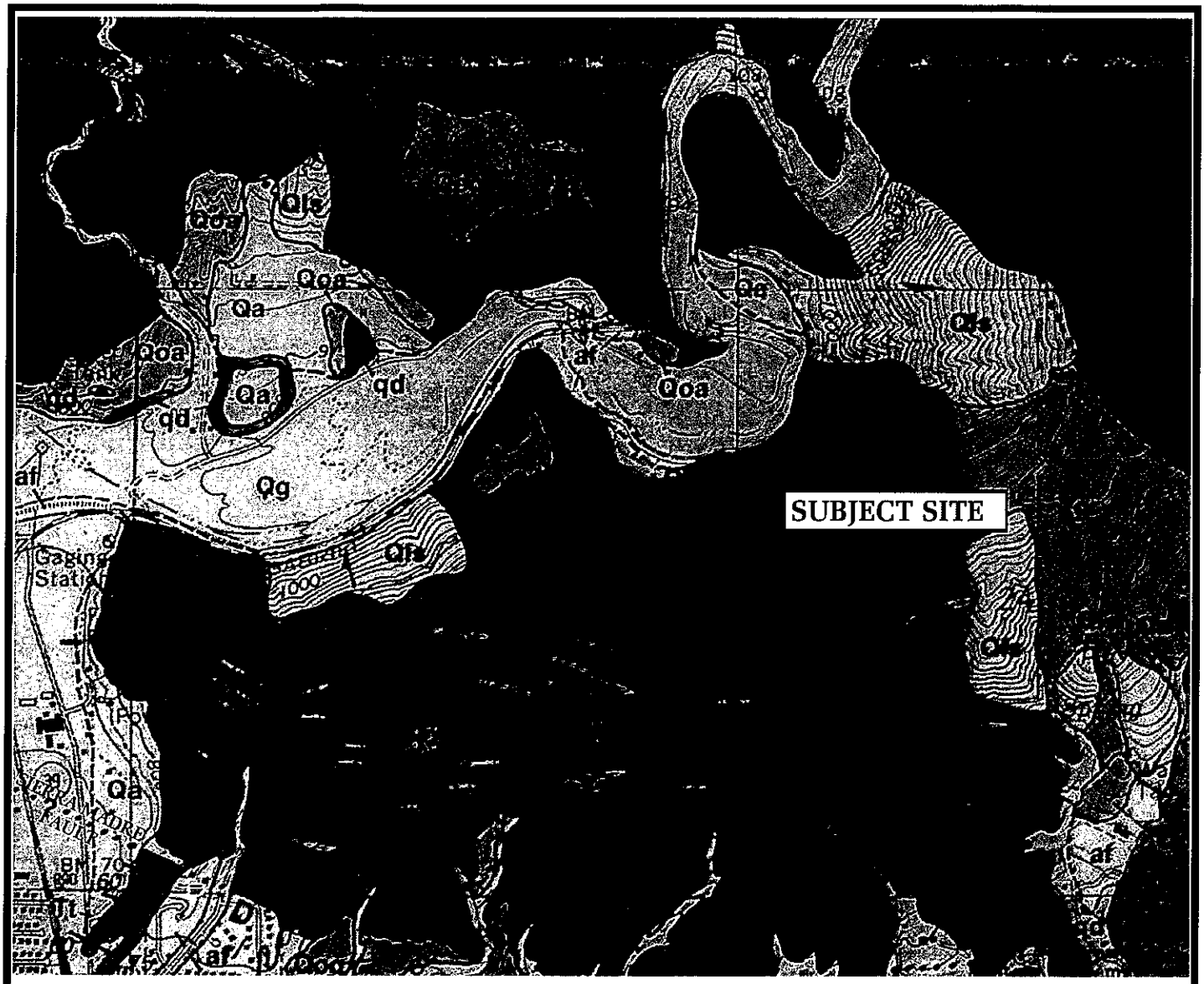
FILE NO. 20092



SCALE IN FEET

0 500 1000 2000

LEGEND

- af: Artificial fill
- Qg: Gravel and sands of stream channels, and alluvial fan outwash from major canyons
- Qa: Alluvium of valley areas
- Qls: Landslide and talus debris
- Qoa: Low terrace remnants of alluvial gravel and sand
- Qog: Elevated remnants of fan gravel and sand
- bi: Dike Rocks - thin dikes of gray to black, fine-grained, mafic andesite to basalt
- gr: Granitic Rocks - Ranging from granite to granodiorite
- qd: Quartz Diorite - medium grained, incoherent where weathered, rock massive to gneissoid.
- —••••? Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

N

Geotechnologies, Inc

REFERNCE: DIBBLEE, T.W., (1998), MAP #DF-67, GEOLOGIC MAP OF THE MOUNT WILSON AND AZUSA QUADRANGLES

LOCAL GEOLOGIC MAP, DIBBLEE, T.W.

Geotechnologies, Inc.
Consulting Geotechnical Engineers

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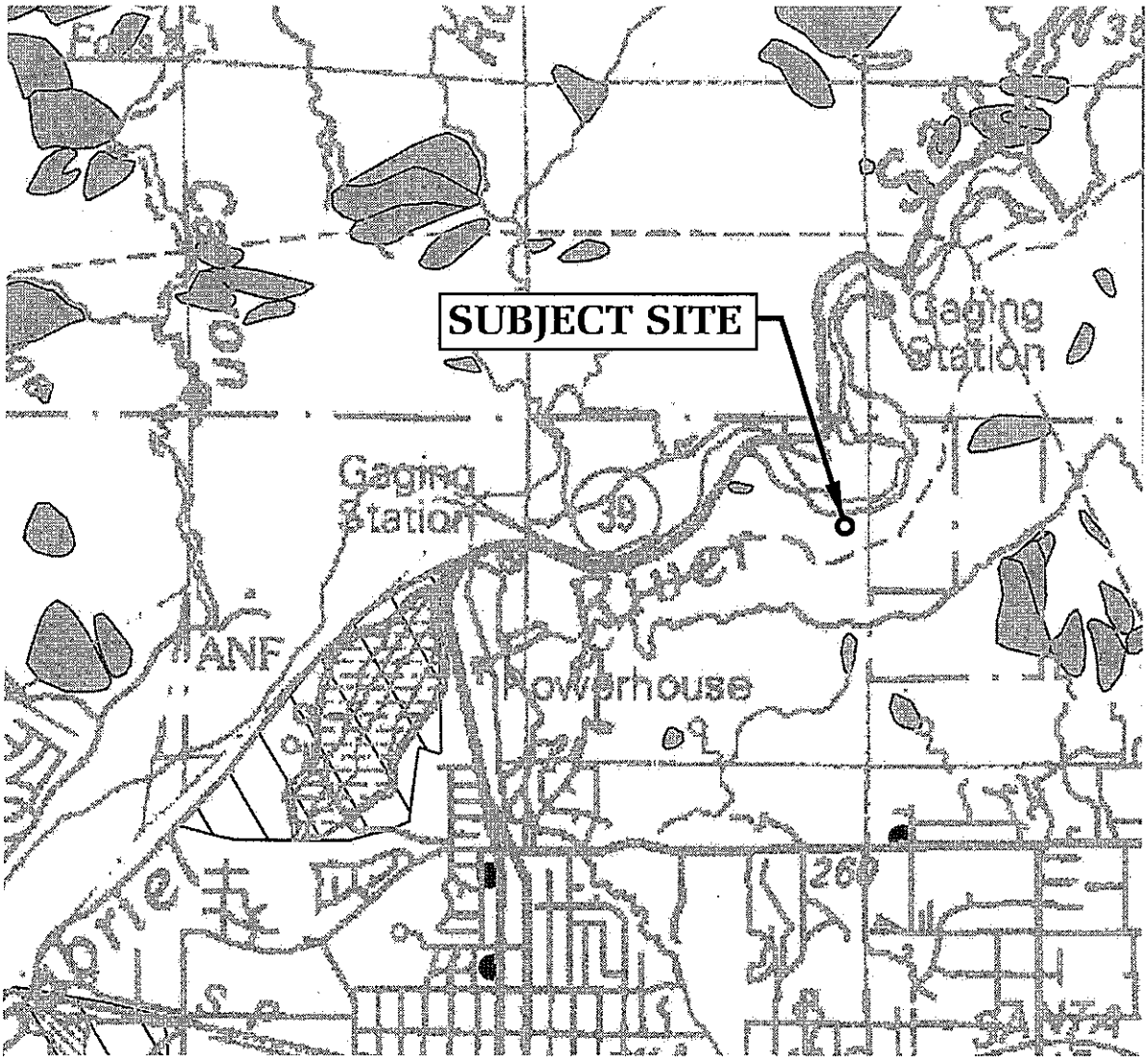
FILE NO. 20092



Areas of Significant Grading

Landslide

N

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 021
AZUSA 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

LANDSLIDE INVENTORY MAP

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Consulting Geotechnical Engineers

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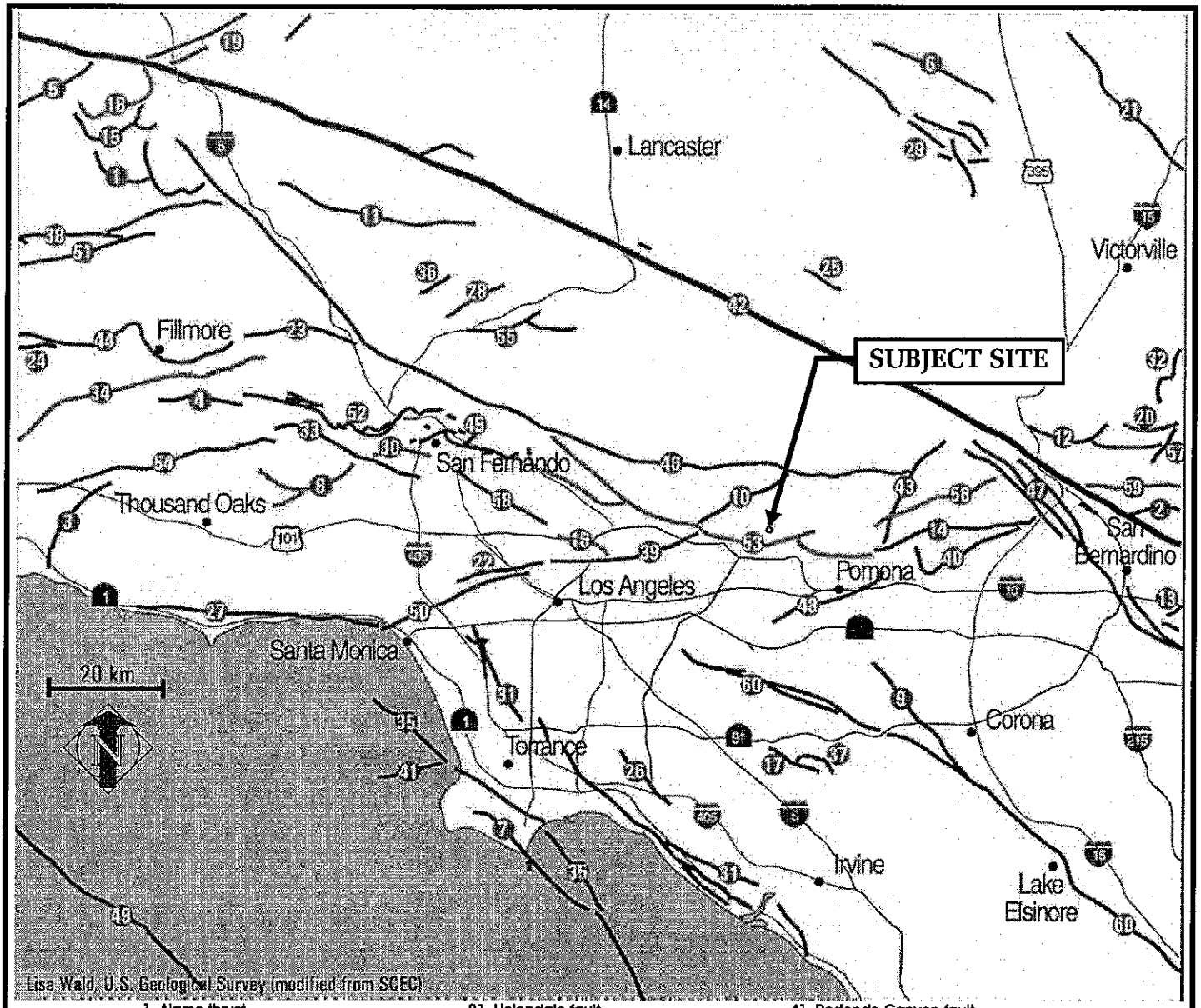
FILE No. 20092



1 Alamo thrust
2 Arrowhead fault
3 Bailey fault
4 Big Mountain fault
5 Big Pine fault
6 Blake Ranch fault
7 Cabrillo fault
8 Chatsworth fault
9 Chino fault
10 Clamshell-Sawpit fault
11 Clearwater fault
12 Cleghorn fault
13 Crafton Hills fault zone
14 Cucamonga fault zone
15 Dry Creek fault
16 Eagle Rock fault
17 El Modeno fault
18 Frazier Mountain thrust
19 Garlock fault zone
20 Grass Valley fault
21 Helendale fault
22 Hollywood fault
23 Holser fault
24 Lion Canyon fault
25 Llano fault
26 Los Alamitos fault
27 Malibu Coast fault
28 Mint Canyon fault
29 Mirage Valley fault zone
30 Mission Hills fault
31 Newport Inglewood fault zone
32 North Frontal fault zone
33 Northridge Hills fault
34 Oak Ridge fault
35 Palos Verdes fault zone
36 Pelona fault
37 Peralta Hills fault
38 Pine Mountain fault
39 Raymond fault
40 Red Hill (Etiwanda Ave) fault
41 Redondo Canyon fault
42 San Andreas Fault
43 San Antonio fault
44 San Cayetano fault
45 San Fernando fault zone
46 San Gabriel fault zone
47 San Jacinto fault
48 San Jose fault
49 Santa Cruz-Santa Catalina Ridge f.z.
50 Santa Monica fault
51 Santa Ynez fault
52 Santa Susana fault zone
53 Sierra Madre fault zone
54 Simi fault
55 Soledad Canyon fault
56 Stoddard Canyon fault
57 Tunnel Ridge fault
58 Verdugo fault
59 Waterman Canyon fault
60 Whittier fault

REFERENCE: http://pasadena.wr.usgs.gov/info/images/LA%20Faults.pdf

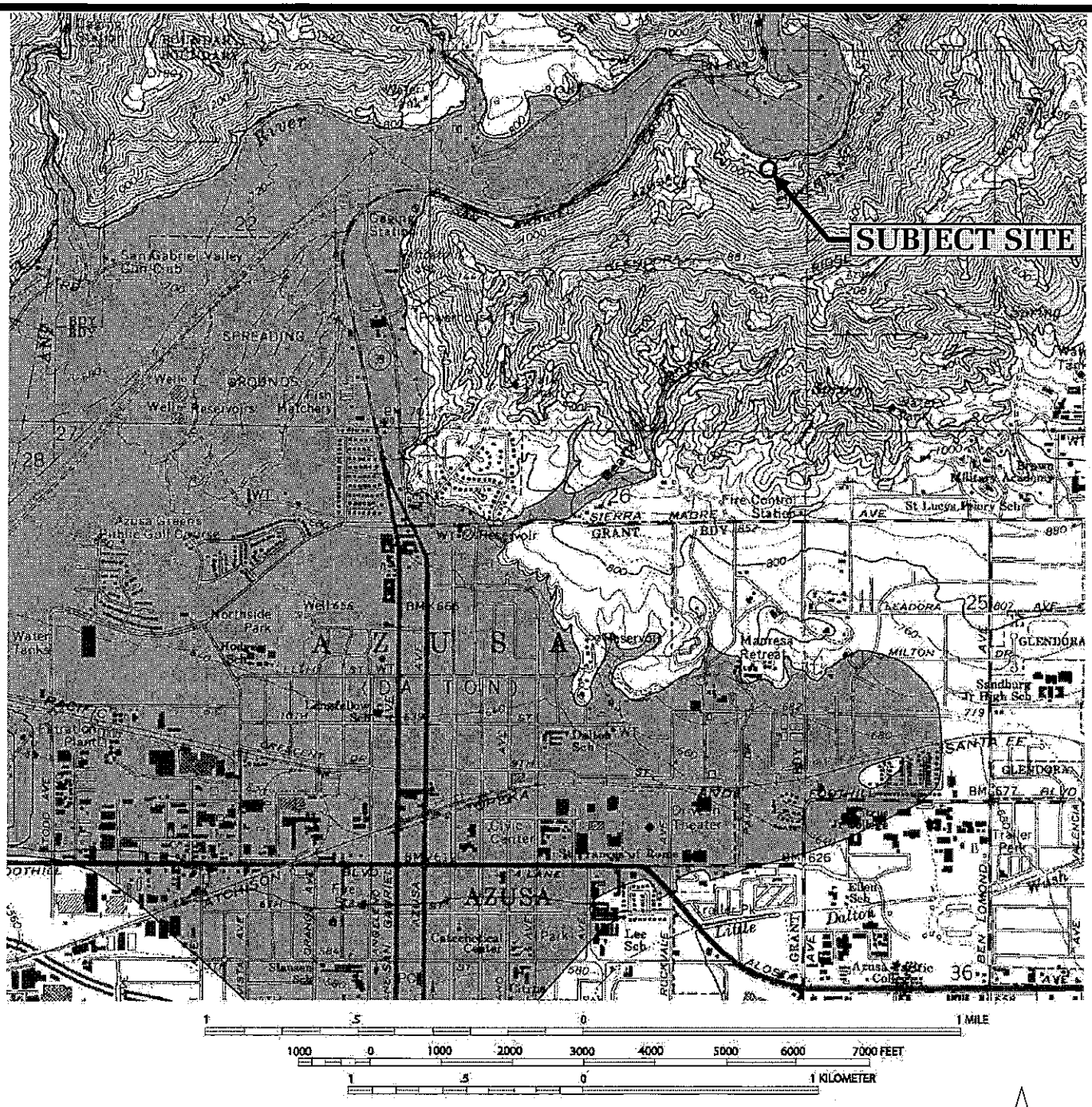
SOUTHERN CALIFORNIA FAULT MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE No. 20092

Exhibit H - Plan Specifications for the Special Use Area



REFERENCE: SEISMIC HAZARD ZONES, AZUSA QUADRANGLE OFFICIAL MAP (CDMG, 1999)

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092

BORING LOG NUMBER 1

BlueGreen Consulting **Date: 01/18/11** **Elevation: 870'***

File No. 20092 **Method: 8-inch Diameter Hollow Stem Auger**

km

*Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
				0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine to coarse grained, abundant rock fragments
				1 --		
2.5	12	5.5	113.3	2 --		
				3 --		
				4 --		
5	17	5.0	SPT	5 --		
				6 --		
				7 --	SM	COLLUVIUM: Silty Sand, medium brown, moist, medium dense to dense, fine to coarse grained, abundant angular rock fragments
7.5	53	3.8	Disturbed	8 --		
				9 --		
10	21	3.6	SPT	10 --		
				11 --		
				12 --		
12.5	49	1.9	119.3	13 --	SM/SW	Silty Sand to Sand, medium brown, moist, dense, fine to coarse grained, abundant angular rock fragments
				14 --		
15	50/6"	3.0	SPT	15 --		
				16 --		
				17 --		
17.5	42	2.9	122.3	18 --	SM	Silty Sand , medium brown, moist, medium dense to dense, fine to coarse grained, abundant sub-angular to angular rock fragments
				19 --		
20	26	3.1	SPT	20 --		
				21 --		
				22 --		
22.5	61	5.4	128.1	23 --		
				24 --		
25	34	6.1	SPT	25 --		

BORING LOG NUMBER 1

BlueGreen Consulting

File No. 20092

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	50/6"	5.3	115.2	28		
				29		
30	52	4.9	SPT	30		
				31		
				32		
32.5	75	7.4	119.5	33		
				34		
35	43	7.8	SPT	35		
				36		
				37	SP	ALLUVIUM: Sand, dark to medium brown, moist, dense, fine grained
37.5	100/5"	5.5	105.4	38		
				39		
40	100/1"	1.2	SPT	40		
				41		Total depth: Refusal 40 feet No Water Fill to 6 feet
				42		
				43		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual
				44		
				45		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				46		
				47		SPT=Standard Penetration Test
				48		
				49		
				50		

LOG OF TEST PIT NUMBER 1

BlueGreen Consulting **Drilling Date: 01/11/11** **Elevation: 868'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, medium dense to dense, fine
			-		to coarse grained, abundant sub-angular to angular rock fragments up to
1	9.3	122.6	1 --		2 feet in diameter
			-		
			2 --		
			-		
3	6.7	117.2	3 --		
			-		
			4 --		
			-		
5	8.7	119.3	5 --		
			-		
			6 --		
			-		
7	9.8	109.0	7 --		
			-		
			8 --		
			-	SM	COLLUVIUM: Silty Sand, dark brown, moist, medium dense to dense, fine
			9 --		to medium grained, abundant sub-angular to angular rock fragments
			-		
10	6.8	120.9	10 --		
			-		
11	8.4	125.1	11 --		
			-		Total depth: 11 feet
			12 --		No Water
			-		Minor Raveling
			13 --		Fill to 8 feet
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 2

BlueGreen Consulting **Drilling Date: 01/11/11** **Elevation: 882'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine to coarse grained, abundant rock fragments
1	9.8	108.2	1	SM/SW	COLLUVIUM: Silty Sand to Sand, dark brown to dark gray, moist, dense, fine to coarse grained, abundant sub-angular to angular rock fragments up to 1½ feet in diameter
			2		
3	7.4	112.2	3		
			4		
5	8.4	121.5	5		
			6		
7	7.3	121.8	7	SM	Silty Sand, dark to medium brown, moist, dense, fine to coarse grained, rock fragments
			8		
			9		Total depth: 7½ feet No Water Raveling 0 - 7½ feet Fill to 1 foot
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		
			22		
			23		
			24		
			25		

LOG OF TEST PIT NUMBER 3

BlueGreen Consulting **Drilling Date: 01/11/11** **Elevation: 891'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, dense, fine grained, rock fragments
1	7.2	116.2	1 --		
			2 --		
3	8.7	124.3	3 --		
			4 --		
				SM/SW	COLLUVIUM: Silty Sand to Sand, dark and medium brown, moist, dense,
5	8.3	122.0	5 --		fine to coarse grained, abundant angular rock fragments ranging from gravel sized up to 1 foot in diameter
			6 --		
7	6.0	116.9	7 --		
			8 --		
			9 --		
10	6.2	120.4	10 --		
			11 --		Total depth: 10 feet No Water Raveling 0 - 10 feet Fill to 4 feet
			12 --		
			13 --		
			14 --		
			15 --		
			16 --		
			17 --		
			18 --		
			19 --		
			20 --		
			21 --		
			22 --		
			23 --		
			24 --		
			25 --		

LOG OF TEST PIT NUMBER 4

BlueGreen Consulting **Drilling Date: 01/12/11** **Elevation: 911'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, dense, fine grained, abundant rock fragments
			-		
			1 --		
			-		
2	7.9	122.2	2 --		
			-		
			3 --		
			-		
4	7.7	105.8	4 --		
			-		
			5 --		
			-	SM/SW	COLLUVIUM: Silty Sand to Sand, dark brown, moist, dense, fine to coarse grained, abundant sub-angular to angular rock fragments
			6 --		
			-		
7	6.1	106.5	7 --		
			-		
			8 --		
			-		
			9 --		
			-		
10	7.5	118.8	10 --		
			-		Total depth: 10 feet
			11 --		No Water
			-		Raveling 0 - 10 feet
			12 --		Fill to 5 feet
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 5

BlueGreen Consulting **Drilling Date: 01/12/11** **Elevation: 868'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine to coarse grained,
			-		abundant sub-angular to angular rock fragments up to 2 feet diameter
1	5.4	111.3	1 --		
			-		
			2 --		
			-		
3	7.4	116.7	3 --		
			-		
			4 --		
			-		
5	6.4	114.1	5 --		
			-		Slightly less Silty
			6 --		
			-		
7	9.4	127.7	7 --		
			-		
			8 --		
			-		
			9 --		
			-		
			10 --		
			-		Total depth: 10 feet, refusal due to caving
			11 --		No Water
			-		Raveling 0-8 feet
			12 --		Caving 8-10 feet
			-		All Fill
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 6

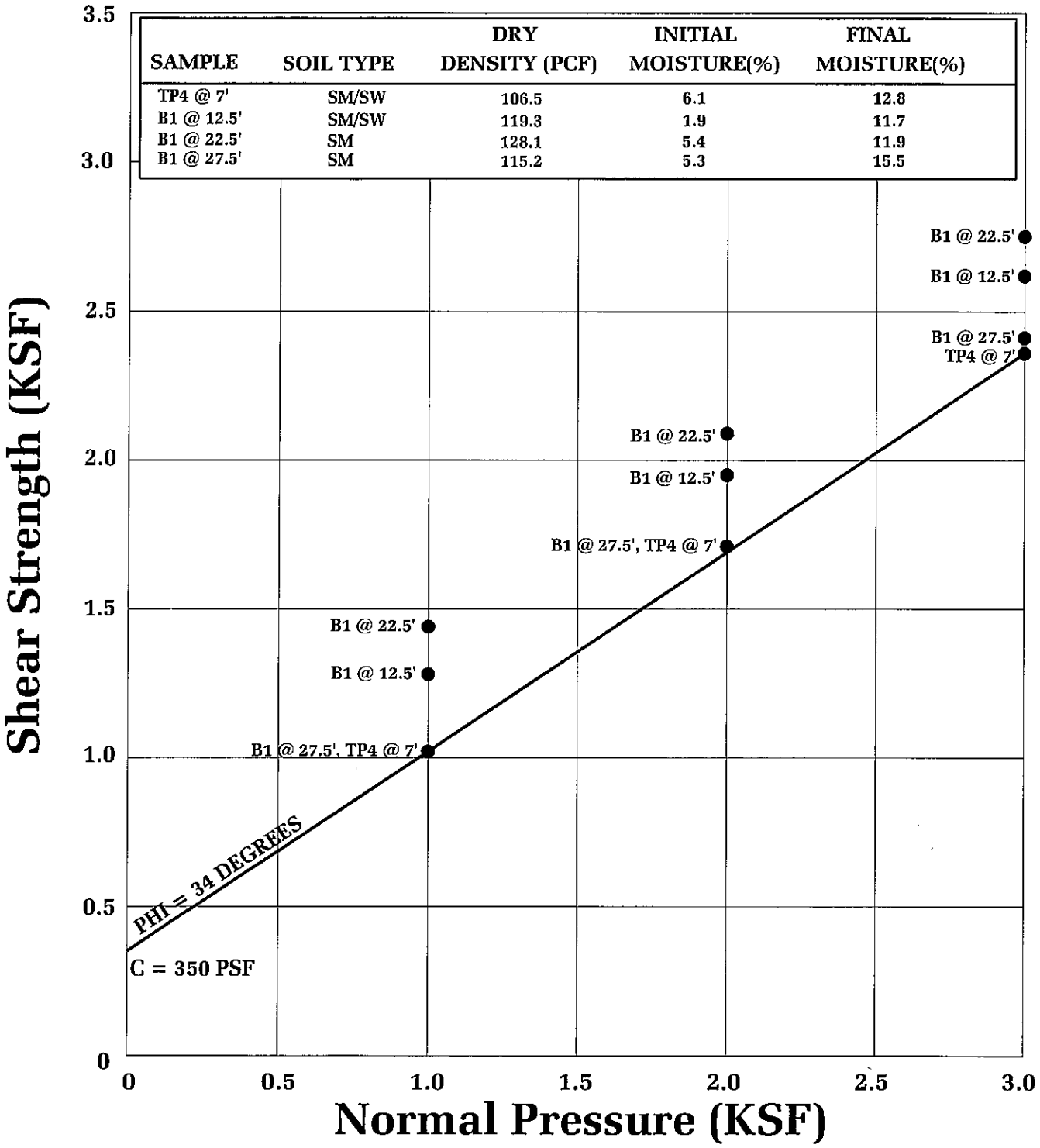
BlueGreen Consulting **Drilling Date: 01/12/11** **Elevation: 858'***

File No. 20092 **Method: Approximate 30-inch square Test Pit**

km *Reference: Topographic Survey Map, by B&E Engineers, dated 4/21/10

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine to coarse grained, abundant angular rock fragments
			1		
2	18.6	105.4	2		1 ½ - 2 feet thick pocket of rounded 1-inch gravel
			3		
4	6.8	116.4	4		
			5		Total depth: 5 feet, refusal due to caving No Water Raveling 0 - 5 feet Caving in Gravels at 1½ - 3½ feet All Fill
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		
			22		
			23		
			24		
			25		

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
TP4 @ 7'	SM/SW	106.5	6.1	12.8
B1 @ 12.5'	SM/SW	119.3	1.9	11.7
B1 @ 22.5'	SM	128.1	5.4	11.9
B1 @ 27.5'	SM	115.2	5.3	15.5



● Direct Shear, Saturated

SHEAR TEST DIAGRAM

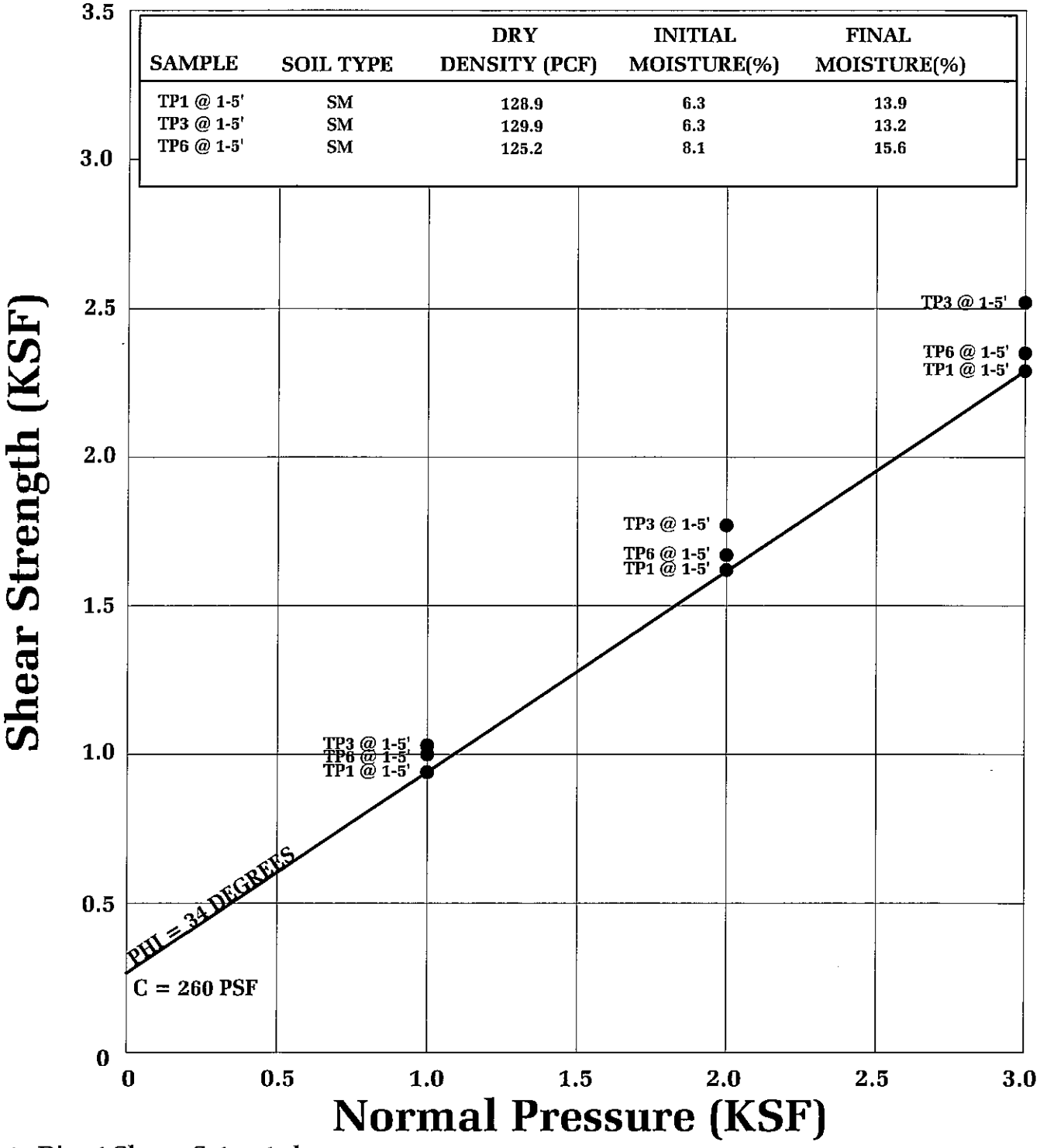
Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092 | PLATE: B-1

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
TP1 @ 1-5'	SM	128.9	6.3	13.9
TP3 @ 1-5'	SM	129.9	6.3	13.2
TP6 @ 1-5'	SM	125.2	8.1	15.6



● Direct Shear, Saturated

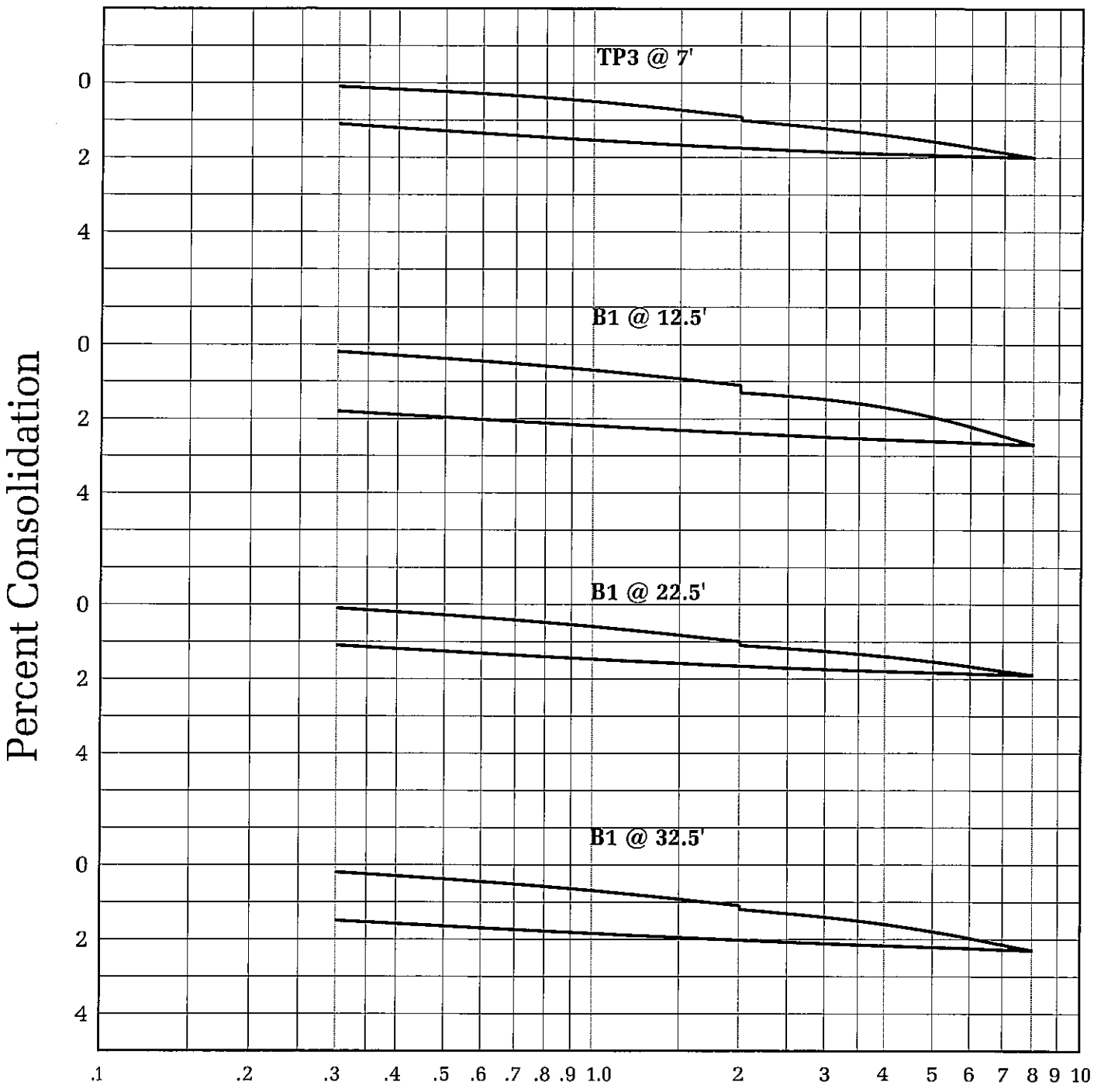
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092 | PLATE: B-2

WATER ADDED AT 2 KSF



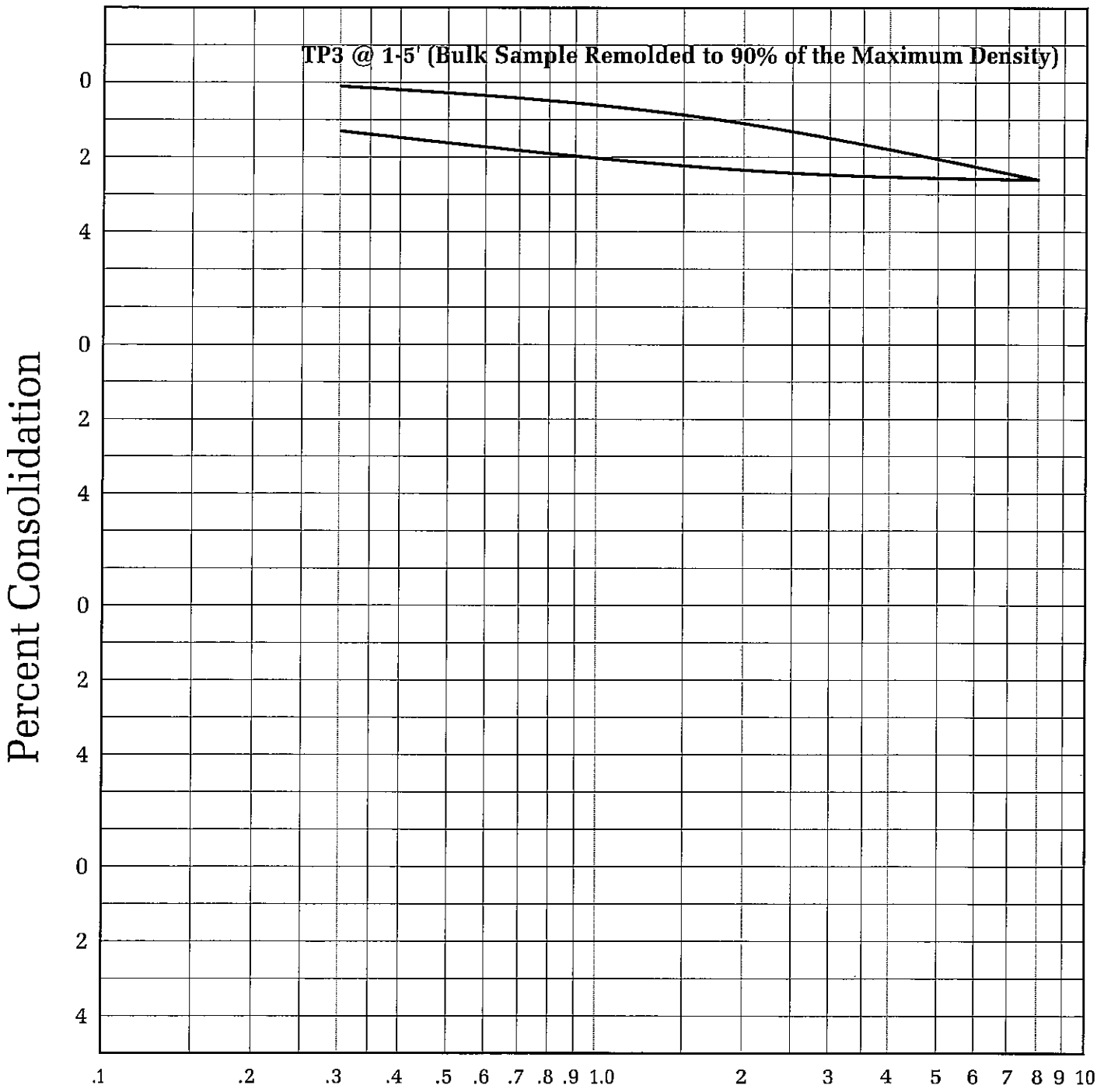
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092 | PLATE: C-1

WATER ADDED AT 2 KSF



CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092 | PLATE: C-2

ASTM D-1557

SAMPLE	TP1 @ 1-5'	TP3 @ 1-5'	TP6 @ 1-5'
SOIL TYPE:	SM	SM	SM
MAXIMUM DENSITY pcf.	143.2	144.3	139.1
OPTIMUM MOISTURE %	6.3	6.3	8.1

ASTM D 4829

SAMPLE	TP1 @ 1-5'	TP3 @ 1-5'	TP6 @ 1-5'
SOIL TYPE:	SM	SM	SM
EXPANSION INDEX UBC STANDARD 18-2	3	3	7
EXPANSION CHARACTER	VERY LOW	VERY LOW	VERY LOW

SULFATE CONTENT

SAMPLE	TP1 @ 1- 5'	TP3 @ 1- 5'	TP6 @ 1-5'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%	< 0.10%

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

BLUEGREEN CONSULTING

FILE NO. 20092 | PLATE: D

Geotechnologies, Inc.

Project: BlueGreen Consulting
File No.: 20092
Description: Liquefaction Analysis
Boring Number: 1

EMPIRICAL ESTIMATION OF LIQUEFACTION POTENTIAL

NCEER (1996) METHOD — By Thomas F. Blake (1994-1996) — LIQ2_30.WQ1

EARTHQUAKE INFORMATION:

Earthquake Magnitude:	7.0
Peak Horiz. Acceleration (g):	0.69
Calculated Mag.Wtg.Factor:	0.851

GROUNDWATER INFORMATION:

Current Groundwater Level (ft):	40.0
Historic Highest Groundwater Level* (ft):	5.0
Unit Wt. Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

ENERGY & ROD CORRECTIONS:

Energy Correction (CE) for N60:	1.30
Rod Len.Corr.(CR)(0-no or 1-yes):	1.0
Bore Dia. Corr. (CB):	1.00
Sampler Corr. (CS):	1.20
Use Ksigma (0 or 1):	1.0

LIQUEFACTION CALCULATIONS:

Depth to Base (ft)	Total Unit Wt. (pcf)	Current Water Level (0 or 1)	FIELD SPT (N)	Depth of SPT (ft)	Liq.Sus. (0 or 1)	-200 (%)	Est. Dr (%)	CN Factor	Corrected $(N_1)_{60}$	Resist. CRR	rd Factor	Induced CSR	Liquefac. Safe.Fact.
1.0	119.5	0	NA	1.0	0	0.0		2.000	0.0	~	0.998	0.381	~
2.0	119.5	0	NA	1.0	0	0.0		#VALUE!	#VALUE!	~	0.993	0.379	~
3.0	119.5	0	NA	1.0	0	0.0		#VALUE!	#VALUE!	~	0.989	0.378	~
4.0	119.5	0	NA	1.0	0	0.0		#VALUE!	#VALUE!	~	0.984	0.376	~
5.0	119.5	0	NA	1.0	0	0.0		#VALUE!	#VALUE!	~	0.979	0.374	~
6.0	119.5	0	17.0	5.0	1	0.0	92	1.984	39.5	Infin.	0.975	0.372	Non-Liq.
7.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.970	0.371	Non-Liq.
8.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.966	0.369	Non-Liq.
9.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.961	0.367	Non-Liq.
10.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.957	0.365	Non-Liq.
11.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.952	0.364	Non-Liq.
12.0	125.8	0	21.0	10.0	1	0.0	91	1.352	33.2	Infin.	0.947	0.362	Non-Liq.
13.0	121.6	0	100.0	15.0	1	0.0	182	1.092	137.3	Infin.	0.943	0.360	Non-Liq.
14.0	121.6	0	100.0	15.0	1	0.0	182	1.092	137.3	Infin.	0.938	0.358	Non-Liq.
15.0	121.6	0	100.0	15.0	1	0.0	182	1.092	137.3	Infin.	0.934	0.357	Non-Liq.
16.0	121.6	0	100.0	15.0	1	0.0	182	1.092	137.3	Infin.	0.929	0.355	Non-Liq.
17.0	121.6	0	100.0	15.0	1	0.0	182	1.092	137.3	Infin.	0.925	0.353	Non-Liq.
18.0	125.8	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.920	0.351	Non-Liq.
19.0	125.8	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.915	0.350	Non-Liq.
20.0	125.8	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.911	0.348	Non-Liq.
21.0	125.8	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.906	0.346	Non-Liq.
22.0	125.8	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.902	0.344	Non-Liq.
23.0	135.0	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.897	0.343	Non-Liq.
24.0	135.0	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.893	0.341	Non-Liq.
25.0	135.0	0	26.0	20.0	1	0.0	86	0.940	34.1	Infin.	0.888	0.339	Non-Liq.
26.0	135.0	0	34.0	25.0	1	0.0	92	0.833	42.2	Infin.	0.883	0.337	Non-Liq.
27.0	135.0	0	34.0	25.0	1	0.0	92	0.833	42.2	Infin.	0.879	0.336	Non-Liq.
28.0	121.1	0	34.0	25.0	1	0.0	92	0.833	42.2	Infin.	0.874	0.334	Non-Liq.
29.0	121.1	0	34.0	25.0	1	0.0	92	0.833	42.2	Infin.	0.870	0.332	Non-Liq.
30.0	121.1	0	34.0	25.0	1	0.0	92	0.833	42.2	Infin.	0.865	0.330	Non-Liq.
31.0	121.1	0	52.0	30.0	1	0.0	107	0.758	61.5	Infin.	0.861	0.329	Non-Liq.
32.0	121.1	0	52.0	30.0	1	0.0	107	0.758	61.5	Infin.	0.856	0.327	Non-Liq.
33.0	128.4	0	52.0	30.0	1	0.0	107	0.758	61.5	Infin.	0.851	0.325	Non-Liq.
34.0	128.4	0	52.0	30.0	1	0.0	107	0.758	61.5	Infin.	0.847	0.323	Non-Liq.
35.0	128.4	0	52.0	30.0	1	0.0	107	0.758	61.5	Infin.	0.842	0.322	Non-Liq.
36.0	128.4	0	43.0	35.0	1	0.0	93	0.701	47.0	Infin.	0.838	0.320	Non-Liq.
37.0	111.1	0	100.0	40.0	1	0.0	135	0.658	102.6	Infin.	0.833	0.318	Non-Liq.
38.0	111.1	0	100.0	40.0	1	0.0	135	0.658	102.6	Infin.	0.829	0.316	Non-Liq.
39.0	111.1	0	100.0	40.0	1	0.0	135	0.658	102.6	Infin.	0.824	0.315	Non-Liq.
40.0	111.1	0	100.0	40.0	1	0.0	135	0.658	102.6	Infin.	0.819	0.313	Non-Liq.

GEOTECHNOLOGIES, INC.

FILE NO.: 20092
PROJECT: BlueGreen Consulting
BORING B1

EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS IN DRY SANDY SOILS

INPUT:

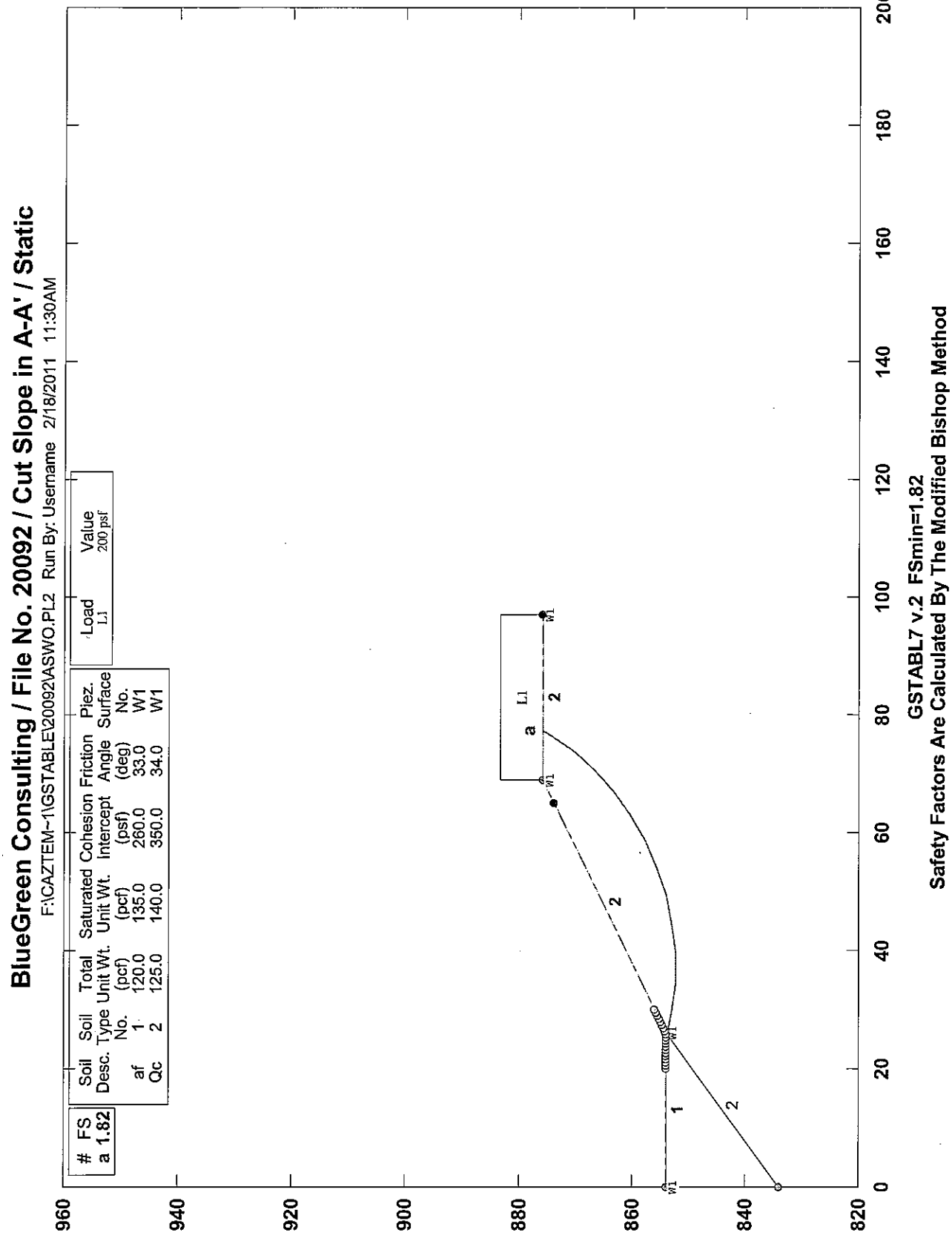
EARTHQUAKE INFORMATION:

Earthquake Magnitude:	7.0
Peak Horiz. Acceleration (g):	0.69

Depth of Base of Strata (ft)	Thickness of Layer (ft)	USCS Soil Type	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress [Tav]	Field SPT [N]	Correction Factor [Cer]	Col "f" Relative Density [Dr] (%)	Correction Factor [Cn]	Corrected [N1]60	Percent Passing 200 Sieve	ΔN for Fines Content	Fines Corrected [N1]60	Maximum Shear Mod. [Gmax] (tsf)	[geff]*[Geff] [Gmax]	COL "F" From Tbl. 4-4 [geff]	[geff]*100%	COL "P" From Tbl. 4-5 Volumetric Strain [E15] (%)	Number of Strain Cycles [Nc]	Corrected Vol. Strains [Ec]	Settlement [S] (inches)
6.0	6.0	SM	3.0	119.5	0.18	0.12	0.080	17	1.3	90.0	1.60	35.4	0.0	0.0	35.4	508.446	1.49E-04	7.10E-04	7.10E-02	3.00E-02	11.0849	0.0262	0.04
12.5	6.5	SM	9.3	125.0	0.56	0.38	0.250	21	1.3	88.0	1.52	41.5	0.0	0.0	41.5	949.300	2.22E-04	7.00E-04	7.00E-02	1.70E-02	11.0849	0.0148	0.02
17.5	5.0	SM/SW	15.0	121.6	0.92	0.61	0.402	100	1.3	120.0	1.25	162.5	0.0	0.0	162.5	1911.708	1.63E-04	3.40E-04	3.40E-02	1.10E-05	11.0849	0.0000	0.00
22.5	5.0	SM	20.0	125.8	1.23	0.82	0.529	26	1.3	84.0	1.10	37.2	0.0	0.0	37.2	1352.155	2.82E-04	6.50E-04	6.50E-02	2.40E-02	11.0849	0.0209	0.03
27.5	5.0	SM	25.0	135.0	1.55	1.04	0.655	34	1.3	90.0	1.00	44.2	0.0	0.0	44.2	1611.628	2.76E-04	6.00E-04	6.00E-02	1.50E-02	11.0849	0.0131	0.02
32.5	5.0	SW	30.0	121.1	1.87	1.25	0.770	52	1.3	103.0	0.90	60.8	0.0	0.0	60.8	1968.984	2.52E-04	5.20E-04	5.20E-02	4.90E-03	11.0849	0.0043	0.01
36.0	3.5	SW	34.3	128.4	2.14	1.43	0.857	43	1.3	92.0	0.88	49.2	0.0	0.0	49.2	1959.274	2.71E-04	5.50E-04	5.50E-02	9.50E-03	11.0849	0.0083	0.01
40.0	4.0	SP	38.0	111.1	2.36	1.58	0.925	100	1.3	110.0	0.82	106.6	0.0	0.0	106.6	2664.745	2.09E-04	3.50E-04	3.50E-02	2.10E-04	11.0849	0.0002	0.00

Total Calculated Dynamic Dry Settlement (inches) 0.11

Exhibit H - Plan Specifications for the Special Use Area


BlueGreen Consulting / File No. 20092 / Cut Slope in A-A' / Static
F:\CAZTEM~1\GSTABLE\20092\ASWO.PL2 Run By: Username 2/18/2011 11:30AM
FS
a 1.82
Soil Desc. Soil Type No. Total Unit Wt. (pcf) Saturated Unit Wt. (pcf) Cohesion Intercept (psf) Friction Angle (deg) Piez. Surface No.
af 1 120.0 135.0 260.0 33.0 W1
Qc 2 125.0 140.0 350.0 34.0 W1
Load L1 Value 200 psf
960
940
920
900
880
860
840
820
0
20
40
60
80
100
120
140
160
180
200
a
L1
W1
1
2
GSTABL7 v.2 FSmin=1.82
Safety Factors Are Calculated By The Modified Bishop Method

```
                    *** GSTABL7 ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*******************************************************************************
Analysis Run Date:        2/18/2011
Time of Run:              11:30AM
Run By:                   Username
Input Data Filename:      F:ASWO.
Output Filename:          F:ASWO.OUT
Unit System:              English
Plotted Output Filename:  F:ASWO.PLT
PROBLEM DESCRIPTION:  BlueGreen Consulting / File No. 20092 /
                      Cut Slope in A-A' / Static
BOUNDARY COORDINATES
    3 Top   Boundaries
    4 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.         (ft)        (ft)        (ft)        (ft)     Below Bnd
    1          0.00      854.00       26.00      854.00        1
    2         26.00      854.00       69.00      876.00        2
    3         69.00      876.00       97.00      876.00        2
    4          0.00      834.00       26.00      854.00        2
User Specified Y-Origin =        820.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.   (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   120.0    135.0     260.0      33.0    0.00       0.0      1
  2   125.0    140.0     350.0      34.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      854.00
    2         26.00      854.00
    3         69.00      876.00
    4         97.00      876.00
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load         X-Left      X-Right     Intensity     Deflection
 No.          (ft)         (ft)        (psf)         (deg)
  1          69.00        97.00       200.0          0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
 100 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
Along The Ground Surface Between  X =  20.00(ft)
                            and   X =  30.00(ft)
Each Surface Terminates Between   X =  65.00(ft)
                            and   X =  97.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
 5.00(ft) Line Segments Define Each Trial Failure Surface.
```



```
Following Are Displayed The Ten Most Critical Of The Trial
     Failure Surfaces Evaluated. They Are
     Ordered - Most Critical First.
     * * Safety Factors Are Calculated By The Modified Bishop Method * *
     Total Number of Trial Surfaces Evaluated =  2000
     Statistical Data On All Valid FS Values:
        FS Max =   6.115   FS Min =   1.820   FS Ave =   2.299
        Standard Deviation =    0.345   Coefficient of Variation =   15.02 %
     Failure Surface Specified By 14 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.74      854.00
         2         29.62      852.92
         3         34.59      852.38
         4         39.59      852.38
         5         44.56      852.92
         6         49.44      854.00
         7         54.18      855.60
         8         58.71      857.70
         9         62.99      860.29
        10         66.97      863.32
        11         70.59      866.77
        12         73.81      870.59
        13         76.61      874.74
        14         77.27      876.00
     Circle Center At X =    37.11 ; Y =    898.18 ; and Radius =    45.88
          Factor of Safety
          ***    1.820   ***
          Individual data on the    16  slices
                        Water  Water     Tie      Tie      Earthquake
                        Force  Force     Force    Force       Force    Surcharge
Slice  Width   Weight    Top    Bot      Norm     Tan      Hor      Ver      Load
 No.    (ft)   (lbs)    (lbs)  (lbs)    (lbs)    (lbs)    (lbs)    (lbs)    (lbs)
  1     1.0     14.4      0.0     6.8      0.       0.       0.0      0.0      0.0
  2     0.3      9.6      0.0     4.5      0.       0.       0.0      0.0      0.0
  3     3.6    804.4      0.0   332.8      0.       0.       0.0      0.0      0.0
  4     5.0   3079.2      0.0  1251.3      0.       0.       0.0      0.0      0.0
  5     5.0   5051.5      0.0  2040.6      0.       0.       0.0      0.0      0.0
  6     5.0   6590.9      0.0  2678.3      0.       0.       0.0      0.0      0.0
  7     4.9   7630.4      0.0  3156.7      0.       0.       0.0      0.0      0.0
  8     4.7   8137.6      0.0  3470.1      0.       0.       0.0      0.0      0.0
  9     4.5   8116.3      0.0  3615.0      0.       0.       0.0      0.0      0.0
 10     4.3   7605.4      0.0  3589.6      0.       0.       0.0      0.0      0.0
 11     4.0   6677.4      0.0  3394.2      0.       0.       0.0      0.0      0.0
 12     2.0   3148.6      0.0  1756.4      0.       0.       0.0      0.0      0.0
 13     1.6   2220.2      0.0  1366.5      0.       0.       0.0      0.0    317.7
 14     3.2   3304.5      0.0  2283.3      0.       0.       0.0      0.0    645.1
 15     2.8   1303.0      0.0  1040.2      0.       0.       0.0      0.0    558.3
 16     0.7     58.4      0.0    55.9      0.       0.       0.0      0.0    132.3
     Failure Surface Specified By 14 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.21      854.00
         2         29.12      853.07
         3         34.10      852.63
         4         39.10      852.70
         5         44.07      853.26
         6         48.96      854.33
         7         53.71      855.88
         8         58.28      857.90
         9         62.63      860.37
        10         66.71      863.26
        11         70.47      866.55
        12         73.89      870.20
        13         76.92      874.18
        14         78.04      876.00
     Circle Center At X =    35.96 ; Y =    902.12 ; and Radius =    49.53
```

Exhibit H - Plan Specifications for the Special Use Area

Factor of Safety
*** 1.823 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.16	854.00
2	28.02	852.84
3	32.98	852.18
4	37.98	852.03
5	42.96	852.38
6	47.89	853.24
7	52.70	854.60
8	57.35	856.45
9	61.78	858.75
10	65.96	861.50
11	69.84	864.65
12	73.38	868.19
13	76.54	872.06
14	79.13	876.00

Circle Center At X = 36.97 ; Y = 901.05 ; and Radius = 49.03
Factor of Safety
*** 1.823 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.26	854.00
2	30.10	852.72
3	35.05	852.02
4	40.05	851.89
5	45.02	852.35
6	49.91	853.39
7	54.65	855.00
8	59.17	857.15
9	63.40	859.81
10	67.29	862.94
11	70.80	866.51
12	73.86	870.46
13	76.44	874.75
14	77.00	876.00

Circle Center At X = 38.60 ; Y = 894.48 ; and Radius = 42.62
Factor of Safety
*** 1.825 ***
Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.79	854.00
2	30.73	853.26
3	35.73	853.04
4	40.72	853.33
5	45.65	854.14
6	50.48	855.46
7	55.14	857.27
8	59.59	859.56
9	63.77	862.29
10	67.65	865.44
11	71.19	868.98
12	74.33	872.87
13	76.37	876.00

Circle Center At X = 35.39 ; Y = 901.19 ; and Radius = 48.16
Factor of Safety
*** 1.826 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.21	854.00
2	29.10	852.94
3	34.07	852.42

4	39.07	852.46
5	44.04	853.03
6	48.91	854.15
7	53.63	855.80
8	58.14	857.95
9	62.39	860.59
10	66.33	863.67
11	69.90	867.17
12	73.07	871.04
13	75.80	875.23
14	76.18	876.00

Circle Center At X = 36.29 ; Y = 897.85 ; and Radius = 45.48
Factor of Safety
*** 1.828 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.79	854.00
2	30.61	852.68
3	35.55	851.91
4	40.55	851.71
5	45.54	852.07
6	50.45	852.99
7	55.23	854.46
8	59.81	856.46
9	64.14	858.97
10	68.16	861.94
11	71.81	865.35
12	75.06	869.16
13	77.86	873.30
14	79.27	876.00

Circle Center At X = 39.86 ; Y = 895.81 ; and Radius = 44.11
Factor of Safety
*** 1.828 ***
Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.11	854.00
2	26.96	852.82
3	31.91	852.11
4	36.91	851.89
5	41.90	852.15
6	46.85	852.89
7	51.70	854.11
8	56.40	855.79
9	60.93	857.92
10	65.23	860.48
11	69.25	863.44
12	72.98	866.77
13	76.36	870.45
14	79.37	874.45
15	80.32	876.00

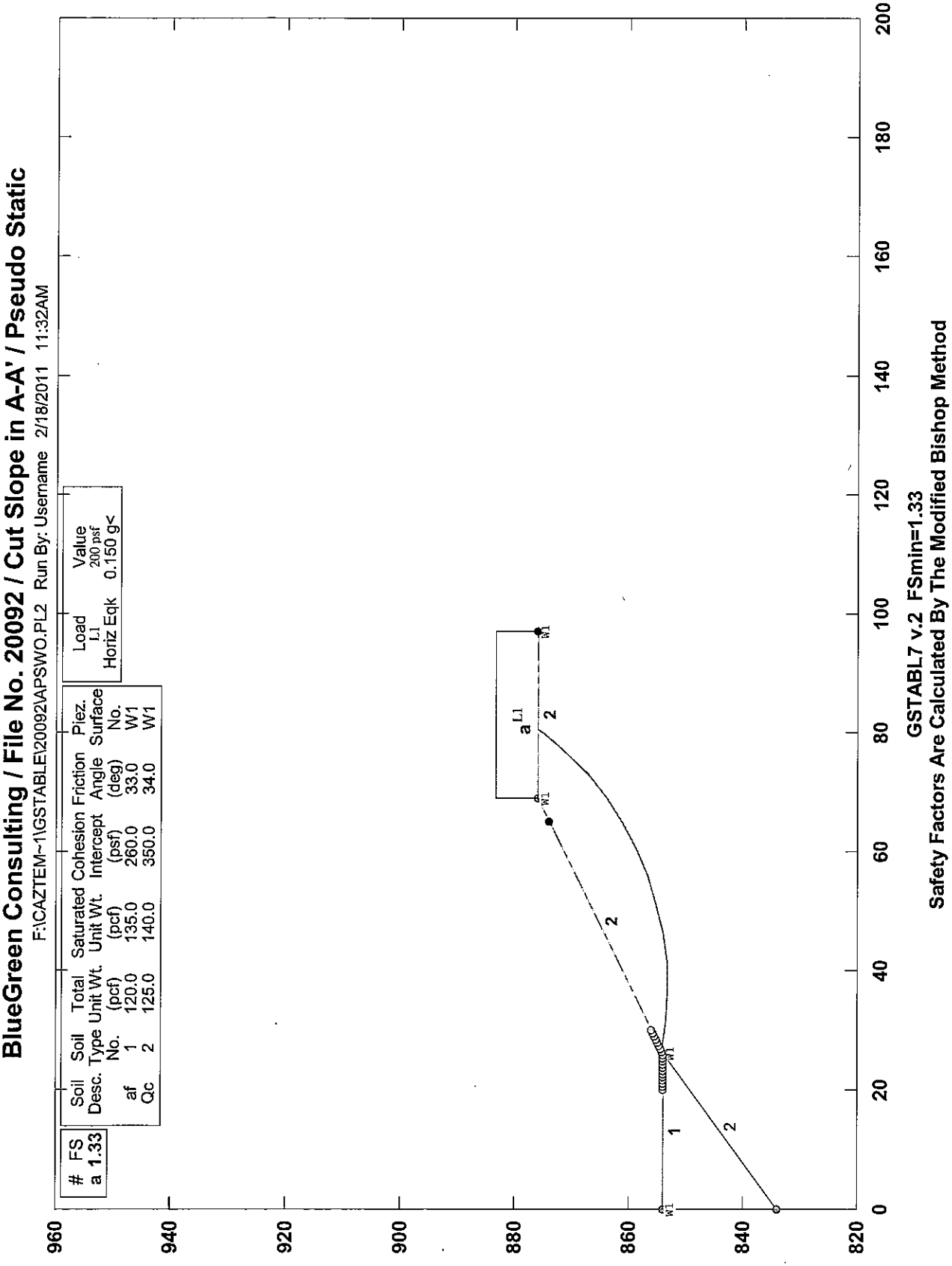
Circle Center At X = 36.72 ; Y = 903.49 ; and Radius = 51.60
Factor of Safety
*** 1.830 ***
Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	26.32	854.16
2	31.26	853.43
3	36.26	853.16
4	41.25	853.36
5	46.21	854.02
6	51.08	855.13
7	55.83	856.70
8	60.42	858.69
9	64.80	861.10

Exhibit H - Plan Specifications for the Special Use Area

```
   10          68.93       863.91
   11          72.79       867.09
   12          76.34       870.61
   13          79.55       874.45
   14          80.61       876.00
Circle Center At X =    36.66 ; Y =   906.88 ; and Radius =    53.72
      Factor of Safety
     ***    1.831   ***
Failure Surface Specified By 14 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          24.21       854.00
    2          29.15       853.19
    3          34.13       852.84
    4          39.13       852.95
    5          44.10       853.52
    6          48.99       854.54
    7          53.77       856.00
    8          58.40       857.90
    9          62.83       860.22
   10          67.03       862.93
   11          70.97       866.02
   12          74.60       869.45
   13          77.90       873.21
   14          79.94       876.00
Circle Center At X =    35.47 ; Y =   907.07 ; and Radius =    54.25
      Factor of Safety
     ***    1.831   ***
         **** END OF GSTABL7 OUTPUT ****
```

Exhibit H - Plan Specifications for the Special Use Area


BlueGreen Consulting / File No. 20092 / Cut Slope in A-A' / Pseudo Static
F:\CAZTEM~1\GSTABLE\20092\APSWO.PL2 Run By: Username 2/18/2011 11:32AM
FS
a 1.33
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
af | 1 | 120.0 | 135.0 | 260.0 | 33.0 | W1
Qc | 2 | 125.0 | 140.0 | 350.0 | 34.0 | W1
Load
L1
Horiz Eqk
Value
200 psf
0.150 g<
960
940
920
900
880
860
840
820
0
20
40
60
80
100
120
140
160
180
200
a L1
W1
1
2
GSTABL7 v.2 FSmin=1.33
Safety Factors Are Calculated By The Modified Bishop Method

```
                    *** GSTABL7 ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*******************************************************************************
Analysis Run Date:        2/18/2011
Time of Run:              11:32AM
Run By:                   Username
Input Data Filename:      F:APSWO.
Output Filename:          F:APSWO.OUT
Unit System:              English
Plotted Output Filename:  F:APSWO.PLT
PROBLEM DESCRIPTION:  BlueGreen Consulting / File No. 20092 /
                      Cut Slope in A-A' / Pseudo Static
BOUNDARY COORDINATES
    3 Top   Boundaries
    4 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.         (ft)        (ft)        (ft)        (ft)     Below Bnd
    1          0.00      854.00       26.00      854.00         1
    2         26.00      854.00       69.00      876.00         2
    3         69.00      876.00       97.00      876.00         2
    4          0.00      834.00       26.00      854.00         2
User Specified Y-Origin =        820.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
  1   120.0    135.0     260.0      33.0    0.00      0.0       1
  2   125.0    140.0     350.0      34.0    0.00      0.0       1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  4 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      854.00
    2         26.00      854.00
    3         69.00      876.00
    4         97.00      876.00
BOUNDARY LOAD(S)
    1 Load(s) Specified
Load        X-Left      X-Right     Intensity     Deflection
 No.          (ft)        (ft)        (psf)         (deg)
  1          69.00       97.00       200.0          0.0
NOTE - Intensity Is Specified As A Uniformly Distributed
       Force Acting On A Horizontally Projected Surface.
A Horizontal Earthquake Loading Coefficient
Of0.150 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure =     0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
 100 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
Along The Ground Surface Between  X =  20.00(ft)
                                  and  X =  30.00(ft)
```



```
Each Surface Terminates Between   X =  65.00(ft)
                                  and  X =  97.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
 5.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
     Failure Surfaces Evaluated. They Are
     Ordered - Most Critical First.
     * * Safety Factors Are Calculated By The Modified Bishop Method * *
     Total Number of Trial Surfaces Evaluated =  2000
     Statistical Data On All Valid FS Values:
        FS Max =   4.650   FS Min =   1.330   FS Ave =   1.653
        Standard Deviation =    0.253   Coefficient of Variation =   15.29 %
     Failure Surface Specified By 14 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         26.32      854.16
         2         31.26      853.43
         3         36.26      853.16
         4         41.25      853.36
         5         46.21      854.02
         6         51.08      855.13
         7         55.83      856.70
         8         60.42      858.69
         9         64.80      861.10
        10         68.93      863.91
        11         72.79      867.09
        12         76.34      870.61
        13         79.55      874.45
        14         80.61      876.00
     Circle Center At X =    36.66 ; Y =    906.88 ; and Radius =    53.72
          Factor of Safety
        ***   1.330   ***
       Individual data on the    14  slices
                    Water  Water    Tie     Tie     Earthquake
                    Force  Force    Force   Force      Force    Surcharge
Slice  Width  Weight  Top    Bot    Norm    Tan     Hor    Ver     Load
 No.    (ft)  (lbs)   (lbs)  (lbs)  (lbs)   (lbs)   (lbs)  (lbs)   (lbs)
  1     4.9   1116.3    0.0   455.8     0.      0.    167.4    0.0     0.0
  2     5.0   3228.8    0.0  1306.2     0.      0.    484.3    0.0     0.0
  3     5.0   5023.1    0.0  2030.7     0.      0.    753.5    0.0     0.0
  4     5.0   6436.9    0.0  2623.2     0.      0.    965.5    0.0     0.0
  5     4.9   7428.4    0.0  3078.4     0.      0.   1114.3    0.0     0.0
  6     4.7   7977.6    0.0  3392.5     0.      0.   1196.6    0.0     0.0
  7     4.6   8086.5    0.0  3562.8     0.      0.   1213.0    0.0     0.0
  8     4.4   7779.6    0.0  3587.8     0.      0.   1166.9    0.0     0.0
  9     4.1   7102.2    0.0  3467.3     0.      0.   1065.3    0.0     0.0
 10     0.1    110.7    0.0    57.9     0.      0.     16.6    0.0     0.0
 11     3.8   5560.1    0.0  3210.7     0.      0.    834.0    0.0   758.6
 12     3.5   3550.3    0.0  2230.0     0.      0.    532.5    0.0   709.6
 13     3.2   1556.4    0.0  1081.8     0.      0.    233.5    0.0   641.2
 14     1.1    115.7    0.0    90.9     0.      0.     17.4    0.0   213.5
     Failure Surface Specified By 14 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.21      854.00
         2         29.14      853.17
         3         34.13      852.79
         4         39.13      852.85
         5         44.10      853.36
         6         49.01      854.32
         7         53.81      855.72
         8         58.47      857.54
         9         62.94      859.77
        10         67.20      862.39
        11         71.20      865.38
        12         74.92      868.72
```

Exhibit H - Plan Specifications for the Special Use Area

13	78.33	872.39
14	81.13	876.00

Circle Center At X = 35.91 ; Y = 908.36 ; and Radius = 55.61

Factor of Safety

*** 1.332 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.11	854.00
2	26.96	852.82
3	31.91	852.11
4	36.91	851.89
5	41.90	852.15
6	46.85	852.89
7	51.70	854.11
8	56.40	855.79
9	60.93	857.92
10	65.23	860.48
11	69.25	863.44
12	72.98	866.77
13	76.36	870.45
14	79.37	874.45
15	80.32	876.00

Circle Center At X = 36.72 ; Y = 903.49 ; and Radius = 51.60

Factor of Safety

*** 1.334 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.21	854.00
2	29.15	853.19
3	34.13	852.84
4	39.13	852.95
5	44.10	853.52
6	48.99	854.54
7	53.77	856.00
8	58.40	857.90
9	62.83	860.22
10	67.03	862.93
11	70.97	866.02
12	74.60	869.45
13	77.90	873.21
14	79.94	876.00

Circle Center At X = 35.47 ; Y = 907.07 ; and Radius = 54.25

Factor of Safety

*** 1.334 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.16	854.00
2	28.02	852.84
3	32.98	852.18
4	37.98	852.03
5	42.96	852.38
6	47.89	853.24
7	52.70	854.60
8	57.35	856.45
9	61.78	858.75
10	65.96	861.50
11	69.84	864.65
12	73.38	868.19
13	76.54	872.06
14	79.13	876.00

Circle Center At X = 36.97 ; Y = 901.05 ; and Radius = 49.03

Factor of Safety

*** 1.334 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.21	854.00
2	29.05	852.76
3	33.99	851.98
4	38.98	851.69
5	43.98	851.87
6	48.94	852.53
7	53.81	853.66
8	58.55	855.25
9	63.11	857.29
10	67.46	859.76
11	71.55	862.63
12	75.35	865.88
13	78.82	869.48
14	81.93	873.40
15	83.62	876.00

Circle Center At X = 39.58 ; Y = 903.83 ; and Radius = 52.15

Factor of Safety

*** 1.334 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.21	854.00
2	29.12	853.07
3	34.10	852.63
4	39.10	852.70
5	44.07	853.26
6	48.96	854.33
7	53.71	855.88
8	58.28	857.90
9	62.63	860.37
10	66.71	863.26
11	70.47	866.55
12	73.89	870.20
13	76.92	874.18
14	78.04	876.00

Circle Center At X = 35.96 ; Y = 902.12 ; and Radius = 49.53

Factor of Safety

*** 1.336 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.68	854.00
2	28.55	852.84
3	33.49	852.11
4	38.49	851.84
5	43.48	852.01
6	48.45	852.63
7	53.33	853.69
8	58.10	855.19
9	62.72	857.11
10	67.14	859.43
11	71.34	862.15
12	75.28	865.23
13	78.93	868.65
14	82.25	872.38
15	84.94	876.00

Circle Center At X = 39.07 ; Y = 907.49 ; and Radius = 55.66

Factor of Safety

*** 1.336 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.79	854.00
2	30.62	852.70
3	35.56	851.92

Exhibit H - Plan Specifications for the Special Use Area

4	40.55	851.69
5	45.54	851.98
6	50.47	852.82
7	55.29	854.17
8	59.92	856.04
9	64.34	858.39
10	68.47	861.20
11	72.28	864.44
12	75.71	868.08
13	78.74	872.05
14	81.12	876.00

Circle Center At X = 40.28 ; Y = 898.14 ; and Radius = 46.46

Factor of Safety

*** 1.337 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.79	854.00
2	30.71	853.12
3	35.69	852.66
4	40.69	852.62
5	45.68	852.99
6	50.61	853.78
7	55.47	854.98
8	60.21	856.58
9	64.79	858.57
10	69.20	860.93
11	73.39	863.66
12	77.34	866.72
13	81.02	870.11
14	84.40	873.79
15	86.12	876.00

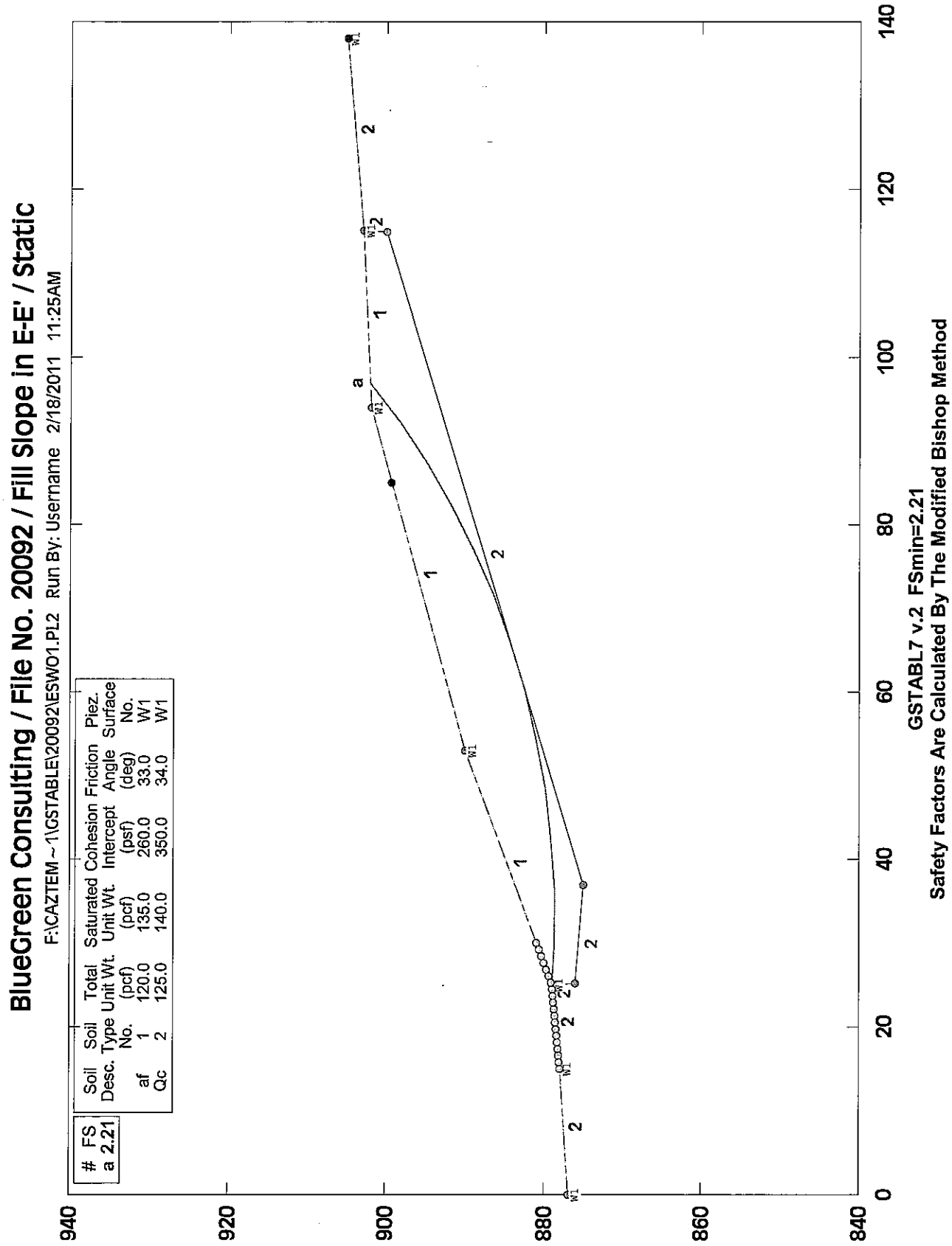
Circle Center At X = 38.72 ; Y = 912.41 ; and Radius = 59.82

Factor of Safety

*** 1.337 ***

**** END OF GSTABL7 OUTPUT ****

Exhibit H - Plan Specifications for the Special Use Area


BlueGreen Consulting / File No. 20092 / Fill Slope in E-E' / Static
F:\CAZTEM~1\GSTABLE\20092\ESWO1.PL2 Run By: Username 2/18/2011 11:25AM
FS
a 2.21
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
af | 1 | 120.0 | 135.0 | 260.0 | 33.0 | W1
Qc | 2 | 125.0 | 140.0 | 350.0 | 34.0 | W1
940
920
900
880
860
840
0
20
40
60
80
100
120
140
GSTABL7 v.2 FSmin=2.21
Safety Factors Are Calculated By The Modified Bishop Method

```
                    *** GSTABL7 ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
       Modified Bishop, Simplified Janbu, or GLE Method of Slices.
       (Includes Spencer & Morgenstern-Price Type Analysis)
       Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
       Nonlinear Undrained Shear Strength, Curved Phi Envelope,
       Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
       Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*******************************************************************************
Analysis Run Date:        2/18/2011
Time of Run:              11:25AM
Run By:                   Username
Input Data Filename:      F:ESWO1.
Output Filename:          F:ESWO1.OUT
Unit System:              English
Plotted Output Filename:  F:ESWO1.PLT
PROBLEM DESCRIPTION:  BlueGreen Consulting / File No. 20092 /
                      Fill Slope in E-E' / Static
BOUNDARY COORDINATES
    6 Top   Boundaries
   10 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.         (ft)        (ft)        (ft)        (ft)     Below Bnd
    1          0.00      877.00       15.00      878.00         2
    2         15.00      878.00       25.00      879.00         2
    3         25.00      879.00       53.00      890.00         1
    4         53.00      890.00       94.00      902.00         1
    5         94.00      902.00      115.00      903.00         1
    6        115.00      903.00      138.00      905.00         2
    7         25.00      879.00       25.10      876.00         2
    8         25.10      876.00       37.00      875.00         2
    9         37.00      875.00      114.90      900.00         2
   10        114.90      900.00      115.00      903.00         2
User Specified Y-Origin =       840.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion  Friction   Pore    Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)    Param.    (psf)     No.
  1   120.0    135.0     260.0     33.0     0.00       0.0      1
  2   125.0    140.0     350.0     34.0     0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  7 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      877.00
    2         15.00      878.00
    3         25.00      879.00
    4         53.00      890.00
    5         94.00      902.00
    6        115.00      903.00
    7        138.00      905.00
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
 100 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
Along The Ground Surface Between  X =  15.00(ft)
                                 and  X =  30.00(ft)
Each Surface Terminates Between   X =  85.00(ft)
                                 and  X = 138.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
```



```
At Which A Surface Extends Is  Y =      0.00(ft)
 6.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
     Failure Surfaces Evaluated. They Are
     Ordered - Most Critical First.
     * * Safety Factors Are Calculated By The Modified Bishop Method * *
     Total Number of Trial Surfaces Evaluated =  2000
     Statistical Data On All Valid FS Values:
        FS Max =   5.571   FS Min =   2.215   FS Ave =   2.765
        Standard Deviation =    0.333   Coefficient of Variation =   12.06 %
     Failure Surface Specified By 15 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.47      878.95
         2         30.47      878.63
         3         36.47      878.68
         4         42.45      879.09
         5         48.40      879.86
         6         54.30      880.98
         7         60.11      882.46
         8         65.83      884.28
         9         71.42      886.45
        10         76.88      888.94
        11         82.18      891.76
        12         87.29      894.90
        13         92.21      898.33
        14         96.92      902.06
        15         97.01      902.14
     Circle Center At X =    32.67 ; Y =   978.36 ; and Radius =    99.75
          Factor of Safety
          ***    2.215   ***
          Individual data on the    18  slices
                          Water  Water    Tie     Tie      Earthquake
                          Force  Force    Force   Force      Force    Surcharge
Slice  Width   Weight     Top    Bot      Norm    Tan      Hor      Ver     Load
 No.    (ft)   (lbs)     (lbs)  (lbs)    (lbs)   (lbs)    (lbs)    (lbs)   (lbs)
  1     0.5      2.9      0.0     1.3      0.      0.       0.0      0.0     0.0
  2     0.0      0.0      0.0     0.0      0.      0.       0.0      0.0     0.0
  3     5.5    949.5      0.0   413.2      0.      0.       0.0      0.0     0.0
  4     6.0   2948.4      0.0  1281.3      0.      0.       0.0      0.0     0.0
  5     6.0   4647.0      0.0  2024.1      0.      0.       0.0      0.0     0.0
  6     6.0   6020.1      0.0  2637.7      0.      0.       0.0      0.0     0.0
  7     4.6   5420.9      0.0  2398.1      0.      0.       0.0      0.0     0.0
  8     1.3   1625.7      0.0   738.0      0.      0.       0.0      0.0     0.0
  9     5.8   7432.8      0.0  3419.8      0.      0.       0.0      0.0     0.0
 10     5.7   7334.8      0.0  3433.3      0.      0.       0.0      0.0     0.0
 11     5.6   6926.4      0.0  3311.7      0.      0.       0.0      0.0     0.0
 12     5.5   6230.2      0.0  3055.3      0.      0.       0.0      0.0     0.0
 13     5.3   5275.4      0.0  2665.2      0.      0.       0.0      0.0     0.0
 14     5.1   4097.8      0.0  2142.8      0.      0.       0.0      0.0     0.0
 15     4.9   2739.2      0.0  1489.9      0.      0.       0.0      0.0     0.0
 16     1.8    648.4      0.0   368.8      0.      0.       0.0      0.0     0.0
 17     2.9    459.6      0.0   270.7      0.      0.       0.0      0.0     0.0
 18     0.1      0.5      0.0     0.3      0.      0.       0.0      0.0     0.0
     Failure Surface Specified By 14 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         27.63      880.03
         2         33.62      879.61
         3         39.62      879.58
         4         45.60      879.96
         5         51.55      880.74
         6         57.44      881.93
         7         63.22      883.50
         8         68.89      885.47
         9         74.42      887.81
        10         79.77      890.52
```

Exhibit H - Plan Specifications for the Special Use Area

11	84.93	893.58
12	89.87	896.98
13	94.57	900.71
14	96.10	902.10

Circle Center At X = 37.00 ; Y = 968.20 ; and Radius = 88.67

Factor of Safety
*** 2.253 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.47	878.95
2	30.35	877.75
3	36.31	877.03
4	42.31	876.81
5	48.30	877.08
6	54.25	877.83
7	60.12	879.07
8	65.87	880.79
9	71.46	882.97
10	76.85	885.61
11	82.01	888.67
12	86.90	892.15
13	91.49	896.01
14	95.75	900.24
15	97.39	902.16

Circle Center At X = 42.05 ; Y = 950.06 ; and Radius = 73.25

Factor of Safety
*** 2.264 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.26	879.10
2	31.12	877.79
3	37.06	876.98
4	43.06	876.66
5	49.05	876.85
6	55.01	877.54
7	60.89	878.73
8	66.66	880.40
9	72.26	882.56
10	77.66	885.17
11	82.82	888.23
12	87.71	891.70
13	92.29	895.58
14	96.53	899.83
15	98.55	902.22

Circle Center At X = 43.81 ; Y = 948.24 ; and Radius = 71.58

Factor of Safety
*** 2.266 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.68	878.87
2	29.45	877.21
3	35.34	876.04
4	41.30	875.37
5	47.30	875.20
6	53.29	875.55
7	59.23	876.39
8	65.07	877.73
9	70.79	879.56
10	76.33	881.86
11	81.66	884.62
12	86.73	887.82
13	91.52	891.44
14	95.98	895.45
15	100.10	899.82

16	102.14	902.39

Circle Center At X = 46.25 ; Y = 946.21 ; and Radius = 71.02

Factor of Safety
*** 2.266 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.74	878.47
2	25.56	877.01
3	31.47	875.99
4	37.44	875.42
5	43.44	875.30
6	49.43	875.62
7	55.38	876.40
8	61.26	877.62
9	67.02	879.28
10	72.65	881.37
11	78.10	883.88
12	83.35	886.79
13	88.36	890.08
14	93.11	893.74
15	97.58	897.75
16	101.73	902.08
17	101.97	902.38

Circle Center At X = 42.07 ; Y = 955.09 ; and Radius = 79.80

Factor of Safety
*** 2.267 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	25.26	879.10
2	31.26	878.89
3	37.26	879.04
4	43.24	879.56
5	49.17	880.44
6	55.04	881.69
7	60.82	883.29
8	66.49	885.24
9	72.04	887.54
10	77.43	890.18
11	82.65	893.14
12	87.68	896.41
13	92.49	899.98
14	94.94	902.04

Circle Center At X = 31.83 ; Y = 976.46 ; and Radius = 97.58

Factor of Safety
*** 2.268 ***

Failure Surface Specified By 16 Coordinate Points

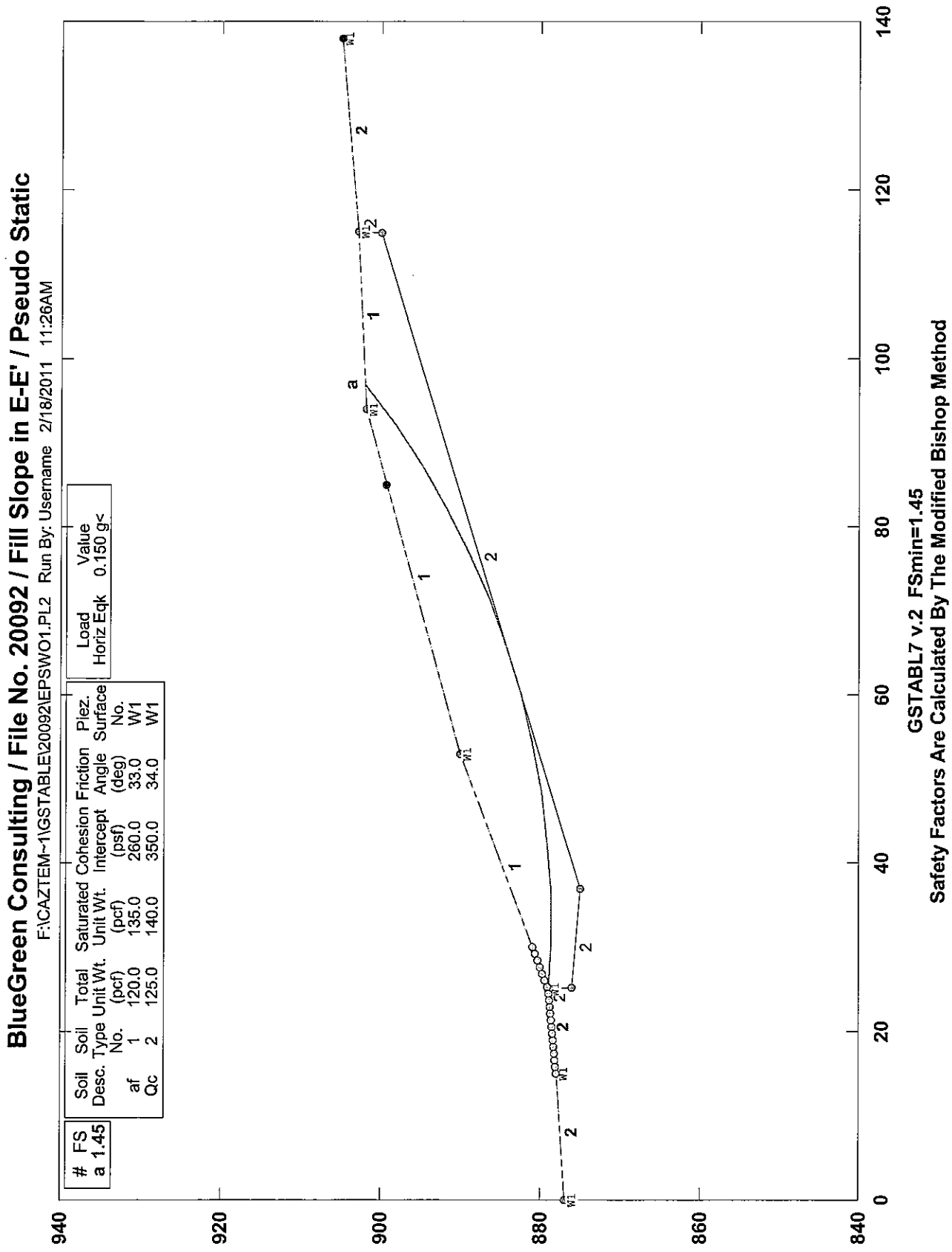
Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.90	878.79
2	28.77	877.59
3	34.72	876.82
4	40.72	876.49
5	46.71	876.60
6	52.69	877.14
7	58.61	878.13
8	64.44	879.54
9	70.15	881.38
10	75.71	883.62
11	81.10	886.27
12	86.27	889.31
13	91.21	892.72
14	95.89	896.48
15	100.28	900.57
16	101.95	902.38

Circle Center At X = 42.24 ; Y = 958.23 ; and Radius = 81.76

Exhibit H - Plan Specifications for the Special Use Area

```
      Factor of Safety
     ***    2.269   ***
Failure Surface Specified By 15 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          22.90      878.79
    2          28.79      877.70
    3          34.76      877.04
    4          40.76      876.83
    5          46.75      877.07
    6          52.71      877.75
    7          58.61      878.86
    8          64.40      880.42
    9          70.07      882.39
   10          75.57      884.78
   11          80.88      887.57
   12          85.97      890.75
   13          90.81      894.29
   14          95.38      898.19
   15          99.50      902.26
Circle Center At X =    40.58 ; Y =   957.82 ; and Radius =    80.98
      Factor of Safety
     ***    2.270   ***
Failure Surface Specified By 15 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
    1          25.26      879.10
    2          31.18      878.10
    3          37.15      877.56
    4          43.15      877.46
    5          49.14      877.82
    6          55.09      878.63
    7          60.95      879.89
    8          66.71      881.59
    9          72.32      883.72
   10          77.75      886.26
   11          82.98      889.21
   12          87.96      892.55
   13          92.68      896.25
   14          97.11      900.30
   15          98.92      902.23
Circle Center At X =    41.41 ; Y =   956.73 ; and Radius =    79.29
      Factor of Safety
     ***    2.272   ***
        **** END OF GSTABL7 OUTPUT ****
```

Exhibit H - Plan Specifications for the Special Use Area


BlueGreen Consulting / File No. 20092 / Fill Slope in E-E' / Pseudo Static
F:\CAZTEM~1\GSTABL\20092\EPSWO1.PL2 Run By: Username 2/18/2011 11:26AM
FS
a 1.45
Soil Desc. Soil Type No. Total Unit Wt. (pcf) Saturated Unit Wt. (pcf) Cohesion Intercept (psf) Friction Angle (deg) Piez. Surface No.
af 1 120.0 135.0 260.0 33.0 W1
Qc 2 125.0 140.0 350.0 34.0 W1
Load Horiz Eqk Value 0.150 g<
940
920
900
880
860
840
0
20
40
60
80
100
120
140
GSTABL7 v.2 FSmin=1.45
Safety Factors Are Calculated By The Modified Bishop Method

```
                    *** GSTABL7 ***
                ** GSTABL7 by Garry H. Gregory, P.E. **
  ** Original Version 1.0, January 1996; Current Version 2.002, December 2001 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                    SLOPE STABILITY ANALYSIS SYSTEM
      Modified Bishop, Simplified Janbu, or GLE Method of Slices.
      (Includes Spencer & Morgenstern-Price Type Analysis)
      Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
      Nonlinear Undrained Shear Strength, Curved Phi Envelope,
      Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
      Surfaces, Pseudo-Static Earthquake, and Applied Force Options.
*******************************************************************************
Analysis Run Date:        2/18/2011
Time of Run:              11:26AM
Run By:                   Username
Input Data Filename:      F:EPSWO1.
Output Filename:          F:EPSWO1.OUT
Unit System:              English
Plotted Output Filename:  F:EPSWO1.PLT
PROBLEM DESCRIPTION:  BlueGreen Consulting / File No. 20092 /
                      Fill Slope in E-E' / Pseudo Static
BOUNDARY COORDINATES
    6 Top   Boundaries
   10 Total Boundaries
Boundary     X-Left      Y-Left     X-Right     Y-Right     Soil Type
   No.         (ft)        (ft)        (ft)        (ft)     Below Bnd
    1          0.00      877.00       15.00      878.00         2
    2         15.00      878.00       25.00      879.00         2
    3         25.00      879.00       53.00      890.00         1
    4         53.00      890.00       94.00      902.00         1
    5         94.00      902.00      115.00      903.00         1
    6        115.00      903.00      138.00      905.00         2
    7         25.00      879.00       25.10      876.00         2
    8         25.10      876.00       37.00      875.00         2
    9         37.00      875.00      114.90      900.00         2
   10        114.90      900.00      115.00      903.00         2
User Specified Y-Origin =        840.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
 No.  (pcf)    (pcf)     (psf)     (deg)   Param.    (psf)     No.
  1   120.0    135.0     260.0     33.0    0.00       0.0      1
  2   125.0    140.0     350.0     34.0    0.00       0.0      1
1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water =  62.40 (pcf)
Piezometric Surface No.  1 Specified by  7 Coordinate Points
Pore Pressure Inclination Factor =  0.50
  Point      X-Water     Y-Water
   No.         (ft)        (ft)
    1          0.00      877.00
    2         15.00      878.00
    3         25.00      879.00
    4         53.00      890.00
    5         94.00      902.00
    6        115.00      903.00
    7        138.00      905.00
A Horizontal Earthquake Loading Coefficient
Of0.150 Has Been Assigned
A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned
Cavitation Pressure =     0.0(psf)
A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.
2000 Trial Surfaces Have Been Generated.
 100 Surface(s) Initiate(s) From Each Of    20 Points Equally Spaced
```



```
Along The Ground Surface Between  X =  15.00(ft)
                            and   X =  30.00(ft)
Each Surface Terminates Between   X =  85.00(ft)
                            and   X = 138.00(ft)
Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y =       0.00(ft)
 6.00(ft) Line Segments Define Each Trial Failure Surface.
Following Are Displayed The Ten Most Critical Of The Trial
     Failure Surfaces Evaluated. They Are
     Ordered - Most Critical First.
     * * Safety Factors Are Calculated By The Modified Bishop Method * *
     Total Number of Trial Surfaces Evaluated =  2000
     Statistical Data On All Valid FS Values:
        FS Max =   3.758   FS Min =   1.454   FS Ave =   1.750
        Standard Deviation =    0.206   Coefficient of Variation =   11.77 %
     Failure Surface Specified By 15 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.47      878.95
         2         30.47      878.63
         3         36.47      878.68
         4         42.45      879.09
         5         48.40      879.86
         6         54.30      880.98
         7         60.11      882.46
         8         65.83      884.28
         9         71.42      886.45
        10         76.88      888.94
        11         82.18      891.76
        12         87.29      894.90
        13         92.21      898.33
        14         96.92      902.06
        15         97.01      902.14
     Circle Center At X =    32.67 ; Y =   978.36 ; and Radius =    99.75
           Factor of Safety
            ***   1.454   ***
          Individual data on the    18  slices
                      Water  Water    Tie     Tie      Earthquake
                      Force  Force    Force   Force      Force    Surcharge
Slice  Width   Weight   Top    Bot     Norm    Tan      Hor      Ver     Load
 No.    (ft)   (lbs)   (lbs)  (lbs)   (lbs)   (lbs)    (lbs)    (lbs)   (lbs)
  1     0.5      2.9     0.0    1.3      0.      0.       0.4      0.0     0.0
  2     0.0      0.0     0.0    0.0      0.      0.       0.0      0.0     0.0
  3     5.5    949.5     0.0  413.2      0.      0.     142.4      0.0     0.0
  4     6.0   2948.4     0.0 1281.3      0.      0.     442.3      0.0     0.0
  5     6.0   4647.0     0.0 2024.1      0.      0.     697.1      0.0     0.0
  6     6.0   6020.1     0.0 2637.7      0.      0.     903.0      0.0     0.0
  7     4.6   5420.9     0.0 2398.1      0.      0.     813.1      0.0     0.0
  8     1.3   1625.7     0.0  738.0      0.      0.     243.9      0.0     0.0
  9     5.8   7432.8     0.0 3419.8      0.      0.    1114.9      0.0     0.0
 10     5.7   7334.8     0.0 3433.3      0.      0.    1100.2      0.0     0.0
 11     5.6   6926.4     0.0 3311.7      0.      0.    1039.0      0.0     0.0
 12     5.5   6230.2     0.0 3055.3      0.      0.     934.5      0.0     0.0
 13     5.3   5275.4     0.0 2665.2      0.      0.     791.3      0.0     0.0
 14     5.1   4097.8     0.0 2142.8      0.      0.     614.7      0.0     0.0
 15     4.9   2739.2     0.0 1489.9      0.      0.     410.9      0.0     0.0
 16     1.8    648.4     0.0  368.8      0.      0.      97.3      0.0     0.0
 17     2.9    459.6     0.0  270.7      0.      0.      68.9      0.0     0.0
 18     0.1      0.5     0.0    0.3      0.      0.       0.1      0.0     0.0
     Failure Surface Specified By 16 Coordinate Points
       Point      X-Surf      Y-Surf
        No.         (ft)        (ft)
         1         24.47      878.95
         2         30.36      877.80
         3         36.32      877.08
         4         42.31      876.80
         5         48.31      876.96
```

6	54.28	877.55
7	60.19	878.58
8	66.01	880.04
9	71.71	881.91
10	77.26	884.20
11	82.63	886.88
12	87.78	889.95
13	92.70	893.38
14	97.36	897.17
15	101.73	901.28
16	102.77	902.42

Circle Center At X = 43.16 ; Y = 958.93 ; and Radius = 82.13

Factor of Safety

*** 1.477 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	27.63	880.03
2	33.62	879.61
3	39.62	879.58
4	45.60	879.96
5	51.55	880.74
6	57.44	881.93
7	63.22	883.50
8	68.89	885.47
9	74.42	887.81
10	79.77	890.52
11	84.93	893.58
12	89.87	896.98
13	94.57	900.71
14	96.10	902.10

Circle Center At X = 37.00 ; Y = 968.20 ; and Radius = 88.67

Factor of Safety

*** 1.477 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.90	878.79
2	28.77	877.56
3	34.71	876.75
4	40.70	876.38
5	46.70	876.43
6	52.68	876.91
7	58.61	877.81
8	64.46	879.14
9	70.21	880.88
10	75.81	883.03
11	81.24	885.57
12	86.48	888.50
13	91.50	891.79
14	96.26	895.44
15	100.76	899.41
16	103.75	902.46

Circle Center At X = 43.00 ; Y = 960.04 ; and Radius = 83.70

Factor of Safety

*** 1.478 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	19.74	878.47
2	25.54	876.96
3	31.44	875.87
4	37.41	875.20
5	43.40	874.97
6	49.40	875.17
7	55.37	875.79
8	61.27	876.85

9	67.09	878.33
10	72.78	880.22
11	78.32	882.51
12	83.69	885.20
13	88.85	888.27
14	93.77	891.70
15	98.43	895.47
16	102.81	899.57
17	105.57	902.55

Circle Center At X = 43.66 ; Y = 958.36 ; and Radius = 83.40

Factor of Safety

*** 1.478 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	22.11	878.71
2	27.97	877.45
3	33.91	876.61
4	39.90	876.17
5	45.90	876.14
6	51.88	876.53
7	57.83	877.34
8	63.71	878.55
9	69.49	880.16
10	75.14	882.16
11	80.64	884.56
12	85.97	887.32
13	91.09	890.45
14	95.98	893.92
15	100.63	897.72
16	105.00	901.83
17	105.67	902.56

Circle Center At X = 43.24 ; Y = 963.09 ; and Radius = 86.99

Factor of Safety

*** 1.479 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.32	878.63
2	27.11	877.07
3	33.00	875.92
4	38.95	875.18
5	44.94	874.87
6	50.94	874.99
7	56.92	875.53
8	62.84	876.49
9	68.68	877.86
10	74.41	879.65
11	80.00	881.83
12	85.42	884.41
13	90.64	887.36
14	95.64	890.67
15	100.40	894.33
16	104.88	898.32
17	109.07	902.61
18	109.17	902.72

Circle Center At X = 46.32 ; Y = 959.67 ; and Radius = 84.81

Factor of Safety

*** 1.479 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	24.47	878.95
2	30.35	877.72
3	36.29	876.89
4	42.27	876.47
5	48.27	876.45

```
     6         54.26      876.85
     7         60.21      877.65
     8         66.09      878.85
     9         71.87      880.45
    10         77.53      882.44
    11         83.04      884.81
    12         88.38      887.55
    13         93.52      890.64
    14         98.44      894.08
    15        103.11      897.85
    16        107.51      901.92
    17        108.22      902.68
Circle Center At X =    45.48 ; Y =   964.56 ; and Radius =    88.15
      Factor of Safety
     ***    1.479   ***
Failure Surface Specified By 16 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1         23.68      878.87
     2         29.45      877.21
     3         35.34      876.04
     4         41.30      875.37
     5         47.30      875.20
     6         53.29      875.55
     7         59.23      876.39
     8         65.07      877.73
     9         70.79      879.56
    10         76.33      881.86
    11         81.66      884.62
    12         86.73      887.82
    13         91.52      891.44
    14         95.98      895.45
    15        100.10      899.82
    16        102.14      902.39
Circle Center At X =    46.25 ; Y =   946.21 ; and Radius =    71.02
      Factor of Safety
     ***    1.479   ***
Failure Surface Specified By 16 Coordinate Points
  Point       X-Surf      Y-Surf
   No.         (ft)        (ft)
     1         22.90      878.79
     2         28.77      877.59
     3         34.72      876.82
     4         40.72      876.49
     5         46.71      876.60
     6         52.69      877.14
     7         58.61      878.13
     8         64.44      879.54
     9         70.15      881.38
    10         75.71      883.62
    11         81.10      886.27
    12         86.27      889.31
    13         91.21      892.72
    14         95.89      896.48
    15        100.28      900.57
    16        101.95      902.38
Circle Center At X =    42.24 ; Y =   958.23 ; and Radius =    81.76
      Factor of Safety
     ***    1.480   ***
         **** END OF GSTABL7 OUTPUT ****
```

Geotechnologies, Inc.

Project: BlueGreen Consulting
File #: 20092

Surficial Stability Calculations - Colluvium

Input

Slope Angle	A	45	degrees
Soil Thickness	h	4	feet
Saturated Weight of Soil	Ws	140	pcf
Friction Angle of Soil	phi	34	degrees
Cohesion of Soil	c	350	psf

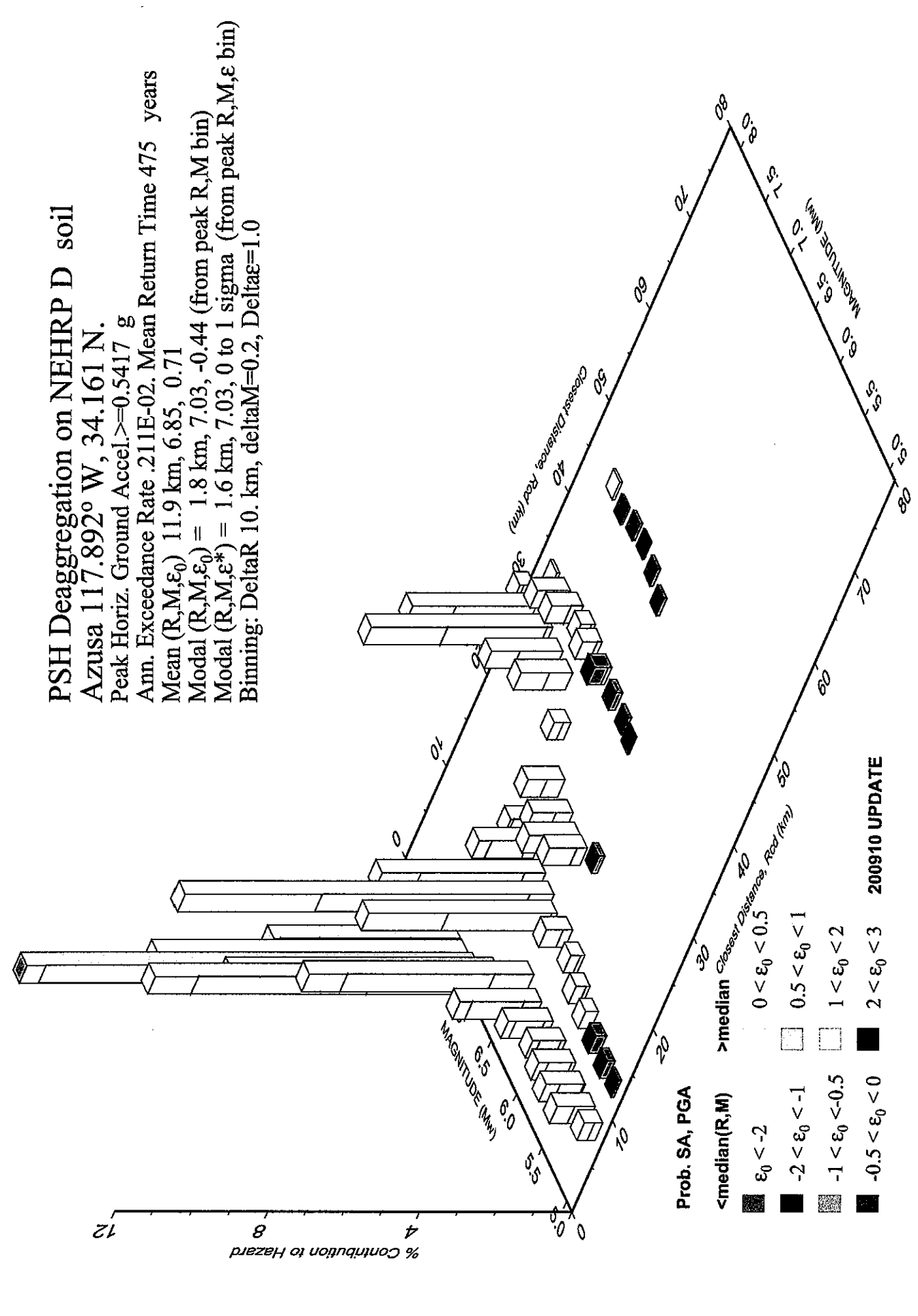
F.S. = (c+(Ws-Ww)*h*(cos A)^2*(tan (phi)))/(Ws*h*(cos A)*(sin A))
F.S. = 1.62

Surficial Stability Calculations - Proposed Cut or Fill Slope

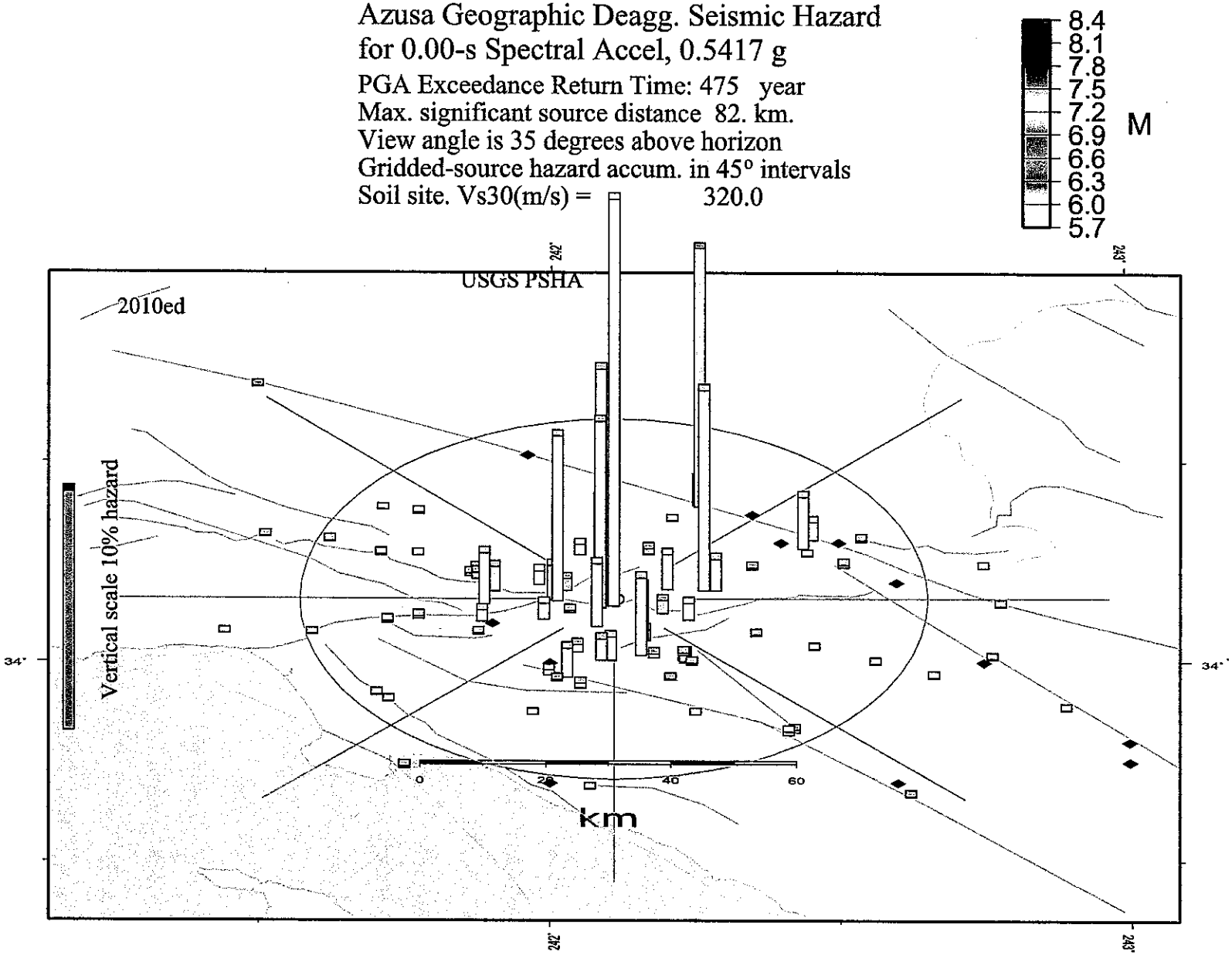
Input

Slope Angle	A	27	degrees
Soil Thickness	h	4	feet
Saturated Weight of Soil	Ws	140	pcf
Friction Angle of Soil	phi	34	degrees
Cohesion of Soil	c	260	psf

F.S. = (c+(Ws-Ww)*h*(cos A)^2*(tan (phi)))/(Ws*h*(cos A)*(sin A))
F.S. = 1.88



GMT 2011 Feb 16 00:26:44 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 320. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted



GMT 2011 Feb 16 00:26:44 Site Coords:-117.891 34.1606 (yellow disk) Vs30= 320.0. Max annual ExcdRate .3596E-03 (column height prop. to ExRate). Red diamonds: historical earthquakes, M>6

https://geohazards.usgs.gov/deaggint/2008/out/Azusa_2011.02.16_00.2...

*** Deaggregation of Seismic Hazard at One Period of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2008 version ***
PSHA Deaggregation. %contributions. site: Azusa long: 117.892 W., lat: 34.161 N.
Vs30(m/s)= 320.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.5417 g. Weight * Computed_Rate_Ex 0.211E-0
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.03074
#This deaggregation corresponds to Mean Hazard w/all GMPEs

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
7.7	5.05	0.478	0.270	0.208	0.000	0.000	0.000	0.000
12.4	5.05	0.084	0.084	0.000	0.000	0.000	0.000	0.000
7.8	5.20	1.005	0.462	0.538	0.004	0.000	0.000	0.000
12.7	5.20	0.214	0.214	0.000	0.000	0.000	0.000	0.000
7.9	5.40	1.035	0.364	0.618	0.054	0.000	0.000	0.000
13.1	5.40	0.285	0.264	0.021	0.000	0.000	0.000	0.000
7.9	5.60	0.986	0.275	0.605	0.106	0.000	0.000	0.000
13.5	5.60	0.340	0.292	0.048	0.000	0.000	0.000	0.000
8.0	5.80	0.876	0.195	0.555	0.126	0.000	0.000	0.000
13.9	5.80	0.372	0.280	0.092	0.000	0.000	0.000	0.000
7.6	6.02	1.183	0.202	0.758	0.223	0.000	0.000	0.000
15.0	6.00	0.360	0.264	0.096	0.000	0.000	0.000	0.000
7.3	6.22	2.150	0.325	1.359	0.467	0.000	0.000	0.000
15.0	6.23	0.691	0.440	0.251	0.000	0.000	0.000	0.000
23.0	6.24	0.160	0.148	0.012	0.000	0.000	0.000	0.000
7.8	6.43	5.901	1.011	3.873	1.015	0.002	0.000	0.000
14.1	6.47	4.948	2.096	2.714	0.138	0.000	0.000	0.000
21.4	6.45	0.996	0.721	0.275	0.000	0.000	0.000	0.000
33.5	6.45	0.056	0.056	0.000	0.000	0.000	0.000	0.000
5.7	6.59	9.493	1.112	4.621	3.142	0.613	0.005	0.000
14.7	6.59	9.698	3.600	5.468	0.630	0.000	0.000	0.000
21.2	6.58	1.343	0.895	0.448	0.000	0.000	0.000	0.000
34.0	6.59	0.095	0.095	0.000	0.000	0.000	0.000	0.000
3.9	6.80	7.030	0.480	2.507	3.124	0.909	0.011	0.000
14.9	6.77	4.283	1.016	2.723	0.544	0.000	0.000	0.000
21.6	6.76	1.056	0.603	0.453	0.000	0.000	0.000	0.000
34.3	6.79	0.178	0.171	0.007	0.000	0.000	0.000	0.000
44.9	6.77	0.091	0.091	0.000	0.000	0.000	0.000	0.000
1.8	7.03	11.880	0.505	2.872	5.766	2.618	0.119	0.000
16.2	6.96	1.610	0.331	0.973	0.296	0.009	0.000	0.000
22.5	6.99	0.977	0.505	0.467	0.005	0.000	0.000	0.000
34.4	7.02	0.461	0.378	0.083	0.000	0.000	0.000	0.000
45.8	6.97	0.083	0.082	0.000	0.000	0.000	0.000	0.000
1.2	7.19	8.144	0.295	1.754	3.984	1.998	0.113	0.000
16.5	7.14	0.592	0.072	0.303	0.200	0.017	0.000	0.000
26.4	7.19	0.431	0.244	0.181	0.006	0.000	0.000	0.000
34.7	7.24	0.524	0.395	0.128	0.000	0.000	0.000	0.000
46.3	7.18	0.064	0.061	0.003	0.000	0.000	0.000	0.000
1.1	7.33	4.925	0.174	1.036	2.396	1.248	0.071	0.000
29.4	7.40	1.359	0.756	0.600	0.002	0.000	0.000	0.000
34.9	7.39	0.385	0.288	0.097	0.000	0.000	0.000	0.000
46.2	7.36	0.083	0.074	0.009	0.000	0.000	0.000	0.000
1.1	7.51	0.236	0.008	0.049	0.114	0.061	0.003	0.000
29.5	7.60	1.878	0.749	1.124	0.005	0.000	0.000	0.000
34.4	7.60	0.816	0.502	0.315	0.000	0.000	0.000	0.000
45.6	7.56	0.071	0.057	0.013	0.000	0.000	0.000	0.000
29.6	7.81	4.766	2.003	2.625	0.138	0.000	0.000	0.000
33.8	7.80	0.859	0.437	0.422	0.000	0.000	0.000	0.000
46.1	7.76	0.077	0.058	0.019	0.000	0.000	0.000	0.000
29.7	8.00	3.452	1.147	2.100	0.205	0.000	0.000	0.000
33.5	7.99	0.079	0.035	0.044	0.000	0.000	0.000	0.000
29.8	8.19	0.391	0.112	0.237	0.042	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 100.0
Mean src-site R= 11.9 km; M= 6.85; eps0= 0.71. Mean calculated for all sources.

Modal src-site R= 1.8 km; M= 7.03; eps0= -0.44 from peak (R,M) bin
MODE R*= 1.6km; M*= 7.03; EPS.INTERVAL: 0 to 1 sigma % CONTRIB.= 5.766

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	39.50	8.3	6.88	0.46
California B-faults GR	31.11	7.2	6.74	0.38
California A-faults	16.97	30.5	7.65	1.55
CA Compr. crustal gridded	12.37	9.7	5.91	1.17

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Sierra Madre Char	8.75	1.2	7.14	-0.57	-176.4
Clamshell-Sawpit Char	2.83	6.7	6.50	0.87	-5.8
Cucamonga Char	6.36	14.6	6.60	1.57	77.1
Raymond Char	5.07	9.0	6.61	1.10	-88.4
Sierra Madre Connected Char	8.31	1.1	7.24	-0.61	-176.4
Sierra Madre GR	9.94	2.4	6.83	-0.29	-116.6
Cucamonga, nominally GR	2.04	14.6	6.50	1.64	77.1
Sierra Madre Connected GR	7.83	2.7	6.90	-0.25	-125.8
SSAnd;PK+CH+CC+BB+NM+SM aPriori	2.08	29.8	7.89	1.39	27.1

#*********End of deaggregation corresponding to Mean Hazard w/all GMPEs *********#

PSHA Deaggregation. %contributions. site: Azusa long: 117.892 W., lat: 34.161 N.
Vs30(m/s)= 320.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.5417 g. Weight * Computed_Rate_Ex 0.752E-0
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.02529
#This deaggregation corresponds to Boore-Atkinson 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
7.4	5.05	0.037	0.037	0.000	0.000	0.000	0.000	0.000
7.5	5.20	0.093	0.092	0.001	0.000	0.000	0.000	0.000
7.6	5.40	0.118	0.106	0.012	0.000	0.000	0.000	0.000
7.7	5.60	0.136	0.112	0.024	0.000	0.000	0.000	0.000
13.2	5.61	0.029	0.029	0.000	0.000	0.000	0.000	0.000
7.8	5.80	0.146	0.110	0.035	0.000	0.000	0.000	0.000
14.1	5.81	0.050	0.050	0.000	0.000	0.000	0.000	0.000
7.3	6.02	0.246	0.148	0.098	0.000	0.000	0.000	0.000
15.3	6.00	0.066	0.066	0.000	0.000	0.000	0.000	0.000
7.1	6.22	0.495	0.217	0.276	0.002	0.000	0.000	0.000
15.1	6.24	0.190	0.158	0.031	0.000	0.000	0.000	0.000
23.3	6.24	0.058	0.054	0.004	0.000	0.000	0.000	0.000
7.9	6.43	1.560	0.425	1.095	0.040	0.000	0.000	0.000
14.2	6.47	1.729	0.793	0.896	0.040	0.000	0.000	0.000
21.5	6.45	0.334	0.245	0.088	0.000	0.000	0.000	0.000
33.7	6.46	0.045	0.045	0.000	0.000	0.000	0.000	0.000
5.7	6.59	2.716	0.388	1.450	0.802	0.076	0.000	0.000
14.9	6.58	3.497	1.283	2.045	0.169	0.000	0.000	0.000
21.4	6.58	0.550	0.367	0.183	0.000	0.000	0.000	0.000
34.1	6.59	0.088	0.088	0.000	0.000	0.000	0.000	0.000
44.0	6.61	0.028	0.028	0.000	0.000	0.000	0.000	0.000
3.9	6.80	2.045	0.169	0.825	0.898	0.153	0.000	0.000
15.1	6.76	1.655	0.417	1.103	0.135	0.000	0.000	0.000
21.9	6.76	0.547	0.280	0.267	0.000	0.000	0.000	0.000
34.4	6.80	0.167	0.160	0.007	0.000	0.000	0.000	0.000
44.8	6.77	0.087	0.087	0.000	0.000	0.000	0.000	0.000
1.8	7.03	3.469	0.170	0.969	1.829	0.501	0.000	0.000
16.1	6.95	0.618	0.124	0.395	0.098	0.000	0.000	0.000
22.7	6.99	0.562	0.229	0.328	0.005	0.000	0.000	0.000
34.4	7.02	0.393	0.311	0.083	0.000	0.000	0.000	0.000
45.7	6.97	0.078	0.078	0.000	0.000	0.000	0.000	0.000
55.9	7.02	0.018	0.018	0.000	0.000	0.000	0.000	0.000
1.2	7.19	2.362	0.098	0.585	1.280	0.399	0.000	0.000
16.5	7.14	0.178	0.025	0.110	0.043	0.000	0.000	0.000
26.4	7.19	0.287	0.130	0.151	0.006	0.000	0.000	0.000
34.7	7.23	0.407	0.278	0.128	0.000	0.000	0.000	0.000

46.2	7.18	0.058	0.055	0.003	0.000	0.000	0.000	0.000
56.6	7.20	0.021	0.021	0.000	0.000	0.000	0.000	0.000
62.2	7.20	0.020	0.020	0.000	0.000	0.000	0.000	0.000
1.1	7.33	1.424	0.058	0.345	0.770	0.250	0.000	0.000
29.5	7.40	0.936	0.415	0.519	0.002	0.000	0.000	0.000
35.0	7.38	0.290	0.197	0.093	0.000	0.000	0.000	0.000
46.2	7.36	0.075	0.065	0.009	0.000	0.000	0.000	0.000
56.6	7.36	0.021	0.021	0.000	0.000	0.000	0.000	0.000
62.1	7.39	0.020	0.020	0.000	0.000	0.000	0.000	0.000
1.1	7.51	0.068	0.003	0.016	0.037	0.012	0.000	0.000
29.5	7.59	1.077	0.364	0.708	0.005	0.000	0.000	0.000
34.5	7.60	0.584	0.308	0.276	0.000	0.000	0.000	0.000
45.6	7.56	0.061	0.048	0.013	0.000	0.000	0.000	0.000
62.1	7.58	0.043	0.043	0.000	0.000	0.000	0.000	0.000
75.8	7.61	0.023	0.023	0.000	0.000	0.000	0.000	0.000
29.6	7.80	2.779	0.815	1.829	0.135	0.000	0.000	0.000
33.8	7.79	0.558	0.220	0.337	0.000	0.000	0.000	0.000
46.1	7.75	0.061	0.042	0.019	0.000	0.000	0.000	0.000
56.8	7.74	0.022	0.018	0.004	0.000	0.000	0.000	0.000
29.7	7.99	2.021	0.527	1.295	0.200	0.000	0.000	0.000
33.5	7.99	0.048	0.015	0.033	0.000	0.000	0.000	0.000
29.8	8.19	0.213	0.046	0.136	0.031	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 35.7
Mean src-site R= 15.8 km; M= 7.01; eps0= 0.96. Mean calculated for all sources.
Modal src-site R= 14.9 km; M= 6.58; eps0= 1.38 from peak (R,M) bin
MODE R*= 14.8km; M*= 6.59; EPS.INTERVAL: 0 to 1 sigma % CONTRIB.= 2.045

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	13.09	10.0	6.86	0.73
California B-faults GR	9.56	8.0	6.73	0.61
California A-faults	10.70	31.0	7.62	1.44

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Sierra Madre Char	2.54	1.2	7.14	-0.27	-176.4
Clamshell-Sawpit Char	0.75	6.7	6.52	1.05	-5.8
Cucamonga Char	2.55	14.6	6.61	1.52	77.1
Raymond Char	1.53	9.0	6.62	1.18	-88.4
Sierra Madre Connected Char	2.40	1.1	7.24	-0.28	-176.4
Sierra Madre GR	2.87	2.3	6.83	-0.05	-116.6
Cucamonga, nominally GR	0.78	14.6	6.50	1.61	77.1
Sierra Madre Connected GR	2.28	2.9	6.90	0.01	-125.8
SSAnd;PK+CH+CC+BB+NM+SM aPriori	1.19	29.8	7.89	1.25	27.1

#*********End of deaggregation corresponding to Boore-Atkinson 2008 *********#

PSHA Deaggregation. %contributions. site: Azusa long: 117.892 W., lat: 34.161 N.
Vs30(m/s)= 320.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.5417 g. Weight * Computed_Rate_Ex 0.519E-0
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.02938
#This deaggregation corresponds to Campbell-Bozorgnia 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
7.6	5.05	0.094	0.085	0.008	0.000	0.000	0.000	0.000
7.7	5.20	0.232	0.188	0.044	0.000	0.000	0.000	0.000
12.0	5.21	0.026	0.026	0.000	0.000	0.000	0.000	0.000
7.8	5.40	0.286	0.205	0.081	0.000	0.000	0.000	0.000
12.5	5.41	0.056	0.056	0.000	0.000	0.000	0.000	0.000
7.9	5.60	0.286	0.184	0.102	0.000	0.000	0.000	0.000
13.0	5.60	0.078	0.078	0.000	0.000	0.000	0.000	0.000
8.0	5.80	0.241	0.142	0.099	0.000	0.000	0.000	0.000
13.5	5.80	0.082	0.082	0.000	0.000	0.000	0.000	0.000
7.6	6.01	0.298	0.168	0.130	0.000	0.000	0.000	0.000
14.7	5.99	0.075	0.075	0.000	0.000	0.000	0.000	0.000

https://geohazards.usgs.gov/deaggint/2008/out/Azusa_2011.02.16_00.2...

7.3	6.22	0.561	0.225	0.324	0.012	0.000	0.000	0.000
15.0	6.23	0.148	0.131	0.017	0.000	0.000	0.000	0.000
22.3	6.25	0.029	0.027	0.002	0.000	0.000	0.000	0.000
7.8	6.43	1.597	0.426	1.102	0.069	0.000	0.000	0.000
13.7	6.47	1.252	0.667	0.537	0.048	0.000	0.000	0.000
21.1	6.46	0.263	0.215	0.049	0.000	0.000	0.000	0.000
5.3	6.59	2.958	0.398	1.382	0.921	0.256	0.001	0.000
14.5	6.58	2.123	0.978	1.052	0.093	0.000	0.000	0.000
21.1	6.58	0.304	0.224	0.080	0.000	0.000	0.000	0.000
3.4	6.80	2.111	0.157	0.704	0.925	0.323	0.002	0.000
14.6	6.77	1.063	0.423	0.580	0.060	0.000	0.000	0.000
21.5	6.75	0.209	0.157	0.051	0.000	0.000	0.000	0.000
1.6	7.03	3.681	0.172	0.924	1.800	0.757	0.028	0.000
16.4	6.97	0.279	0.098	0.158	0.024	0.000	0.000	0.000
22.3	7.00	0.184	0.131	0.053	0.000	0.000	0.000	0.000
34.2	7.03	0.039	0.039	0.000	0.000	0.000	0.000	0.000
1.2	7.19	2.494	0.098	0.583	1.250	0.536	0.027	0.000
16.5	7.14	0.116	0.022	0.068	0.026	0.000	0.000	0.000
25.8	7.20	0.063	0.047	0.016	0.000	0.000	0.000	0.000
34.5	7.24	0.051	0.051	0.000	0.000	0.000	0.000	0.000
1.1	7.33	1.508	0.058	0.345	0.758	0.330	0.017	0.000
29.5	7.40	0.190	0.148	0.042	0.000	0.000	0.000	0.000
34.8	7.39	0.036	0.036	0.000	0.000	0.000	0.000	0.000
1.1	7.51	0.072	0.003	0.016	0.036	0.016	0.001	0.000
29.3	7.58	0.192	0.137	0.055	0.000	0.000	0.000	0.000
34.5	7.59	0.070	0.070	0.000	0.000	0.000	0.000	0.000
29.6	7.80	0.637	0.413	0.224	0.000	0.000	0.000	0.000
33.6	7.79	0.098	0.084	0.013	0.000	0.000	0.000	0.000
29.7	7.99	0.416	0.259	0.157	0.000	0.000	0.000	0.000
29.8	8.20	0.042	0.027	0.015	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 24.6
Mean src-site R= 8.8 km; M= 6.79; eps0= 0.64. Mean calculated for all sources.
Modal src-site R= 1.6 km; M= 7.03; eps0= -0.35 from peak (R,M) bin
MODE R*= 1.4km; M*= 7.03; EPS.INTERVAL: 0 to 1 sigma % CONTRIB.= 1.800

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	10.30	6.9	6.91	0.47
California B-faults GR	9.17	6.3	6.75	0.33
CA Compr. crustal gridded	3.07	9.0	5.94	1.26

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Sierra Madre Char	2.71	1.2	7.14	-0.43	-176.4
Clamshell-Sawpit Char	0.76	6.7	6.49	1.03	-5.8
Cucamonga Char	1.15	14.6	6.59	1.84	77.1
Raymond Char	1.21	9.0	6.59	1.30	-88.4
Sierra Madre Connected Char	2.55	1.1	7.24	-0.44	-176.4
Sierra Madre GR	3.31	2.4	6.82	-0.30	-116.6
Cucamonga, nominally GR	0.41	14.6	6.50	1.86	77.1
Sierra Madre Connected GR	2.50	2.6	6.89	-0.22	-125.8
SSAnd;PK+CH+CC+BB+NM+SM aPriori	0.27	29.8	7.89	1.83	27.1

#*********End of deaggregation corresponding to Campbell-Bozorgnia 2008 *********#

PSHA Deaggregation. %contributions. site: Azusa long: 117.892 W., lat: 34.161 N.
Vs30(m/s)= 320.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 475 yrs. Exceedance PGA =0.5417 g. Weight * Computed_Rate_Ex 0.837E-0
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.03912
#This deaggregation corresponds to Chiou-Youngs 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
7.8	5.05	0.347	0.255	0.092	0.000	0.000	0.000	0.000
12.5	5.05	0.077	0.077	0.000	0.000	0.000	0.000	0.000
7.9	5.20	0.680	0.440	0.240	0.000	0.000	0.000	0.000

https://geohazards.usgs.gov/deaggint/2008/out/Azusa_2011.02.16_00.2...

12.8	5.20	0.184	0.184	0.000	0.000	0.000	0.000	0.000
7.9	5.40	0.631	0.339	0.292	0.000	0.000	0.000	0.000
13.3	5.40	0.215	0.215	0.000	0.000	0.000	0.000	0.000
8.0	5.60	0.564	0.258	0.306	0.000	0.000	0.000	0.000
13.7	5.60	0.233	0.223	0.010	0.000	0.000	0.000	0.000
8.0	5.80	0.490	0.192	0.298	0.000	0.000	0.000	0.000
14.0	5.80	0.240	0.220	0.020	0.000	0.000	0.000	0.000
7.7	6.02	0.640	0.200	0.436	0.003	0.000	0.000	0.000
15.0	6.00	0.218	0.197	0.021	0.000	0.000	0.000	0.000
23.8	6.01	0.024	0.024	0.000	0.000	0.000	0.000	0.000
7.3	6.22	1.094	0.238	0.785	0.071	0.000	0.000	0.000
15.0	6.22	0.347	0.269	0.077	0.000	0.000	0.000	0.000
23.0	6.23	0.073	0.067	0.006	0.000	0.000	0.000	0.000
7.8	6.43	2.744	0.422	1.893	0.429	0.000	0.000	0.000
14.4	6.46	1.815	0.823	0.951	0.041	0.000	0.000	0.000
21.5	6.45	0.347	0.247	0.100	0.000	0.000	0.000	0.000
6.0	6.58	3.808	0.374	1.855	1.298	0.278	0.003	0.000
14.5	6.57	3.744	1.146	2.224	0.374	0.000	0.000	0.000
21.0	6.57	0.516	0.310	0.206	0.000	0.000	0.000	0.000
4.3	6.79	2.890	0.188	1.052	1.213	0.429	0.009	0.000
15.0	6.76	2.067	0.495	1.254	0.318	0.000	0.000	0.000
21.4	6.75	0.327	0.189	0.137	0.000	0.000	0.000	0.000
1.8	7.03	4.724	0.172	1.002	2.101	1.357	0.091	0.000
16.1	6.97	0.702	0.112	0.383	0.198	0.009	0.000	0.000
22.2	6.99	0.227	0.149	0.078	0.000	0.000	0.000	0.000
34.2	7.04	0.028	0.028	0.000	0.000	0.000	0.000	0.000
1.2	7.19	3.288	0.098	0.586	1.454	1.063	0.086	0.000
16.4	7.14	0.298	0.025	0.125	0.132	0.016	0.000	0.000
25.6	7.20	0.087	0.059	0.029	0.000	0.000	0.000	0.000
34.6	7.25	0.062	0.062	0.000	0.000	0.000	0.000	0.000
1.1	7.33	1.993	0.058	0.345	0.868	0.667	0.055	0.000
29.5	7.42	0.323	0.202	0.121	0.000	0.000	0.000	0.000
34.8	7.40	0.059	0.056	0.003	0.000	0.000	0.000	0.000
1.1	7.51	0.096	0.003	0.016	0.041	0.033	0.003	0.000
29.1	7.59	0.318	0.196	0.122	0.000	0.000	0.000	0.000
34.2	7.61	0.154	0.120	0.034	0.000	0.000	0.000	0.000
29.6	7.80	1.265	0.604	0.658	0.003	0.000	0.000	0.000
33.7	7.80	0.214	0.141	0.073	0.000	0.000	0.000	0.000
29.7	7.98	1.297	0.581	0.710	0.006	0.000	0.000	0.000
33.5	7.99	0.023	0.014	0.009	0.000	0.000	0.000	0.000
29.8	8.19	0.134	0.039	0.085	0.010	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 39.7
Mean src-site R= 10.3 km; M= 6.74; eps0= 0.53. Mean calculated for all sources.
Modal src-site R= 1.8 km; M= 7.03; eps0= -0.71 from peak (R,M) bin
MODE R*= 14.4km; M*= 6.57; EPS.INTERVAL: 0 to 1 sigma % CONTRIB.= 2.224

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	16.11	7.9	6.87	0.23
California B-faults GR	12.38	7.3	6.73	0.24
California A-faults	4.20	29.8	7.74	1.63
CA Compr. crustal gridded	7.02	9.7	5.83	1.05

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
Sierra Madre Char	3.50	1.2	7.14	-0.90	-176.4
Clamshell-Sawpit Char	1.32	6.7	6.50	0.68	-5.8
Cucamonga Char	2.65	14.6	6.59	1.50	77.1
Raymond Char	2.33	9.0	6.60	0.94	-88.4
Sierra Madre Connected Char	3.36	1.1	7.24	-0.96	-176.4
Sierra Madre GR	3.75	2.4	6.84	-0.47	-116.6
Cucamonga, nominally GR	0.85	14.6	6.50	1.56	77.1
Sierra Madre Connected GR	3.05	2.8	6.91	-0.47	-125.8
SSAnd;PR+CH+CC+BB+NM+SM aPriori	0.63	29.8	7.90	1.48	27.1

#*********End of deaggregation corresponding to Chiou-Youngs 2008 *********#

********** Southern California **********

Exhibit H - Plan Specifications for the Special Use Area

SECTION 00 72 00
GENERAL CONDITIONS

PART 1 – GENERAL

A. The Contract Documents consist of the Conditions of the Contract, Exhibits to the Contract, General Conditions, Special Conditions, if any, the Drawings, the Specifications, all Addenda issued prior to award, and all Modifications thereto. A modification is (1) a written amendment signed by both parties, (2) a Change Order, (3) a written interpretation issued by the WCA, (4) a written order for a minor change in the work issued by the WCA. A Modification may be made only after award of contract.

B. The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, including the bidding documents. The Contract may be amended or modified only by Modification as defined in Part 1, Section A of the General Conditions.

C. The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

D. The Project is the total construction, of which the Work performed under the Contract Documents may be the whole or a part

E. The Contract Documents shall be signed in not less than triplicate by the WCA and Contractor.

F. By executing the Contract, the Contractor represents that Contractor has visited the site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.

G. The Contract Documents are complementary and what is required by any one shall be as binding as if required by all. The intention of the Documents is to include all labor, materials, equipment, and other items necessary for the proper execution and completion of the Work.

H. All drawings, Specifications and copies thereof furnished by the WCA are, and shall remain, property of the WCA.

PART 2 – CONTRACT ADMINISTRATION

A. The WCA will provide general administration of the Construction Contract including performance of the functions hereinafter described.

B. The WCA shall at all times have access to the Work, including periods of preparation to commence the Work and during progress of the Work. The Contractor shall provide facilities for such access so the WCA may perform its functions under the Contract Documents.

C. The WCA will have authority to reject Work which does not conform to the Contract Documents. Whenever the WCA considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, WCA will have authority to require the Contractor to stop the Work or any portion thereof, or to require special inspection or testing of the Work, whether or not such Work be then fabricated, installed or completed.

D. The WCA will prepare Change Order(s), and will have authority to order minor changes in the Work.

E. The WCA will conduct inspections to determine the dates of Substantial Completion and final completion of the Work. Contractor will assemble and provide WCA with written guarantees and related documents required by the Contract.

PART 3 – THE WCA

A. The WCA is the Watershed Conservation Authority, a public entity of the State of California exercising joint powers of the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy and the Los Angeles County Flood Control District pursuant to Section 65000 et seq. of the Government Code.

B. The WCA shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the Project.

C. Information or services under the WCA's control shall be furnished by the WCA with reasonable promptness to avoid delay in the orderly progress of the Work.

PART 4 – THE CONTRACTOR

A. The Contractor is the person or organization identified as such in the Contract. The term Contractor means the Contractor or its authorized representative.

B. The Contractor shall carefully study and compare the Contract, Conditions of the Contract, Exhibits to the Contract, Drawings, Specifications, Addenda and Modifications, and shall at once report any error, inconsistency or omission it may discover. Contractor shall not be liable to the WCA for any damage resulting from any such errors, inconsistencies or omissions. The Contractor shall do no Work without Drawings, Specifications or interpretations.

C. The Contractor shall supervise and direct the Work using its best skill and attention. Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

D. Unless otherwise specifically noted, the Contractor shall provide and pay all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

E. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Work anyone not skilled in the task assigned.

F. The Contractor warrants to the WCA that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. No substitute "or equal" material or equipment shall be installed without written approval of WCA.

G. The warranty provided in Paragraph 4F shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contract Documents.

H. The Contractor shall pay all sales, consumer, use and other similar taxes required by law.

I. The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the Work.

J. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications will be confirmed in writing. Other communications will be so confirmed on written request in each case.

K. The Contractor shall be responsible to the WCA for the acts and omissions of all Contractors, employees and all Subcontractors, their agents and employees, and all other persons performing any of the Work under a contract with the Contractor.

L. The Contractor, immediately after being awarded the Contract, shall prepare and submit for the WCA's approval an estimated progress schedule for the Work.

M. The Contractor shall maintain at the site for the WCA one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other Modifications in good order and marked to record all changes made during construction. An original copy of the Drawings, marked to record all changes made during construction shall be delivered to WCA upon completion of the Work. The drawings shall represent the "As-built" Conditions.

N. The Contractor shall review, stamp with approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents. At the time of submission the Contractor shall inform the WCA in writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.

O. By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that Contractor has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data. Contractor further represents that Contractor has checked and coordinated each Shop Drawing and Sample with the requirements of the Work and of the Contract Documents.

P. The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

Q. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by Contractor’s operations. At the completion of the Work Contractor shall remove all waste materials, rubbish, tools, construction equipment, machinery and surplus materials from and about the site. Contractor shall clean all surfaces and leave the Work "broomclean" or its equivalent, except as otherwise specified.

R. If the Contractor fails to clean up, the WCA may do so and the cost thereof shall be charged to the Contractor.

S. The Contractor shall protect, defend, indemnify and hold harmless the WCA, the City of Azusa, the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, the State of California, the Los Angeles County Flood Control District, and the Mountains Recreation Conservation Authority, and their agents and employees from and against all claims, damages, loses and expenses including attorney's fees arising out of or resulting from the performance of the Work provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Contractor shall execute an Indemnification and Hold Harmless Agreement and Waiver of Subrogation and Contribution setting forth Contractor's obligations that will be incorporated as part of the Contract Documents for the Project.

T. Any claim by an employee of Contractor, Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts Contractor and/or Subcontractor may be liable, brought against the WCA , the Los Angeles County Flood Control District, and/or their agents and employees will be covered through worker's compensation insurance procured by Contractor and/or Subcontractor. Contractor will indemnify the WCA and the Los Angeles County Flood Control District for any such employee claims arising out of the Work. The indemnification obligation of Contractor, for any acts or omissions of Contractor, Subcontractor, their agents or employees, anyone indirectly employed by Contractor or Subcontractor, or anyone for whose acts any of them may be liable shall not be limited in any way in the amount or type of damages, compensation or benefits payable by or for the Contractor and Subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

U. The obligations of the Contractor set forth in Paragraphs S. and T. above shall not extend to the liability of the WCA or the Los Angeles County Flood Control District, their agents, or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the WCA or the Los Angeles County Flood Control District, their agents, or employees, provided such preparation of said documents, or giving or failure to give said directions or instructions, are the primary cause of the injury or damage.

V. At the time of bid submission, Contractor shall identify its type and class of Contractors License issued by the State of California. Contractor shall keep and maintain the identified Contractors License current throughout the term of the Contract and until the Work is complete. Contractors are required to work within the legal limits of their license.

PART 5 – THE SUBCONTRACTORS

A. A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the Work at the site.

B. A Sub-subcontractor is a person or organization who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site.

C. Nothing contained in the Contract Documents shall create any contractual relation between the WCA, the Los Angeles County Flood Control District, and any Subcontractor or Sub-subcontractor.

D. A Sub-contractor will not perform more than 50 % than the total Contract value.

E. Per California Public Contract Code Section 4104, Bidders shall furnish to the WCA in writing for acceptance by the WCA, a list of the names of the Subcontractors of organizations (including those who are to furnish the materials or equipment fabricated to a special design) proposed to perform at least one half of one percent (1/2 or 1%) of the Work or render service to the Bidder in or about the construction of the Work or improvement described in the Contract Documents, and the type and portion of said Work that will be done by each subcontractor. Prior to the award of the Contract, the WCA shall notify the successful bidder in writing if the WCA, after due investigation, has reasonable objection to any person or organization on such list. Failure on the part of the WCA to make an objection to any person or organization on the list prior to the award shall constitute acceptance of such person or organization.

F. The Contractor shall not contract with any Subcontractor or any person or organization proposed for portions of the Work designated in the bidding requirements, or, if none is so designated, with any Subcontractor proposed for the principal portions of the Work who has not been accepted by the WCA. The Contractor will not be required to contract with any Subcontractor or person or organization against which he has a reasonable objection.

G. If the WCA required a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.

H. The Contractor shall not make any substitution for any Subcontractor or person or organization that has been accepted by the WCA, unless the substitution is accepted in writing by the WCA.

I. All Work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

1. Preserve and protect the rights of the WCA under the Contract and the indemnification rights of all other parties as set forth in paragraphs 4S and 4T above, with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

2. Require that such Work be performed in accordance with the requirements of the Contract Documents;

3. Require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment;

4. Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor of Sub-subcontractor where appropriate) in the manner provided in the Contract Documents for like claims by the Contractor upon the WCA;

5. Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance except such rights as they may have to the proceeds of such insurance held by the WCA, as trustee under Section 11.0 of the General Conditions;

6. Obligate each Subcontractor specifically to consent to the provisions of this paragraph.

J. The Contractor shall pay each Subcontractor, upon receipt of payment from the WCA, an amount equal to the percentage of completions allowed to the Contractor.

K. The WCA shall not have any obligations to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.

L. Contractor will employ only those Subcontractors who possess current Contractors Licenses of the type and class appropriate to the Work performed by said Subcontractors.

M. Contractor agrees that any Subcontractor hired by Contractor will maintain a current Contractors license while performing any portion of Work until said Work is completed. Upon request of WCA, Contractor will provide verification that any Subcontractor hired by Contractor possesses a current Contractors License of the type and class appropriate to the portion of the Work performed.

PART 6 - WCA'S RIGHT TO AWARD SEPARATE CONTRACTS

A. The WCA reserves the right to award other contracts in connection with other portions of the Project under these or similar Conditions of the Contract.

B. When separate contracts are awarded for different portions of the Project, "the Contractor" in the contract documents in each case shall be the Contractor who signs each separate contract.

PART 7 - MISCELLANEOUS PROVISIONS

A. The Contract shall be governed by the law of the place where the Project is located.

B. The WCA and the Contractor each binds itself, its partners, successors, assigns and legal representative of such other party in respect to all covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due hereunder, without the previous written consent of the WCA.

C. Written notice shall be deemed to have been duly served if delivered in person to the or if delivered at or sent by registered or certified mail to the last business address known to the party who gives the notice.

D. Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of its employees, agents or others for whose acts that party is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage but in no event will the time to seek legal remedy for such a claim be extended beyond the time allowed by law. Nothing in this paragraph is intended to waive the applicable statute of limitations for claims for bodily injury, personal injury, property damage, or breach of contract.

E. The WCA shall have the right, prior to signing the Contract, to require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising there under in such form and amount as the WCA may prescribe and with such sureties as may be agreeable to the parties. If such bonds are stipulated in the bidding requirements, the premiums shall be paid by the Contractor, if required subsequent to the submission of quotations or bids, the cost shall be reimbursed by the WCA. The Contractor shall deliver the required bonds to the WCA no later than the date of execution of the Contract, or, if the Work is commenced prior thereto in response to a notice to proceed, the Contractor shall, prior to commencement of the Work, submit evidence satisfactory to the WCA that such bonds will be issued.

F. If the Contractor defaults or neglects to carry out the Work in Accordance with the Contract Documents or fails to perform any provisions of the Contract, the WCA may, after seven days' written notice to the Contractor and without prejudice to any other remedy WCA may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. If the payments then or thereafter due to the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the WCA.

G. The Contractor shall pay all royalties and license fees. Contractor shall protect, indemnify, defend and hold harmless the WCA in any and all suits or claims arising from or on account of infringement of any patent rights, unless the WCA has specified use of a particular design, process, or product of a particular manufacturer or manufacturers, in which case the WCA shall be responsible for all such loss. If the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, Contractor shall be responsible for such loss unless Contractor promptly gives written notice to the WCA of the suspected infringement to allow WCA reasonable time to investigate, prevent, or cure said infringement.

H. If the Contract Documents, laws, ordinances, rules, or regulations of any public authority having jurisdiction require any Work to be inspected, tested, or approved, the Contractor shall give the WCA timely notice of its readiness and schedule such inspection, testing, or approval. The Contractor shall bear all costs of such inspections, tests and approvals unless otherwise provided.

I. If after the commencement of the Work the WCA determines that any work requires special inspection, testing or approval which Paragraph 7H does not include, WCA will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as in Paragraph 7H. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, otherwise the WCA shall bear such costs, and an appropriate Change Order shall be issued.

J. Required certificates of inspection, testing, or approval shall be secured by the Contractor and promptly delivered to the WCA.

K. Neither the observations of the WCA in Administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from obligations to perform the Work in accordance with the Contract Documents.

L. The Contractor and its subcontractors shall be properly licensed as may be required by all state and local authorities.

M. If discrepancies occur between the Construction Documents and Specifications, the information found on the Construction Documents shall take precedent. All other discrepancies shall be decided by the designer of record or the chief landscape architect.

N. Reference the *"GREENBOOK" Standard Specifications for Public Works Construction, Latest Edition* for additional information not found on Construction Documents or Project Specifications.

PART 8 - TIME

A. The Contract Time is the period of time allotted in the Contract Documents for completion of the Work.

B. The date of commencement of the Work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein.

C. The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the WCA when construction is sufficiently complete, in accordance with the Contract Documents, so the WCA may occupy the Work or designated portion thereof for the use for which it is intended.

D. The Contractor shall begin the Work on the date of commencement as defined in Paragraph 8B. Contractor shall carry the Work forward expeditiously with adequate forces and shall complete it within the Contract Time.

E. If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the WCA, or by any separate contractor employed by the WCA, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties or any causes beyond the Contractor's control, or by delay authorized by the WCA pending arbitration, or by any cause which the WCA determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the WCA may determine.

F. All requests for extension of time to complete the Work shall be made in writing to the WCA as soon as it becomes known to Contractor that an extension is necessary, but no more than fifteen days after the scheduled completion date of any portion of the Work. WCA will have sole discretion to determine if a request for extension will be granted and whether per diem damages will be charged to Contractor for any delay. WCA will provide written approval or disapproval of Contractor's request for extension, and will notify Contractor the amount of per diem damages that will be charged to the Contractor for the delay. If Contractor fails to timely request an extension, the right of Contractor to request an extension will be waived and Contractor will pay liquidated damages as set forth in the Contract Documents. In the case of a continuing cause of delay only one timely request for extension is necessary.

G. Paragraph 8C does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

H. Contractor shall provide WCA with a construction schedule that will provide in sufficient detail the chronological relationship of all activities of the Work, including but not limited to start and completion dates of various activities. Said schedule should also include time for submittal of shop drawings to WCA for approval, procurement of materials, scheduling of equipment, and the removal, protection, or relocation of utilities if said activities are pertinent to Contractor's obligations under the Contract.

PART 9 - PAYMENTS AND COMPLETION

A. The Contract Sum is stated in the Contract, and is the total amount payable by the WCA to the Contractor for the performance of the Work under the Contract Documents.

B. At the beginning of the project, the Contractor shall submit to the WCA a cost breakdown for the various subunits of the contract. The Contractor may then submit progress payment requests based on this breakdown, indicating percentage of completion and payment due. All payment requests shall include a 10% retention based on the value of the labor and materials incorporated into the Work. At least ten days before each progress payment falls due, the Contractor shall submit to the WCA the itemized application for payment less the 10% retention supported by such date substantiating the Contractor's right to payment, as WCA may require.

C. The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the project or not, will pass to the WCA upon receipt of such payment by the Contractor, free and clear of all claims, liens, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an application for Payment will have been acquired by the Contractor or any other person performing the work at the site or furnishing materials and equipment for the project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

D. Payment shall be made to the Contractor by the WCA in the amount of 90% of the value of the labor expended upon and materials incorporated into the Work. Said payment shall be based upon the total contract price and only such labor and materials therein required. Neither final payment nor the remaining retainage shall become due to the Contractor until sixty (60) calendar days following the WCA's recordation of a Notice of Completion. In the event of a dispute between WCA and the Contractor, WCA may withhold from final payment an amount not to exceed 150% of the disputed amount. Final payment is subject to withholding under Paragraph 9E of these General Conditions.

E. The making of final payment shall constitute a waiver of all claims by the WCA except those arising from:

1. Unsettled liens.

2. Faulty or defective work appearing after substantial completion.

3. Failure of the work to comply with the requirements of the Contract Documents.

4. Terms of any special guarantees required by the contract documents.

F. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

PART 10 - SAFETY PRECAUTIONS AND PROGRAMS

A. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

B. The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All employees hired to perform the Work and all other persons who may be affected by the performance of the Work;

2. All the Work and all materials and equipment to be incorporated therein, whether in storage on or off site, under the care, custody or control of the Contractor, or any of his Subcontractors or Sub-subcontractors; and

3. Property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

C. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect persons or property from damage, injury or loss. Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and barriers.

D. All damage or loss to any property referred to in Paragraphs 10B and 10C above caused in whole or in part by the Contractor, any Subcontractor, and Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable to faulty Drawings or Specifications or to the acts or omissions of the WCA, and not attributable to the fault or negligence of the Contractor.

E. If any emergency threatens injury to persons or damage or loss to property during the Contractor's preparation to perform the Work, the performance of the Work, and until completion of Work, Contractor shall act to prevent the threatened damage, injury or loss. Any extension of time requested by the Contractor on account of such an emergency shall be granted by WCA as provided in the provisions under "Article 8.0 Time Extensions" as set forth above.

F. Contractor and each Subcontractor shall evaluate, and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (1) location, condition, layout, and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools, and equipment, and (5) other similar issues. WCA assumes no responsibility or liability for the physical condition or safety of the Project site. Contractor shall be solely responsible for providing a safe place for the performance of the work. WCA shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Subparagraph, except as may be required pursuant to relocation of utilities under Government Code Section 4215.

PART 11 - CONTRACTOR'S LIABILITY INSURANCE

A. The Contractor shall purchase and maintain such insurance that will protect Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by Contractor, by any Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Coverage to be $ 1 million dollars per occurrence and $2 million dollars aggregate.

1. Claims under workmen's compensation, disability benefit and other similar employees' benefit acts;

2. Claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees, and claims insured by usual personal injury liability coverage;

3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees, and claims insured by usual personal injury liability coverage; and

4. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom;

5. Claims of vandalism and/or loss or damage or theft of any tools, equipment, forms, shanties, storage buildings and/or other items owned or rented by the Contractor.

B. The insurance required by Paragraph 11A shall be written for not less than any limits or liability specified in the Contract Documents, or required by law, whichever is greater, and shall include contractual liability insurance as applicable to the Contractor's obligations.

C. Certificates of Insurance acceptable to the WCA shall be filed with the WCA prior to commencement of the Work. These Certificates shall contain a provision that coverage afforded under the policies will not be canceled until at least fifteen days' prior written notice has been given to the WCA.

D. The WCA shall be responsible for purchasing and maintaining liability insurance and, may, at its option, purchase and maintain such insurance as will protect it against claims which may arise from operations under the Contract.

PART 12 - CHANGE ORDERS

A. The WCA, without invalidating the Contract, may order Changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such Changes in the Work shall be authorized by Change Order, and shall be executed under the applicable conditions of the Contract Documents.

B. A Change Order is a written order to the Contractor signed by the WCA issued after the execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum of the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order.

C. The cost or credit to the WCA resulting from a Change in the Work shall be determined in one or more of the following ways:

(a) By mutual acceptance of a lump sum properly itemized;

(b) By unit prices stated in the Contract Documents or subsequently agreed upon; or

(c) By cost and a mutually acceptable fixed or percentage fee.

D. If Contractor receives a Change Order and none of the methods set forth in Paragraph 12C is agreed upon, Contractor shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the WCA on the basis of the Contractor's reasonable expenditures and savings, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Paragraph 12C above, the Contractor shall keep and present, in such form as the WCA may prescribe, an itemized accounting together with appropriate supporting data.

E. If unit prices are stated in the Contract Documents or subsequently agreed upon, and the quantities originally contemplated are changed in a proposed Change Order so that application of the agreed unit prices to the quantities of Work proposed will create a hardship on the WCA or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship.

F. Should concealed conditions encountered in the performance of the Work below the surface of the ground be at variance with the conditions indicated by the Contract Documents, or should the parties discover unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party, made within a reasonable time, after the first observance of the conditions.

G. If the Contractor wishes to make a request for an increase in the Contract Sum or an extension in the Contract Time, Contractor shall give the WCA written notice thereof within a reasonable time after the occurrence of the event giving rise to such request, but no more than 15 days after the scheduled completion date of any portion of the work in case of a delay as set forth in Article 8.0 Time Extensions above. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 10E. No such request shall be valid unless so made. No Contract Sum or Contract Time can be changed without an authorized Change Order.

H The WCA shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on the WCA and the Contractor.

I. A change in the Contract Sum or the Contract time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that WCA has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim for an increase in any amounts due under the Contract Documents or for a change in any time period provided for in the Contract Documents.

J. Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change, any impact such change may have on the unchanged Work, and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents.

K. WCA may approve additional payment not to exceed 10% of the agreed amounts following completion of the procedures set forth in this Section. Change orders exceeding these limits shall be approved by the WCA Board.

L. The value of the Work to be changed, added, or omitted shall be determined by the lump sum or unit prices, if any, stipulated for such work in the Contract Documents. If no prices are stipulated, the value shall be determined by whichever of the following methods or combination of them the WCA may elect:

(a) By adding or deducting a lump sum or an amount determined by a unit price agreed upon between the parties.

(b) By adding (1) the actual net cost to the Contractor of labor in accordance with the established rates, including required union benefits, premiums the Contractor is required to pay for workers' compensation and liability insurance, and payroll taxes on such labor; (2) the actual cost to the Contractor of materials and equipment and such other direct costs as may be approved by the WCA, less all savings, discounts, rebates, and credits; (3) an allowance of fifteen percent (15%) for overhead on the total of items (1) and (2) above.

(c) Any method of resolution as determined by WCA.

PART 13 - UNCOVERING AND CORRECTION OF WORK

A. Contractor may not cover work without authorization by the WCA. In the event Contractor covers the Work without authorization by WCA, Contractor must, at Contractor's expense, uncover the Work to allow for WCA's observation of the Work. If, after observation, WCA determines that the Work must be removed and replaced, such removal and replacement will be at the expense of Contractor.

B. The Contractor shall promptly correct all Work rejected by the WCA as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work.

C. If, within one year after the Date of Substantial Completion, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the Work is found to be defective, or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the WCA to do so unless the WCA has previously given the Contractor a written acceptance of such notice promptly after discovery of the condition.

D. All such defective or nonconforming Work under Subparagraphs 13.3 shall be removed from the site where necessary and the Work shall be corrected to comply with the Contract Documents without cost to the WCA.

E. The Contractor shall bear the cost of making good all work of separate contractors destroyed or damaged by such removal or correction.

F. The obligations of the Contractor under the sections of Article13.0 "Uncovering and Correction of Work" shall be in addition to and not in limitation of any obligations imposed upon him by special guarantees required by the Contract Documents or otherwise prescribed by law.

PART 14 - TERMINATION BY THE CONTRACTOR

A. If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, through no act or fault of the Contractor or a Subcontractor or their agents of employees or any other persons performing any of the Work under a contract with the Contractor, then the Contractor may, upon seven days' written notice to the WCA terminate the Contract and recover from the WCA payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

PART 15 - TERMINATION BY THE WCA

A. If the Contractor is adjudged a bankrupt, or Contractor makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of Contractor's insolvency, or if Contractor persistently or repeatedly refuses or fails (except in cases for which extension of time is provided)to supply enough properly skilled workmen or proper materials, or if Contractor fails to make prompt payment to Subcontractors for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the WCA, given that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and its surety, if any, seven days' written notice, terminate the employment of the Contractor, and take possession of the site and of all materials, equipment, tools, construction equipment, finish the Work by whatever method deemed expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished.

B. If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the WCA.

C. Without limiting any rights which WCA may have by reason of any default by Contractor, WCA may suspend or terminate the Contract in whole or in part, at any time, for any other cause, convenience or any other reason and may suspend or abandon the execution of all or any part of the Work upon written notice to the Contractor. Such termination, suspension or abandonment shall be effective as of the date stated in the written notice, which shall be no less than fifteen (15) days from the date of the notice. Immediately upon receipt of such notice, Contractor shall cease performance of the Work to the extent specified in the notice and shall incur no further costs or expenses, except as specified in the notice. At the option of WCA, all or any of the subcontracts entered into by Contractor prior to the date of termination shall be terminated or shall be assigned to WCA. In the event of termination under this subparagraph, the WCA shall pay Contractor for all services satisfactorily rendered prior to the effective date of the termination and such payment shall be in full satisfaction of all services rendered hereunder.

   WCA shall also pay Contractor fair compensation, either by purchase or rental, at the election of WCA for any equipment of Contractor retained by WCA. If by rental, WCA and Contractor shall enter into a mutually acceptable rental agreement which shall provide that the WCA is to maintain the equipment and return to Contractor in good condition, ordinary wear and tear excepted, and to maintain reasonable insurance coverages on the equipment.

PART 16 - GENERAL REQUIREMENTS

A. Contractor shall at no time use the site for dumping of waste, soil and/or other storage of materials not specifically related to or generated by the work of this Contract

B. Contractor shall clean up all areas outside the limit of work which have been littered or otherwise made unsightly as a result of occupancy or use of such areas, or as a direct result of the work of this Contract.

C. Contractor shall restore to original condition all areas not within the limit of work but injured, damaged, marred, or otherwise affected by the transportation or occupancy of materials, equipment, or workmen belonging to, or employed by the Contractor, Subcontractors, Sub-subcontractors, or those directly or indirectly employed by any of them, or anyone whose acts any of them may be liable.

D. Contractor shall clean all areas where work under this contract has been performed, and all areas occupied by the Contractor's materials, equipment and workmen.

E. Contractor shall remove from the premises all material used for form work, surplus materials, equipment, and all debris resulting from the work or caused by the workmen.

F. Contractor shall wash down or broom-clean all paved surfaces and shall rake-clean all bare earth areas.

G. Final acceptance of the work done under the contract will not be given until the completion cleaning has been accomplished and approved by the WCA.

PART 17 - SPECIAL CONDITIONS

A. Soil, debris, old asphalt and other material removed during the demolition and grading shall be disposed of off site and properly in accordance to local codes by the Contractor. Contractor shall provide written certificate of acceptance for all removal, dumping, or hauling operations. WCA shall not be obligated for payment of hauling operations and disposal fees without appropriate certified paperwork.

END OF SECTION

SECTION 01 33 00
SUBMITTALS – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section supplements Parts 4 through 7 of the General Conditions.

B. All product substitutions are to be approved by the Landscape Architect.

C. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.2 GENERAL PROCEDURES FOR SUBMITTALS

A. Timeliness – The Contractor shall submit at the pre-construction conference all submittals for long lead time items such as benches, trash receptacles, recycling receptacles, light poles and luminaries, and others not identified herein, for review by the Owner and the Landscape Architect. The Owner and the Landscape Architect will approve outright, approve with modification, modify the whole, or modify parts of all submittals by the close of business day of that day of the pre-construction conference. For all other items that do not require long lead times for ordering and delivery, the Contractor shall transmit each submittal to the Landscape Architect sufficiently in advance of performing related work or other applicable activities so that the installation is not delayed by processing times, including disapproval and re-submittal (if required), coordination with other submittals, testing, purchasing, or fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Landscape Architect in advance of the Work.

B. Sequence – The Contractor shall transmit each submittal in a sequence which will not result in the Landscape Architect's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

C. Contractor's Review and Approval – Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Landscape Architect. Submittals shall be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purposed (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.

D. Landscape Architect's Action – The Landscape Architect will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

(1.) Final Unrestricted Release: Where marked "Approved" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.

(2.) Final-But-Restricted Release: When marked "Approved as Noted" the Work may proceed provided it complies with the Landscape Architect's notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.

(3.) Returned for Resubmittal: When marked “Revise and Resubmit” or “Disapproved” the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Landscape Architect’s notations stating the reasons for returning the submittal.

E. Processing – all costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract shall be included in the Contract Sum.

1.3 OR EQUALS

A. Definition – Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission shall be considered and “or equal” or a “material substitution”. For the purposes of the Contract, the terms “or equal” and “material substitution” shall be considered synonymous.

B. In no case may an item be furnished on the Work other than the item named or described, unless the Landscape Architect, with the Project manager’s written concurrence, shall consider the item equal to the Item so named or described.

C. The equality of items offered as “equal” to items named or described shall be proved to the satisfaction of the Landscape Architect at the expense of the Contractor submitting the substitution.

D. The Landscape Architect may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor shall bear full cost for providing, delivering, and disposal of all such samples.

E. The Contractor shall assume full responsibility for the performance of any item submitted as an “Or-Equal” and assume the costs of any changes in any work that may be caused by such substitution.

F. Or-Equal Approval Process – On the transmittal, or on a separate sheet attached to the submission, the Contractor shall direct attention to any deviations, including minor limitations and variations, from the Contract Documents.
   1. The Contractor shall submit to the Landscape Architect for consideration of any or-equal substitution a written point-by-point comparison containing the name and full particulars of the proposed product and the product named or described n the Contract Documents.
   2. Such submittal shall in no event be made later than 120 calendar days prior to the incorporation of the item into the Work. In any case in which the time period specified in the Contract Documents from the Notice to Proceed to Substantial Completion is less than 120 days, this requirement can be waived by the Landscape Architect.
   3. Upon receipt of a written request for approval of an or-equal substitution, the Landscape Architect shall investigate whether the proposed item shall be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Landscape Architect shall promptly advise the Contractor that the item is, or is not, considered acceptable as an Or-Equal substitution. Such written notice must have the concurrence of the Administrator.

1.4 SUBMISSION OF SHOP DRAWINGS

A. Shop Drawings shall be complete, giving all information necessary or requested in the individual section of the specifications. They shall also show adjoining Work and details of connections thereto.

B. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.

C. The Landscape Architect reserves the right to review and approve shop drawings only after approval of related product data and samples.

D. Shop drawings shall be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Landscape Architect's stamp.

E. The Contractor shall submit to the Landscape Architect electronic files of all submittals in Portable Document format (PDF). Transmission of PDF files shall be by email message with copy to the Owner and other designated parties.

F. The Landscape Architect will review the PDF submittal documents and will make notes, changes, corrections and cross outs as deemed appropriate by the Landscape Architect and return amended documents in PDF electronic format by email.

G. When the Landscape Architect returned the submittal with the stamp 'Rejected', 'Note Markings', 'Comments Attached', 'Confirm', 'Resubmit' or similar language calling for modification to the submittal, the Contractor shall correct the original submittal drawing(s) or prepare a new submittal drawing(s) and resubmit a new PDF file thereof to the Landscape Architect for review and approval. This procedure shall be repeated until the Landscape Architect's approval is obtained.

H. When the Landscape Architect returns the submittal with the stamp 'No Exceptions Taken', or similar language, the Contractor shall provide and distribute hard copy prints or electronic files for all Contractor and Subcontractor use, and in addition submit to the Owner at the end of the Project, electronic files of all submittals distributed for construction.

I. The Contractor shall maintain one full set of approved shop drawings at the site.

1.5 SUBMISSION OF PRODUCT DATA

A. The Contractor shall submit electronic files in PDF format of all Product Data to the Landscape Architect. All such data shall be specific and identification of material or equipment submitted shall be clearly identified. Data of general nature will not be accepted.

B. Product Data shall be accompanied by an electronic transmittal notice in form of the transmitting email. The contractor's stamp or similar device of approval shall appear on the submittal file, in a form or location which will not compromise or impair legibility.

C. Product Data returned by the Landscape Architect as 'Rejected', 'Note Markings', 'Comments Attached', 'Confirm', 'Resubmit' or similar language calling for modification to the submittal shall be resubmitted in PDF format electronically by email. Continue resubmission process until approval by Landscape Architect is obtained.

D. When the Product Data are acceptable, the Landscape Architect will stamp them 'No Exceptions Taken'. The Contractor shall provide and distribute hard copy prints or electronic files for all Contractor and Subcontractor use, and in addition submit to the Owner at the end of the Project, electronic files of all Product Data distributed for construction.

E. The Contractor shall make available to the Owner, Owner's Representative, or the Landscape Architect, electronic or hard copies of Product Data at the site upon demand.

1.6 SUBMISSION OF SAMPLES

A. Unless otherwise specified in the individual section, the Contractor shall submit two specimens of each sample.

B. Samples shall be of adequate size to permit proper evaluation of material. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work.

C. Samples of items of interior finishes shall be submitted all at once to permit a coordinated selection of colors and finishes.

D. Samples that can be conveniently mailed shall be sent directly to the Landscape Architect, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted.

E. All other samples shall be delivered at the field office of the Project Representative, with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval shall be mailed to the Landscape Architect.

F. If a sample is rejected by the Landscape Architect, a new sample shall be resubmitted in the manner specified herein above. This procedure shall be repeated until the sample is approved by the Landscape Architect.

G. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to the Owner.

END OF SECTION

SECTION 01 35 00
SPECIAL PROCEDURES – ROMTEC PRE-ENGINEERED RESTROOM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Attached specifications from Romtec.

PART 2 – PRODUCTS

A. To be provided by Romtec.

PART 3 – EXECUTION

ROMTEC SIERRA™ RESTROOM FACILITY
Model: 2026 – M SIERRA II PIONEER CMU WITH 4' STORAGE/MECHANICAL ROOM BUILDING PACKAGE

Project: El Encanto Special Use Area

Floor Plan Dimensions: 16'-8" X 14'-0" Plan Set #: Rev Date: 7/13/11

Includes all standard items for this building model and the following additional items: Tile Roofing Package, Stucco Siding Package, Exterior Counter and Sink Package, Tile Floor Package, China Plumbing Fixture Package with floor-mount toilets, Electrical Fixture Package-single phase, Powder Coat Upgrade Package, Hand Dryer Package, Diaper Deck Package, and an Accessory Package.

DESCRIPTION

The following sections describe all materials and labor required in the placement and erection of the Romtec Sierra ™ CMU Restroom Package. Materials shall be supplied by Romtec, Inc. (herein referred to as Romtec) or the building installer. The specific supplier is indicated for each item. Romtec supplied components are listed in Part II. Installer supplied products are listed in Part III. Generally, contractor work will include: labor, including unloading the building package, site preparation and grading, excavations for structures, backfill or structural backfill, foundation and pad construction and building construction.

PART I – GENERAL

APPROVED MANUFACTURERS

This specification is based on the Sierra Restroom Facility Model: 2026-SIERRA II PIONEER CMU RESTROOM WITH 4' STORAGE/MECHANICAL ROOM BUILDING PACKAGE as manufactured by:

Romtec, Inc., 18240 North Bank Road, Roseburg, OR 97470
Phone: 541-496-3541; Fax: 541-496-0803; E-mail: romtec1@romtec.com

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Any building proposed as an equal shall be submitted to the owner no later than ten (10) days prior to the bid date and must receive written approval from the owner. Otherwise, any alternate other than a Romtec building will not be considered. Temporary, prefabricated modular or pre-cast buildings are not acceptable.

Building materials, design and plans shall be provided by a single source provider, with at least five years of exclusive experience in restroom building design, supply and construction.

BUILDING DESIGN

The restroom should be the latest standard product of a manufacturer regularly engaged and having at least 5 years of experience in the production of restroom buildings. The equipment supplied under this section shall be supplied or manufactured by a single source manufacturer capable of producing a complete, pre-engineered, packaged, restroom building. The single source manufacturer must meet or exceed the product specification which was prepared using the Romtec Inc. building as a guide and example. Said product specification defines the requirements and specifications for the complete restroom building. Should the Bidder propose a single source manufacturer other than Romtec Inc., then the Bidder proposing on this project must submit their proposed pre-engineered building by a single manufacturer as an attachment to their bid.

Building is to be constructed on site to meet local codes and approvals for permanent structures.

Building is to be engineered to meet specific site conditions including wind and snow loading, local frost depth, and ground conditions.

Footings are to be dug and poured on site to meet local code for permanent structures. Footings will be built to 24" depth or local frost depth, whichever is deeper.

Building sidings, treatments, and roofing are to be as specified. Precast buildings with painted textures are not to be considered architecturally equivalent.

Building plans are to be submitted to the local building authority for design approval.

CODE COMPLIANCE AND STANDARDS

All work and materials shall comply with the latest industry building codes and regulations.

DESIGN CRITERIA

Design shall meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and 2010 California Title 24.

WARRANTY

The Romtec building and all its associated components shall be warranted against defects in materials and workmanship for a period of not less than one year and six months from date of final acceptance.

PART II – PRODUCTS

FACTORY SUPPLIED ITEMS PER BUILDING:

IMPORTANT: Refer to plans for quantities, dimensions, locations and installation methods for the materials and items described in this section.

Note: Romtec reserves the right to make substitutions of equivalent materials and items without notice.

Concrete Masonry Units – CMU (supplied by Romtec)
Walls are constructed of 8"W x 16"L x 8"H dry stack interlocking concrete masonry units (concrete blocks), manufactured to ASTM C90-02 designation for load bearing concrete masonry units, compressive strength = f'm = 1500 psi. Wall construction has #5 Rebar and # 4 Rebar, see plans for spacing. All rebar used in building must meet ASTM A615 manufacturing standards. (see Installer Supplied Items-Rebar in Walls). Walls are fully grouted with 2500 psi concrete and are not to be wetted. Blocks are tan in color and have a smooth face exterior and smooth interior surface.

1. Mortar Additive
Horn Hydratite® Plus shall be mixed with mortar (supplied by installer) in a continuous bed for the first course of blocks. This material provides a watertight seal at the base of the walls.

2. Wall Sealant
Tamms Tamoseal® cement based waterproofing finish shall be mixed (per manufacturer's instructions) with Tamms Akkro®-7T liquid bonding admixture. Contractor to apply 1/16 inch thick, 2 coats to obtain proper coverage, to the surface of all interior block walls, slab to ceiling. Trowel 3/8" radius coving at all interior walls. This material seals the pores and voids in the wall surface. Tamoseal finish coat to be uniform sponge or sponge trowel finish.

Note: Interior Wall Finish Installer supplied Latex Epoxy based paint, low VOC, or equal, over sponge trowel finish Tamms Tamoseal. Color to be white unless otherwise specified by owner.

Wall Materials-Wood Filler Walls (supplied by Romtec)
Wood filler walls are located on top of 8' high CMU walls as shown in drawings. All wood filler walls are pre-assembled, requiring minimal assembly on site by installer, as shown in drawings. Wood filler walls are constructed of the following materials:

1. Frame: 2x8 #2 and better framing lumber, 16" o.c. studs with single top and bottom plates, ripped to 7" with painted (paint to be installer supplied) ½" Smart Panel, both sides.

2. Wall Frame Fasteners: # 12 x 2 ½" wood screws, 8" o.c.; ½" x 4 ½" carbon steel anchor bolts.

3. Interior Wall Sheathing: Smart Panel to finish as identified on the plan set. Painted. (paint supplied by installer)

Roof Extension- post and beam (supplied by Romtec)

1. 6" x 8" Full Sawn Rough Sawn #2 & BTR Columns
2. 5-1/2" x 9" Glu Lam Beams. Manufacture grade 24F-V4, appearance grade Architectural.
3. Hangers, Plates & Saddle Brackets are fabricated from ASTM A36 3/8" steel plate and attached with ¾" Bolts & Simpson SSTB-16 anchor bolts. Finish for hangers, plates and fasteners are powder-coated, "brown", RAL color, 49 series, to be determined by owner from RAL color chart.
4. Column anchors are to be Romtec BT-000-1025
6. Wood Stain (supplied by installer)

Tongue & Groove Decking (supplied by Romtec)
2x6 V- edge, ¾" plywood, 30# felt; 4x6 girders, 16" o.c.

Roofing – Concrete Tile (supplied by installer)
Redland ® clay tile as specified by owner, 2251 Sedona Blend 2-piece, Mission, Includes starter tiles, ridge tiles, birdstops. Customer must choose Fabral metal trim color for covering edge.

WV-1, Wall Vent, kick resistant for CMU wall (supplied by Romtec)
Romtec XV-000-1021, 24" x 24" Pre-assembled steel frame with 1" square lock joint wire weave mesh, 10 gauge, interior louver with integral insect screen. Dimensions: 24" x 24" x 6" o.d. Finish: powder-coated, "brown", RAL color, 49 series, to be determined by owner from RAL color chart.

GV-1, Gable Window Vent, steel frame (supplied by Romtec)
Gable Window Vent consists of one pre-installed 1" square lock joint pattern wire weave mesh, 10 gauge, with insect screen on internal side of vent. Mounted in a triangular frame. Frames are fabricated from 2" x 2" x 1/8" thick angle steel, double sided. Frame and vent panel finish is powder-coated, "brown", RAL color, 49 series, to be determined by owner from RAL color chart. Vent is supplied with all necessary fasteners for connection to building walls and roof panel. Sheet metal sill flashing powder-coated, "brown", RAL color, 49 series, to be determined by owner from RAL color chart. (per the plans).

1. Vent Fasteners
Refer to drawings and/or manuals for quantities, locations and spacing of vent fasteners.

Stucco Exterior- Base, primer, finish (supplied by Romtec)
Base: STO 102, applied ½" thick over substrate. Primer: STO Primer Sand, 80801. Finish: Stolit Acrylic Textured Finish, 80131 medium sand finish coat, min. 1/16" thick. Standard Color: Oatmeal 20905.
NOTE: Metal lath, metal weep screed, casing beads, corner bead (metal), metal expansion joints, and slip sheet to be installer supplied and installed per manufacturer's instructions.

FT-1, Tile (supplied by Romtec)
Daltile, 12 x 12 slip resistant floor tile, Cliff Pointe. Color: Redwood, CP83. 3/16" manufacturer's recommended grout width.

1. Bullnose Trim- backsplash
Daltile S-43C9, Redwood. 3" x 12"

Grout and tile prep (supplied by Romtec)
Sanded grout and modified latex thinset as recommended by manufacturer. Color to match tile unless otherwise specified. Tile/grout sealant included.

Man Door, Steel 3'-0" x 7'-0" for concrete wall (supplied by Romtec)
Steelcraft® SL18-Series Flush Door with honeycomb core. Material is 18-ga. galvanized steel (14-ga. top and bottom channels). Finish is powder-coated, "brown", RAL color, 49 series, to be determined by owner from RAL color chart. Door dimensions are 36" x 84" x 1-3/4". Available with left or right swing.

1. Door Frame for 3'-0" x 7'-0" door for concrete wall
Steelcraft® F16-Series 3-Sided Flush Frame, pre-welded. Material is 16-ga. galvanized steel. Finish is powder-coated, "brown", RAL color, 49 series, to be determined by owner from

RAL color chart. Frame dimensions are: 2" jamb width, 4" header height, and 7-3/4" jamb thickness. Doorframe is grouted into walls during installation. Rubber door stops included.

2. Door Clips for Door Frame
Masonry door clips (3/16" diam.) are fitted between the doorframe and concrete blocks to bond frame to wall. Door clips allow full internal grouting of the frame during installation.

3. Door Hinges
Bommer 4.5" x 4.5" lube-bearing stainless steel, LB8002-450N-630-NRP hinges mounted on top, bottom; Middle hinge: LB8002-450-630. Meets ANSI A5112.

4. Entrance Lock - restroom (single user doors)
Schlage AL50PD SAT 626 Push button locking. Push-button locks outside lever until unlocked with key or by rotating inside lever. Installation on-site with supplied hardware . ANSI A156.2 Series 4000 Grade 2; meets California Green Code.

5. Entrance Lock- "classroom" (multi user restrooms)
Schlage AL70PD SAT 626. Storeroom lock. Outside lever locked and unlocked by key. Inside lever always unlocked. ANSI A156.2 Series 4000 Grade 2; meets California Green Code.

6. Door Closer (supplied by Romtec)
IR Dor-O-Matic SC81 Inside Surface Mounted Door Closer with dual hydraulic valves, power adjustment, adjustable back check, and can be adjusted to meet the ADA accessibility requirements.

7. Kick Plate
A stainless steel kick plate is preinstalled at the bottom of the interior surface of the door.

WC-1, Toilet, Floor Mount China, ADA Compliant (supplied by Romtec)
ProFlo PF1723 WH Bowl. White vitreous china, low consumption, 1.28 gpf, with elongated rim. 17-1/4" high at rim. Siphon action, 1-1/2" top spud. Meets California Green Code.

1. Toilet Seat
Beneke 523 Open end plastic seat for elongated bowl. Seat is injection molded of high strength, impact and chemical resistant polypropylene. Matching check hinges have integrally molded, stainless steel posts fitted with stainless steel washers and nuts, Perma-Bumper feature provides integrally molded bumpers that are permanent, sanitary and easy to clean, white.

2. Flush Valve, Toilet
Sloan Royal 111 1.28 gpf Exposed manual flush valve for 1-1/2" top spud bowl. S3910168; meets California Green Code.

3. Fasteners for Toilet Fixtures
All necessary zinc-plated steel fasteners for attaching plumbing fixtures

LV-1, Lavatory, ADA Compliant, with backsplash (supplied by Romtec)
ProFlo PF5504 Wall Hung Lavatory. White vitreous china, 20"W x 18"D with backsplash.

1. Faucet
Chicago 333-665 PSHABBCP, California Green Code Compliant, Metering Single Faucet with push control handle and aerator.

2. Offset Grid Strainer and P-trap, lavatory
Dearborn 760W Strainer, Dearborn 701 P-trap, 1-1/4", 17-ga.

3. Protective Pipe Cover
ADA-conforming, wheelchair accessible lavatory P-trap and angle valve assembly shall be covered with the molded, anti-microbial Truebro, Inc. LavGuard undersink protective pipe cover Model #101, Color: China White. Cover shall be secured with Snap-Clip flush reusable fasteners, angle stop shall have Lock-Lid locking access cover.

4. Fasteners, Lavatory Fixtures
All necessary zinc-plated steel fasteners for attaching plumbing fixtures to walls, and floors.

Exterior Counter and sink (supplied by Romtec)
2' x 4'6" Countertop to be fabricated of 4x6 PT lumber, ¾" marine grade plywood, 4x4 knee brace, metal connector plates, expansion anchors. Assembled on site by contractor. Plywood to be painted onsite by contractor "brown" as specified by owner

1. Tile on countertop to be Daltile, 12 x 12 slip resistant floor tile, Cliff Pointe. Color: Redwood, CP83. 3/16" manufacturer's recommended grout width. To be installed on site.

2. Bullnose Trim-backsplash
Daltile S-43C9, Redwood.

3. Drop in mount lavatory, ProFloPF5208, 20" x 17".

4. Faucet (lav sinks)
Chicago 333-665 PSHABBCP, California Green Code Compliant, Metering Single Faucet with push control handle and aerator.

HB-1, Wall Hydrant, exterior application (supplied by Romtec)
Woodford 67P Backflow protected, Freezeless Wall Hydrant, No Sprayback, automatic draining with anti-siphon vacuum breaker, for ¾" copper pipe. Depth to match wall thickness.

HB-2, Wall Faucet, interior application (supplied by Romtec)
Woodford model 24 vacuum breaker/anti-siphon wall faucet, NIDEL ® model 34HF with ¾" male hose thread. Polycarbonate wheel handle and loose tee key. Meets California Green Code.

LF-1, Light Fixture, Wall Mount (supplied by Romtec)
Harris Lighting 300SCPHB32PLTHPF120 TPS Light Fixture, Type: Compact Fluorescent Wall Bracket, Housing: Injection Molded, UV-Stabilization Polycarbonate, Lens: Clear Prismatic, Mounting: Surface-Wall Mount, Finish: Bronze, Lamps: 32 Watt PLT, Ballast: Electronic – HPF-Zero Degree: Voltage 120. Dimensions: 6-1/2"W x 9-1/4"H x 6-3/8"D**.**

LF-2, Light Fixture, Ceiling Mount-Mechanical/Storage Room (supplied by Romtec)
Lithonia LB 2 28 MVOLT GEB10PS Fluorescent Light Fixture, Type: Fluorescent. Low Profile Wraparound. Housing: Die-Formed Code Gauge Steel, Mounting: Surface- Ceiling, Finish: White

Baked Enamel, Lamps: F28T5, Ballast: Electronic, Voltage: 120. All T5 lamp types use GEB 10PS ballast only. **(Fluorescent light tubes to be supplied by others)**

BP, Main Breaker Panel, 100 Amp-Single Phase (supplied by Romtec)
Cutler Hammer BR1224B100R 100 Amp Main Breaker Panel. **Note:** This panel has been sized to accept only the loads of the Romtec supplied electrical fixture package. Romtec has the right to modify the mbp to be most efficient based on any changes.

PCL-1, Photo Cell Lighting Control and Weather Box (supplied by Romtec)
Intermatic K4321 Fixed Position Photo Control with weatherproof cover and neoprene gasket. Light activated. BWF-B5 Outdoor Junction Box. 120v, 1800 w.

GB-1, Grab Bars (supplied by Romtec)
Brey-Krause Mfg. Co. D-7816-SS, and D-7815-SS, Stainless Steel Grab Bars, 36" & 42"L, 14-ga, satin finish, 1 ½" o.d 22 ga. round snap-on concealed mount. The space between the wall and the grab bar is 1 ½". Grab bars do not project more than 3" into any clear floor space.

Mirror (supplied by Romtec)
Brey-Krause Mfg. Co.T-1024-36-SS 18 ga. Satin Finish, 24"W x 36"H.

Toilet Paper Dispenser-2-roll, white painted steel (supplied by Romtec)
Aslin Lockable Dispenser, two-roll, 1/4" steel, 13" long, lockable (padlock not included). Finish: white painted steel. Free-rolling dispenser with 1" narrow bar. Required fasteners included.

SI-1, Signs (supplied by Romtec)
Restroom entry signs shall be fastened to exterior walls alongside entry doors to meet ADA requirements. Graphics and Grade 2 Braille on injection molded plastic signs, gray color. Women's, #2385232, Men's # 2385231, Unisex #2385233 Dimensions: 8" W x 8" H x 1/8" thickness.

SI-2, Signs- CA (supplied by Romtec)
Restroom Doorway Geometric Pictorial signs to meet California ADA requirements. Graphics on injection molded plastic signs, Men's #2481604, Women's #2481704; Unisex #8511.

Soap Dispenser (supplied by Romtec)
Bradley 6562 Soap Dispenser. Tank type-vertical surface mounted, push-in corrosion resistant liquid soap valve. Stainless steel finish.

Paper Towel Dispenser (supplied by Romtec)
Bradley 250-15 paper towel dispenser, surface mounted, multi-fold towels, stainless steel finish.

Napkin/Tampon Disposal (supplied by Romtec)
Bradley 4722-15 napkin-tampon disposal receptacle, surface mounted, satin finish stainless steel, single end compartment.

Seat Cover Dispenser (supplied by Romtec)
Bradley 583 Seat Cover Dispenser. Surface mounted, satin finish stainless steel, 500 capacity.

Waste Receptacle (supplied by Romtec)
Bradley 377-38 36-gallon waste receptacle. Fabricated of heavy gauge stainless steel with exposed surfaces in architectural stain finish. Equipped with vinyl wall bumper strip and rubber feet. Top fabricated of heavy gauge stainless steel. Swing door is counter balanced for easy operation.

DD-1, Diaper Deck (supplied by Romtec)
Brocar 100E-EH-TRF, ADA compliant, off white, rated to 250#, 21" X 34", molded-in liner dispenser.

Hand Dryer (supplied by Romtec)
Dyson™ Airblade AB02, as specified by owner, touch free infrared activation. Aluminum casing. UL listed.

PART III – INSTALLER

INSTALLER SUPPLIED ITEMS - ROMTEC IS NOT INSTALLING
The following items are to be supplied by the building installer. Refer to drawings for quantities, dimensions, locations and installation methods for items described in this section. The installer shall supply any parts not listed above in Factory Supplied Items Per Building, including but not limited to items specified in the final plans and items required by building codes. The installer shall be responsible for ensuring that the concrete foundation and slab are adequate for the site conditions and the purpose for which the building and foundation/slab are intended.

Equipment, Labor and Trades (supplied by installer)
All equipment, labor and trades to unload the building, excavate the site, build concrete forms, supply and install the reinforced concrete footings and slab, and install the building and fixtures.

Engineered Fill (supplied by installer)
3/4" minus crushed rock engineered fill around footing, foundation and slab as required.

Slab Vapor Barrier (supplied by installer)
6 mil. continuous vapor barrier under concrete slab.

Cast in Place Concrete Foundation/Footings, Interior Slabs and Exterior/Entry Slabs (supplied by installer)
3000 psi minimum compressive strength at 28 days, 4” +/- 1” slump, with max ¾” aggregate, and tested in accordance to meet ACI 318. Fine broom finish interior surfaces and exterior slabs. Joints required in flat work, see plans for requirements. Poured to dimensions specified in final plans. Steel rebar to be supplied by installer and installed as specified in final plans. Concrete is to be cured in accordance to ACI 308

Concrete Slab Sealer (supplied by installer)
Sonneborn Sonocrete Kure 1315 water-base transparent curing, sealing and dust proofing compound or equivalent. Two (2) coats to be applied per manufacturer’s instructions by installer.

Mortar Bed for First Course of Blocks (supplied by installer)
Mixed with Hydratite® Plus mortar additive (supplied by Romtec). Mortar supplied by installer.

Masonry (Concrete) Grout (supplied by installer)
2500 psi minimum compressive strength at 28 days, 9" +/- 1" slump, with max ½" aggregate, and tested in accordance to meet ACI 318. Fine or coarse grout may be used in accordance with 2010 CBC. All CMU must be fully grouted and not be wetted.
Approx. 1 cubic yd. per 100 blocks.

Rebar in Walls (supplied by installer)
All walls have #4 Rebar and # 5 Rebar. All rebar used in building must meet ASTM A615 manufacturing standards and is to be placed per plans.

Stucco Underlayment (supplied by installer)
Metal lath, metal weep screed, casing beads, corner bead (metal), metal expansion joints, and slip sheet to be installer supplied and installed per manufacturer's instructions.

Plumbing Rough-in (supplied by installer)
All underground water service to building and sewer drain(s) from building to be as specified in final site plan.
All floor drains as shown on final building plans.
Building water shutoff valve and drain and all rough piping as shown on final building plans, final location to be set onsite.
Notes: 1) Minimum water pressure at toilet and urinal flush valves (1 1/2" inlet pipe shall be 50 psi.), minimum pipe sizing as per 2009 Uniform Plumbing Code Section 610.
2) Romtec does not provide a final site plan.

Plumbing Installation and Trim (supplied by installer)
Supplied fixtures as specified in final plans. (Note: supply and install fasteners and trim for fixtures as required.)

FD-1, Floor Drain (supplied by installer)
Smith 2005, General service floor drain. Duco cast iron body with flashing collar and adjustable strainer head. Standard round grate for poured finish floors.

Drain Valve (supplied by installer)
Water Line drain valve to be supplied by installer.

Backflow Check Valve (supplied by installer)
Sewer line backflow check valve to be supplied by installer.

Electrical Rough-in (supplied by installer)
All underground and/or overhead service to building as specified in final site plan.
Electric meter base and all rough wiring, switches, plugs and circuit breakers as shown on final plans. (Note: Romtec does not supply the meter base. Romtec-supplied breaker panel includes main breaker only. Branch circuit breakers are not supplied by Romtec.)

Electrical Installation and Trim (supplied by installer)

Installer is responsible for all necessary wire, connectors, grounding, conduit etc. to install Romtec supplied components. The installation of these components are to comply with all state and /or local codes. Provide #4 bare copper ground wire per NEC 250 and approved connectors per plans.

CB-1, Branch Circuit Breakers (supplied by installer)
Cutler Hammer BR Type-Single Phase-Single Pole (or equivalent)

SW-1, Switch (supplied by installer**)** (if needed)
Leviton 1221-2I quiet wall switch, 15 amp/120 volt, Ivory colored with cover plate (or equivalent)

Fluorescent tubes for light fixtures (supplied by installer)

EO-1, GFCI Outlets, (supplied by installer)
Leviton SmartlockPro Weather and Tamper Resistant GFCI receptacle, 15A-125V. Item W7599-TRW, white with LED indicator light.

Weatherproof Box & Cover (supplied by installer)
Mortared –in- application, 4600 Pass & Seymour Legrand 4600 Enclosure only, without mounting plate, 4600-26P Mounting Plate for Decorator/ GFCI, 4609 Key for Enclosure

Wood stain (supplied by installer)

Latex Epoxy Paint, low VOC interior finish (supplied by installer)
Latex Epoxy based paint, low VOC to meet California Green Code, over sponge trowel finish Tamms Tamoseal®. Color to be white.

Other (supplied by installer)
The building installer is responsible for supply and installation of all other items indicated on final plans or required by building codes, which are not supplied by Romtec.

Special Inspection (supplied by owner, not by Romtec) if required:
If Special Inspection, as defined by Code, is required per the Building Department or other regulatory agencies, then Romtec can assist but NOT provide this service. Romtec can endorse an owner furnished special inspector or special inspection company in order to facilitate the permitting process. In order for Romtec to endorse the proposed special inspector, documentation such as previous experience, resume's and references, etc. shall be requested by Romtec in order to endorse their services. Romtec, under no circumstance shall be considered the special Inspector, nor shall they pay any fees associated with such. All such required costs, fees and arrangements associated with these are the responsibility of the owner.

ITEMS NOT SUPPLIED BY ROMTEC OR INSTALLER

The following items are to be supplied by others. This could be the owner, landscapers, or other site workers. This also includes any items not listed above or in the plans that are not listed as being supplied by either Romtec or the Installer.

Relocation and installation of existing utilities per written specification to be supplied by owner.

Exterior Concrete Sidewalks at Building Perimeter (supplied by others unless specified in quotation as supplied by installer)

Other Materials and Equipment Not Supplied or Installed by Romtec or Installer
The following items and any other items not listed in the quotation or this specification, or not shown in the final plans are outside the scope of the Materials Specification and are not supplied or installed by Romtec or Installer:

- Landscaping
- Irrigation Equipment
- Gutters and Downspouts
- Fire Alarm and Fire Suppression Equipment
- Lighting Equipment not attached to the building.
- Plumbing Equipment not included in the Materials Specification
- Electrical Equipment not included in the Materials Specification

SECTION 01 56 39
TEMPORARY TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Protection of existing trees and plants indicated to remain.
   1. Trees indicated on Sheet TP-1.00 inside the Limit of Work are to be protected from construction activities and impacts. The trees' canopies are depicted to illustrate that care must be taken during construction not to damage overhanging branches, trunks, nor the root zone – which extends to or beyond the tree canopy.
   2. In addition, the Habitat Protection Zone indicated on Sheet TP-1.00 contains significant trees and habitat directly outside the Limit of Work. This Habitat Protection Zone is to be fenced off at start of construction, and protected from construction activities and impacts as well. No construction work is to occur within this zone.

B. Remove trees as indicated.
   1. Within the Limit of Work, 22 non-native trees are to be removed.

1.2 RELATED DOCUMENTS

A. Drawings, Specifications and provisions of Design-Build Contract, including General, Special and Supplementary Conditions and other General Requirements.

1.3 RELATED SECTIONS

1. Section 31 00 00 Earthwork: Site Clearing: Tree removal and site clearing, Site grading and excavation
2. Section 32 90 01 Landscape Planting for Native Plants
3. Section 32 91 00 Planting Preparation

PART 2 PRODUCTS

2.1 MATERIALS

A. Reference Contract Documents for trees indicated for removal. All other trees shall be protected.

PART 3 EXECUTION

3.1 TREE & ROOT ZONE PROTECTION

A. Provide protection for the tree and root zone during construction with the following measures:
   1. Provide chain link fencing with an access gate if needed to protect the root zone. Tree roots are located in the upper 12- 18" of soil and extend to or beyond the tree canopy. Fencing location shall be placed outside the trees canopy/dripline and approved by the projects Landscape Architect or Certified Arborist. Clippings from pruning mounded up to 3' high may be used to protect the root zone but there must still be the ability to effectively irrigate the root zone. Clippings more than 3" thick shall be removed after construction is completed.
   2. Root zone shall be irrigated regularly, as needed, with clean potable water to keep trees from becoming stressed during construction. Deep periodic watering may be required.
   3. No trenching or cutting of roots allowed in the root zone without the presence of the Landscape Architect or Certified Arborist. Re-route pipes or cables elsewhere, tunnel under roots or run trenches radial to the trunk. Whenever possible the same trench should be used for multiple utilities.

4. Avoid heavy machinery over the root zone. Soil compaction injures the tree by restricting the exchange of air and water. Work shall be accomplished with hand tools within the root zone.
5. No construction staging, storage and disposing of materials shall be allowed within the root zone.
6. The adjoining soil should be maintained at the same grade as the root zone before and after construction. No soil shall be in contact with the trunk of the tree above the root flare.

B. Barriers: Provide temporary barriers to height of six (6) feet, around each tree, or around each group of trees and plants at drip line.

C. Trimming: Trim agreed only agreed-on roots and branches which interfere with construction.
1. Employ qualified certified arborist to remove and treat cuts.
2. Do not cut roots greater than one inch in diameter with out direction.
3. Cut close to boles in manner that tree will present balanced appearance.
4. Treat scars resulting from removal of branches over one (1) inch in diameter with heavy coat of accepted tree paint.
5. Light pruning in the presence of the Landscape Architect or Certified Arborist may be performed to avoid damage to branches from construction vehicles or cranes.

D. Root Systems: Maintain natural cover of duff around root systems. Replace natural cover if necessary.

E. Stockpiles: Place stockpiles of topsoil and other excavated material to prevent slough off onto root systems of existing trees.

F. Contaminants: Dispose of solvents, oils and other materials, harmful to plant life, in containers and remove from site. Remove and replace contaminated soil with good soil.

G. Within drip line of existing trees to remain:
1. Do not allow vehicular traffic or parking.
2. Do not store materials or products.
3. Prevent dumping of refuse or chemically injurious materials or liquids.
4. Prevent puddling or continuous running water.
5. Do not leave diesel or gasoline equipment running.

H. Protection: Carefully supervise excavating, grading, filling, and subsequent construction operations. Prevent damage to plant materials. Protect against breaking and skinning of roots, and skinning and bruising of bark.

3.2 WATERING

A. Trees: Water at least every fourteen (14) days during construction period by forming suitable dikes and soaking devices at drip line and applying approximately six (6) inches of water each time. Water frequency during winter rain season may be reduced upon approval.

3.3 TREE REMOVAL

A. General: Landscape Architect will tag trees to be removed.

B. *Removal:* Include new and old stumps and roots of trees. Fall trees in manner not to injure standing trees, plants and other improvements to remain. If impossible to remove roots, grind stumps to six (6) inches below finish grade.

REPLACEMENT

C. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.
1. Project Manager will determine repair and replacement requirements.

2. For trees impossible to replace, Project Manager will place value on units based on latest edition of "Guide for Establishing Values of Trees and Other Plants" prepared by Council of Tree and Landscape Appraisers.

END OF SECTION

SECTION 02 42 00
SALVAGE OF CONCRETE FOR CONSTRUCTION OF STACKED RECYCLED CONCRETE SEATS & WALLS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes:

Furnish materials, equipment and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the contract, including but not limited to:

1. Cut and remove existing concrete paving for re-use in project construction of walls
2. Reconfigure salvaged pieces for conformity to uniform standard.

C. Related Sections:

Recycled Concrete Retaining Walls: Section 04 43 00.8

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, existing concrete pads and paving are to be salvaged for reuse in the Hillside Amphitheater. The recycled concrete shall be broken into smaller pieces for 2'-4' tall seating and retaining walls.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit 3 sample pieces of salvaged concrete to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any other applicable regulatory requirements, except as modified herein.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry material to project in undamaged condition. Store and handle materials to prevent their deterioration or damage due to moisture, temperature, changes, contaminants, and corrosion or other causes.

B. Limit moisture absorption of concrete masonry units during delivery and until time of installation.

C. Store cementitious materials off the ground, under cover and in a dry location.

D. Store and protect aggregates where grading and other required characteristics can be maintained.

E. Store and protect masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

F. Follow OSHA and any other health/safety requirements to prevent against silica inhalation.

PART 2 – PRODUCTS

2.1 SALVAGE & SHAPING RECYCLED CONCRETE PIECES TO A UNIFORM STANDARD

A. Recycled concrete pieces shall follow a general uniform size:
   1. 12"long x 6" deep minimum wall size pieces, 12” x 12” minimum wall cap size.
   2. 3" - 5" thickness range
   3. Natural grey color
   4. No wire or rebar
   5. Straight split faces

B. Face edges shall be *straight split faces*, not saw-cut. See photo for example. To get a rough but controlled straight split face, cut score lines with a diamond edged masonry/concrete blade. Then insert a chisel into the groove and hit it sharply to break the pieces apart. To get desired effect, use a brick or stone hammer on the exposed face.

C. Grind sharp edges and corners of broken concrete pieces.

D. Remove any protruding steel, rebar, wire mesh, etc.

E. Coat exposed steel ends and edges with epoxy to protect concrete or other adjacent surfaces from damage or disintegration.

PART 3 – EXECUTION

3.1 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 03 00 00
CONCRETE CONSTRUCTION

(SECTION 303 "*Greenbook" Standard Specifications for Public Works Construction*)

303-1 CONCRETE STRUCTURES.

303-1 CROSS REFERENCES

Portland Cement Concrete..... **Greenbook* 201-1
Steel Reinforcement for Concrete..... **Greenbook* 201-2
Expansion Joint Filler and Joint Sealants..... **Greenbook* 201-3
Concrete Curing Compound ..... **Greenbook* 201-4
Cement Mortar ..... **Greenbook* 201-5
Lumber and Plywood..... **Greenbook* 204-1
Integrally Colored Concrete..... Section 32 13 13

* *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition*

303-1.1 General. Concrete bridges, culverts, catch basins, retaining walls, abutments, piers, footings, foundations, and similar structures shall be constructed in conformity with the Plans and Specifications. Concrete for use in work constructed under this section shall conform to the requirements of *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1.

Safe and suitable ladders shall be provided to permit access to all portions of the work.

The compressive strength of the concrete referred to in this section will be based on the results of concrete test cylinders made and tested by the Engineer in accordance with the requirements of *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1. The cylinders shall be cured in accordance with ASTM C 31, unless otherwise approved by the Engineer.

When plastic-lined concrete structures are required by the Plans, the plastic liner materials shall
comply with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 210-2 and the installation of the liner shall be in accordance with 311-1.

303-1.2 Subgrade for Concrete Structures. Earth subgrade upon which concrete is placed shall be firm and free from standing water. Groundwater shall be kept below subgrade until the concrete has set.

When the subgrade is in dry earth, it shall be thoroughly dampened with water to ensure that no moisture will be absorbed from the fresh concrete.

When the design details for the project provide for the construction of filter or drain material
consisting of gravel (or combination of gravel and sand), which material will be subgrade for concrete, the placing of steel reinforcement and placement of concrete shall follow the installation of the filter or drain material as closely as practical. The filter or drain material shall be kept dewatered to the extent necessary to prevent any portion of concrete materials being deposited in water. No payment will be made for dewatering other than as may be included in the prices bid for various items of work or when an item for dewatering is provided.

When the concrete is to be deposited on rock, the rock shall be fully uncovered, cleaned, and its
surface shall be removed to a depth sufficient to expose sound rock. Bedrock shall be roughly leveled off or cut to approximately horizontal and vertical steps. Seams in the rock shall be grouted under pressure or otherwise treated as the Engineer may direct. Grouting seams in rock or otherwise treating them will be paid for as provided in the Specifications.

303-1.3 Forms. Forms shall be of suitable material and of a type, size, shape, quality, and strength to ensure construction as designed. The forms shall be true to line and grade, mortar-tight, and sufficiently rigid to resist deflection during placing of the concrete. The responsibility for their adequacy shall rest with the Contractor. All dirt, chips, sawdust, nails, and other foreign matter shall be completely removed from forms before any concrete is deposited therein. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes that would deface the finished surfaces. Forms previously used shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being reused. Before concrete is placed in forms, all inside surfaces of the forms shall be thoroughly treated with an approved releasing agent which will leave no objectionable film on the surface of the forms that can be absorbed by the concrete. Care shall be exercised that no releasing agent is deposited on previously placed concrete.

Forms for all surfaces that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood. Any lumber or material which becomes badly checked or warped, prior to placing concrete, shall not be used.

Forms for all exposed surfaces of bridges, viaducts, overcrossings, and similar structures shall be constructed of plywood or an approved equal. Plywood for forms shall be of the grade “Exterior B-B (concrete form)”, conforming to the latest Product Standard for Soft Plywood, Construction and Industrial, of the National Institute of Standards and Technology. Plywood shall be furnished and placed in no less than 1.2 m (48 inch) widths and in uniform lengths of not less than 2.4 m (96 inches) except where the dimension of the member formed is less than the specified panel dimension. Plywood shall be placed with the grain of the outer plies in the direction of the span. Where plywood is attached directly to the studs or joists, the panels shall be not less than 15 mm (5/8 inch) thick, and the studs or joists shall be spaced not more than 305 mm (12 inches), center to center. Plywood less than 15 mm (5/8 inch) thick, otherwise conforming to the requirements specified herein, may be used with a continuous backing of 19 mm (3/4 inch) sheeting. All form panels shall be placed in a neat, symmetrical pattern with the horizontal joints level and continuous. All joints shall be filled with an approved quick-setting compound and finished flush with the interior of the form.

Wooden forms for copings and curbs shall have a thickness of not less than 38 mm (1-1/2 inches) and a width of not less than the full depth of coping or curb.

Unless otherwise shown on the Plans, all sharp edges shall be chamfered with 19 mm x 19 mm (3/4 inch by 3/4 inch) triangular fillets. Forms for curved surfaces shall be so constructed and placed that the finished surface will not deviate from the arc of the curve.

Forms shall be so constructed that portions, where finishing is required, may be removed without disturbing portions of forms to remain in place.

Joists and stringers supporting slabs and overhangs shall be considered as falsework and designed in accordance with 303-1.6.

Forms for girders and slabs shall be cambered as may be required by the Engineer.

Forms shall, as far as practicable, be so constructed that the form marks will conform to the general lines of the structure. Concrete bridge railings shall be constructed to present a smooth uniform appearance in their final position, conforming to the lines shown on the Plans. The height of the concrete railings shall be adjusted as directed by the Engineer to compensate for the camber and deadload deflection of the superstructure.

Form clamps or bolts, approved by the Engineer, shall be used to fasten forms. The use of twisted-wire loop ties to hold forms in position will not be permitted, nor shall wooden spreaders be used unless authorized by the Engineer. Clamps or bolts shall be of sufficient strength and number to prevent spreading of the forms. They shall be of such type that they can be entirely removed or cut back 25 mm (1 inch) inside the finished surface of the concrete. All forms for outside surfaces shall be constructed with stiff wales at right angles to the studs, and all form clamps or bolts shall extend through and fasten such wales.

Forms for cast-in-place concrete drain conduits or sewer structures will not be required for concrete to be placed directly against the sides of the excavation or sheeting, provided the following conditions are met:

1) If concrete is placed directly against the faces of the excavation, the faces must be firm, compact, able to stand without sloughing, and must be outside the concrete lines shown on the Plans at all points. The entire faces of excavation, against which concrete is to be placed without the use of outside forms, shall be gunited to sufficient thickness to prevent raveling of the exposed earth faces during the placing of reinforcing steel, forms, and concrete.
2) If concrete is placed against sheeting, such sheeting shall be closely fitted and all points shall be outside the concrete lines shown on the Plans. Those surfaces against which the concrete is to be placed shall be faced with building paper. Except as otherwise specified herein, all sheeting shall be removed, but not until at least 7 days after placing concrete, or until the concrete has attained strength in compression of 14 MPa (2,000 psi).
   Care shall be used in removing sheeting so as to avoid damaging the concrete. Voids left by the removal of sheeting, piles or similar sheeting components shall be backfilled with material having a sand equivalent of not less than 30 and consolidated by jetting as directed by the Engineer. When field conditions or the type of sheeting or methods of construction used by the Contractor are such as to make the removal of sheeting impracticable, that portion of the sheeting against which concrete has been placed may be left in place.
3) The reinforcing steel shall be set accurately and held firmly in place.
4) The Contractor shall assume all risks of damage to the Work or to existing improvements that may be attributable to this method of construction.
5) Should this method of construction prove unsatisfactory, the Contractor shall discontinue this method and construct the conduit by using outside forms.
6) No direct payment will be made for building paper, sheeting, gunite, for concrete placed outside of concrete lines shown on the Plans, or for cement used in such gunite and concrete. The cost thereof shall be included in the prices bid for the various items of work.

303-1.4 Removal of Forms.

303-1.4.1 General. The periods of time for form removal set forth herein are permissive only and subject to the Contractor assuming all risks that may be involved. The time periods are minimum with no allowance therein for external loads. At times of low temperature, or other adverse conditions, the Engineer may require the forms to be kept in place for longer periods of time.

The time periods are predicted on the use of concrete to which no admixtures have been added for the purpose of obtaining a high early strength, and upon the use of the same type of cement throughout the structure. The Engineer may permit the use of admixtures, additional cement, or different types of cement in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1.2.4. If such permission is granted, the minimum time periods for stripping forms will be established by the Engineer in accordance with the materials, methods to be used, and the stresses to which the structure may be subjected.

When the Contractor elects to use Type IP (MS) cement in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1.2.1 minimum form removal times may be longer than indicated in the following subsections.

303-1.4.2 Bridges. The periods of time set forth herein are based on the use of Type II cement.

Forms and falsework supporting concrete beams, arch ribs, slabs, or other members subject to direct bending stress shall not be removed in less than 21 days after the concrete has been placed, unless concrete test cylinders show a strength of not less than 21 MPa (3,000 psi) in compression, when cured under conditions similar to those affecting the structure.

Forms and falsework supporting the bottom slab of the superstructure of box girder structures shall remain in place 14 days after placing of the deck of the superstructure. Forms for the webs of box girders shall be removed before the deck slab is placed. Forms for the upper deck slab which are to remain in place shall be supported by bolts through the girder webs or some equally satisfactory method that will prevent the transfer of any load to the lower deck slab. Forms supporting the concrete deck slab of box girders may be left in place. All interior forms in box girders, except those permitted to remain in place, shall be removed completely and the inside of the box girder cleaned of all loose material.

Side forms for beams, girders, columns, railings, or other members in which the forms do not resist dead load bending, may be removed within a period of 2 to 5 days, as authorized by the Engineer, provided that satisfactory arrangements are made to cure and protect the concrete thus exposed.

Side forms for arch rings, columns, and piers shall be removed before the members of the structure which they support are cast so that the quality of the previously placed concrete may be inspected. Such forms shall be so constructed that they may be removed without disturbing other forms which support direct load or resist bending stress.

303-1.4.3 Miscellaneous Structures. The periods of time set forth herein are based on the use of Type II cement.

Forms for concrete members (except bridges) subject to bending stresses, where the member relies upon forms for vertical support, may be removed 7 days after concrete is placed.

Curb forms shall not be removed until the concrete has set sufficiently to hold its shape but shall be removed in time to permit proper finishing.

Stairway forms shall be removed and the finish of the steps completed on the day the concrete is placed. Metal stairway treads, if required by the drawings, shall be installed immediately after the steps have been poured.

303-1.4.4 Standard Structures.

(a) **General.** Except as otherwise stipulated, the periods of time set forth herein for removal of forms are based on the use of Types II, III, IV, or V portland cement.

(b) **Standard Catch Basins.**

1) Outside forms and inside wall forms which do not support the top slab forms -16 hours.

2) Top slab forms - 48 hours if Type II or V cement is used; 24 hours if Type III cement is used.

(c) **Standard Transition Structures.**

1) Outside forms and inside wall forms which do not support the top slab form - 16 hours.

2) Top slab forms - as specified for box section slab forms.

303-1.4.5 Channels and Conduits.

(a) **General.** Except as otherwise specified, the periods of time set forth herein are based on the use of Types II, III, IV, or V portland cement.

(b) **Forms Removal.** Forms for open channels and forms and shoring for box sections and arch sections of sewers and storm drains may be removed as follows:

1) Forms for open channel walls - 16 hours.

2) Outside forms of box sections and inside wall forms of box sections which do not support the slab forms - 16 hours.

3) Arch sections in open cut - 12 hours.

4) Slab forms for box sections -

a) Type II cement - 48 hours or 20 hours per meter (6 hours per foot) of span between supports, whichever is greater.

b) Type III cement - 24 hours or 10 hours per meter (24 hours or 3 hours per foot) of span between supports, whichever is greater.

c) Type V cement - 56 hours or 23 hours per meter (56 hours or 7 hours per foot) of span between supports, whichever is greater.

303-1.5 Removal of Forms for Box Sections. In lieu of form removal as specified in 303-1.4, the forms may be stripped by the following method:

If the walls and top slab of the box structure are placed monolithically, the forms may be removed when the concrete has attained the compressive strength as computed from the following formula:

CSI = 0.45 S + 7 For Metric Units

CUS = 20 S + 1000 For U.S. Std. Measure

Where S = Span length in meters (feet from center to center of supports (maximum span 6 m(20 feet) unless otherwise approved by the Engineer).

Where CSI (Cus) = Required compressive strength in MPa (pounds per square inch) of the concrete as determined in accordance with the requirements below:

If the top slab is not placed monolithically with side walls and if the wall forms do not support the
top slab forms, the forms for the walls may be removed when the concrete has attained a compressive strength of 7 MPa (1,000 psi). The forms for the top slab may be removed when the concrete has attained a compressive strength equal to that computed by the above formula; provided that the concrete in the walls has attained a compressive strength at least equal to that determined for the top slab at the time it is proposed to remove the top slab forms.

The strengths set forth herein at which the Contractor may remove forms in the walls and top slab of box sections are permissive only, and subject to the Contractor assuming all risks that may be involved in such removals. No allowance for external loads is included in the specified strength. At times of low temperature, or other adverse conditions, the Engineer may require the forms to be kept in place until greater concrete strength have been attained.

303-1.6 Falsework.

303-1.6.1 General. The Contractor shall, in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 2-5.3, submit detailed plans of the falsework proposed to be used. Such plans shall be in sufficient detail to indicate the general layout, sizes of members, anticipated stresses, grade of materials to be used in the falsework, and typical soil conditions.

All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads. Falsework for the support of a superstructure shall be designed to support the loads that would be imposed if the entire superstructure were placed at one time.

All falsework, staging, walkways, forms, ladders, cofferdams, and similar accessories shall equal or exceed he minimum requirements of the State Division of Industrial Safety. Compliance with such requirements shall not relieve the Contractor from full responsibility for the adequacy of safety measures.

Sufficient inspection walkways and access thereto shall be provided under the deck to permit inspection of all forms. The walkways shall be not more than 2.4 m (8 feet) below the forms to be inspected.

Falsework shall be placed upon a solid footing safe against undermining and protected from
softening. When the falsework is supported on timber piles, the piles shall be driven to a bearing value as determined by the formula specified in Standard Specifications for Public Works Construction 305-1.5, equal to the total calculated pile loading. The maximum calculated pile loading shall not exceed 180 kN (20 tons).

Construction of falsework which is to be supported on a concrete invert may be started 48 hours after the concrete is placed, provided no heavy equipment or concentrated loads are placed on the concrete invert. When heavy equipment must be placed on the concrete invert to erect falsework, the concrete shall be 7 days old or shall have attained a compressive strength of 14 MPa (2,000 psi) before falsework erection is started. Unless otherwise directed by the Engineer, concentrated falsework loads shall be so spread over the supporting concrete slab as to reduce the soil pressure under it not over 96 kN/m2 (2,000 pounds per square foot), assuming 45-degree lines of distribution through the slab.

Falsework and forms shall be so constructed as to produce in the finish structure the lines and grades indicated on the Plans. Suitable jacks or wedges shall be used in connection with the falsework to set the forms to the grade or the form work before or during the placing of concrete. Single wedges for this purpose will not be permitted, it being required that all such wedges be in pairs to ensure uniform bearing. Dead load deflection in stringers and joists will be compensated for by varying the depths of the joists or by using varying depth nailing strips.

Arch centering shall be removed uniformly and gradually, beginning at the crown and working
toward the haunches to permit the arch to take its load slowly and evenly. Centering for adjacent arch spans shall be struck simultaneously.

Falsework under any continuous unit or rigid frame shall be struck simultaneously; the supporting wedges being released gradually and uniformly, starting at the center and working both ways toward the supports.

303-1.6.2 Falsework Design. Falsework shall be designed to carry all loads and pressures applied to it. The construction loads to be applied are as follows:

1) Tunnel centering - 100 percent of the concrete load where concrete is placed by pneumatic process.
2) All other structures - a live load of 1.5 kN/m2 (30 pounds per square foot) of horizontal area.
3) Transverse and longitudinal bracing - a horizontal force equal to 2 percent of the vertical load.

The unit stresses shown below shall be the maximum allowable for falsework design for used
material. The Contractor may elect to furnish new grade-marked material. In such event, the falsework plans submitted shall indicate the grade. The unit stresses allowed shall be those recommended in the latest issue of “Standard Grading Rules for West Coast Lumber” (published by the West Coast Lumber Inspection Bureau), increased 25 percent for short time loading.

MAXIMUM UNIT STRESSES FOR FALSEWORK

Axial tension and bending..... 9.7 MPa (1,400 psi)
Compression perpendicular to grain..... 2.4 MPa (350 psi)
End grain bearing ..... 9.0 MPa (1,300 Psi)
Shear parallel to grain..... 0.9 MPa (125 psi)

Timber Columns:

Metric Units..... SSI = 9.0 (1 - L/60d)
U.S. Standard Measure..... SUS = 1300 (1 - L/60d)

Where:

SSI (SUS) = Maximum allowable stress in MPa (psi).
d = Least side dimension of column in mm (in).
L = Unbraced length of column in mm (in).
L/d shall not exceed 50 for bracing.
L/d shall not exceed 30 for main members.

Falsework may be bolted or spiked at the option of the Contractor, but the use of bolts and spikes shall not be combined in the same connection. The allowable spacings and connection values of bolts and spikes shall be in accordance with the National Design Specifications for Stress-Grade Lumber and its Fastenings as recommended by National Lumber Manufacturers Association, except that an additional allowance of 25 percent for temporary use shall be added to the connection values for bolts and spikes.

Ends of columns bearing on wedges shall be tied in both directions by girts.

303-1.7 Placing Reinforcement.

303-1.7.1 General. Before placing reinforcing steel, the Contractor shall submit a reinforcing steel placing plan in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 2-5.3.

Reinforcing bars shall be placed in accordance with the size and spacing shown on the Plans.
Reinforcing bars shall be firmly and securely held in position in accordance with the "Manual of
Standard Practice" of the Concrete Reinforcing Steel Institute, using concrete or metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under full load. Metal chairs which extend to the surface of the concrete (except where shown on the Plans) and wooden supports, shall not be used. Tack welding on reinforcing bars will not be permitted.

Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted. Before placing in the form, all reinforcing steel shall be cleaned thoroughly of mortar, oil, dirt, loose mill scale, loose or thick rust, and coatings of any character that would destroy or reduce the bond. No concrete shall be deposited until the placing of the reinforcing steel has been inspected and approved.

Bar spacing is center to center of bars. Bar cover is clear distance between surface of bar and face of concrete and shall be 50 mm (2 inches) unless otherwise noted on the Plans.
Reinforcement shall terminate 50 mm (2 inches) from concrete surfaces and expansion joints, unless otherwise noted on the Plans.

Reinforcement used in post-tensioned concrete shall be adjusted or relocated during the installation of prestressing ducts or tendons, as required to provide planned clearances to the prestressing tendons, anchorages, jacks, and equipment, as approved by the Engineer.

303-1.7.2 Splicing. Splices of bars shall be made only where shown on the Plans or as approved by the Engineer. Where bars are spliced, they shall be lapped at least 30 diameters, unless otherwise shown on the Plans.

Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.

Welding of reinforcing steel will not be permitted unless specifically authorized by the Engineer.

303-1.7.3 Bending Reinforcement. Bends and hooks in bars shall be made in the manner
prescribed in the “Manual of Standard Practice” of the Concrete Reinforcing Steel Institute.

Bars shall not be bent or straightened in a manner which will injure the material. Bars with kinks or unspecified bends shall not be used.

303-1.7.4 Welded Wire Fabric. Welded wire fabric shall be spliced not less than two meshes. It
shall be lifted carefully into its specified position after the concrete is placed but still plastic.

303-1.8 Placing Concrete.

303-1.8.1 General. Concrete shall be conveyed, deposited, and consolidated by any method which will preclude the segregation or loss of ingredients. Equipment used in conveying and depositing concrete shall not have any aluminum or other material component in direct extended contact with the concrete which results in deleterious or injurious effects to the concrete.

All surfaces against which concrete is to be placed shall be thoroughly moistened with water
immediately before placing concrete. All ponded and excess water shall be removed to leave surfaces moist but not flooded.

Chutes used in conveying concrete shall be sloped to permit concrete of the consistency required to flow without segregation. Where necessary to prevent segregation, chutes shall be provided with baffle boards or a reversed section at the outlet.

Where a sequence for placing concrete is shown on the Plans, no deviation will be permitted unless approved in writing by the Engineer.

303-1.8.2 Grouting. Where concrete is to be deposited against hardened concrete at horizontal
construction joints, placing operations shall begin by conveying a grout mixture through the placing system and equipment and depositing the mixture on the joint. Unless otherwise approved by the Engineer, the grout mixture shall have a combined aggregate E grading in accordance with *“Greenbook” Standard Specifications for Public Works Construction, Latest Edition,* 201-1.3.2,

and meet all other requirements consistent with the approved mix design. Consolidation techniques shall be utilized to ensure proper bond at the joint.

303-1.8.3 Depositing. To avoid segregation, concrete shall be deposited as near to its final position as is practicable. The use of vibrators for extensive shifting of the mass of concrete will not be permitted. Concrete that has partially hardened, has been retempered, or is contaminated by foreign materials shall not be deposited in the structure.

Concrete shall be placed in horizontal layers insofar as practical. Placing shall start at the low point and proceed upgrade unless otherwise permitted by the Engineer. Concrete shall be placed in a continuous operation between construction joints and shall be terminated with square ends and level tops unless otherwise shown on the Plans.

Concrete shall not be permitted to free fall more than 1.8 mm (6 ft) without the use of tremies or
other suitable conveyance. Tremies shall be at least 150 mm (6 inches) in diameter, or the equivalent cross-sectional area for rectangular sections. Concrete shall not be placed in horizontal members or sections until the concrete in the supporting vertical members or sections has been consolidated and a 2- hour period has elapsed to permit shrinkage to occur.

303-1.8.4 Consolidating. Concrete shall be thoroughly consolidated in a manner that will encase the reinforcement and inserts, fill the forms, and produce a surface of uniform texture free of rock pockets and excessive voids.

Structural concrete, except slope paving such as spillway aprons and channel lining, and concrete placed under water, shall be consolidated by means of high frequency internal vibrators of a type, size, and number approved by the Engineer. The location, manner, and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without separation of the mortar and coarse aggregate, and without causing water or cement paste to flush to the surface. Internal vibrators shall not be held against the forms or reinforcing steel.

The number of vibrators employed shall be sufficient to consolidate the concrete within 15 minutes after it has been deposited in the forms. At least two vibrators in good operating condition shall be available at the site of the structure in which more than 19 m3 (25 cubic yards) of concrete is to be placed.

Approved external vibrators for consolidating concrete will be permitted when the concrete is not
accessible to internal vibration. Forms and falsework shall be designed and constructed to resist
displacement or damage from external vibration.

303-1.8.5 Walkways. Walkways and platforms shall be provided for personnel and equipment at a level convenient for the concrete placement and to permit the performance of all operations necessary for the completion of such work including finishing.

Where bridge decks are to be constructed to final roadway grade, walkways shall be provided outside the deck area along each side and for the full length of the structure. These walkways shall be of sufficient width and so constructed as to provide for the support of the bridges from which the longitudinal floats specified are to be operated.

303-1.8.6 Joints. The work shall be so prosecuted that construction joints will occur at designated places shown on the Plans unless otherwise authorized by the Engineer. The Contractor shall construct, in one continuous concrete placing operation, all work comprised between such joints. Joints shall be kept moist until adjacent concrete is placed.

All construction joints having a keyed, stepped, or roughened surface shall be cleaned by
sandblasting prior placement of the adjacent concrete, unless otherwise directed by the Engineer. Any quality of sand may be used which will accomplish the desired results.

The sandblasting operations shall be continued until all unsatisfactory concrete, laitance, coatings, stains, debris, and other foreign materials are removed. The surface of the concrete shall be washed thoroughly to remove all loose material. The method used in disposing of wastewater employed in washing the concrete surfaces shall be such that the wastewater will not stain, discolor, or affect exposed surfaces of the structures, and will be subject to the approval of the Engineer.

Expansion and contraction joints in concrete structures shall be formed where shown on the Plans. No reinforcement shall be extended through the joints, except where specifically noted or detailed on the Plans.

Asphalt paint used in joints shall be as specified in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 203-8. Premolded asphalt filler shall be as specified in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-3.

No direct payment will be made for furnishing and placing asphalt paint, premolded asphalt filler, or other types of joint separators. The cost therefore shall be included in the price bid for the item of work of which they are a part.

303-1.8.7 Application of Joint Sealants.

(a) **General.** All joints sealants shall conform to the general requirements *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-3 and the special requirements shown below. Prior to sealing joints containing waterstops, the expansion joint filler, hardboard, concrete spillage, and all foreign material shall be removed from the deck joint down to a depth of the waterstops. All such material shall be removed from the entire depth of joints in curbs, sidewalks, railings, and the overhanging portion of deck slabs. Immediately before applying the joint sealant, the joint shall be thoroughly cleaned by abrasive blasting or other approved means to remove all mortar, laitance, scale, dirt, dust, oil, curing compounds, and other foreign material. The joints shall be blown out with high pressure compressed air to remove all residue.

If a sealant is shown in the sidewalk, saw-cutting of grooves at concrete railing locations shall be completed prior to constructing the railings. Joint seal material shall be protected during the construction of the railing.

At the time of applying the joint sealant, the joint shall be surface dry, and acceptable to the Engineer. No sealant shall be placed during unsuitable weather, when the atmospheric temperature is below 10°C (50°F), or when weather conditions indicate that the temperature may fall below 0°C (32°F) within 24 hours.

The joint shall be filled from the bottom to the top without formation of voids. The top of the finished joint seal shall be between 6 mm (1/4 inch) and 10 mm (3/8 inch) below the finished surface.

All adjoining surfaces shall be carefully protected during the joint sealing operations, and any stains, marks or damage thereto, as a result of the Contractor's operations, shall be corrected in a manner satisfactory to the Engineer.

(b) **Type "A" Seal.** The top edges of the seal shall remain in continuous contact with the
sides of the groove over the entire range of joint movement and such contact shall not break when thumb pressure is applied vertically to the seal at the centerline of the seal. The seal shall satisfactorily resist the intrusion of foreign material and water.

Grooves for joint seals shall be cut to a uniform width and depth and to the alignment shown on the Plans or as ordered by the Engineer. Both sides of the groove shall have saw-cut surfaces for their full depth and shall expose sound concrete.

The concrete saw for cutting the grooves shall be fitted with diamond blades having a core (disk) thickness not less than 5 mm (3/16 inch). Double blades, cutting both sides of the groove simultaneously, shall be used for the initial cut. The completed groove measured at the top shall be within 3 mm (1/8 inch) of the width shown on the Plans. The groove width measured at the bottom shall not vary from the top width by more than 1.5 mm (1/16 inch) for each 50 mm (2 inches) of depth.

Immediately following cutting, the lip of the groove shall be beveled by grinding, as shown on the Plans, and the groove shall be thoroughly washed with water under pressure and blown out with high pressure air jets to remove all residue and foreign materials.

At least 48 hours prior to installing the seal, the Contractor shall repair all spalls, fractures, breaks, or voids in the concrete surfaces of the joint groove by methods approved by the Engineer.

If any of the requirements of this subsection are not satisfied, the Contractor at its expense shall remove the seal, repair or reconstruct the groove, and replace the seal or install new seal material.

(c) **Type "B" Seal.** All of the requirements of 303-1.8.7 (b) shall apply to the application of Type "B" seals. In addition, the following requirements shall apply:

Sawcutting of grooves shall not be started until seal material has been tested, approved, and delivered to the Work site.
The elastomeric joint seal shall be installed with mechanical equipment specifically designed for this purpose.

The equipment shall not elongate the seal longitudinally nor cause structural damage to the seal or the concrete. The equipment shall place the seal to the depth shown on the Plans.

The equipment shall not twist, distort, or cause other malformations in the completed seal. Equipment that does not provide a properly installed seal shall not be used.

A combination lubricant and adhesive shall be applied to the dry sides of the seal and to all vertical surfaces which will be in contact with the seal immediately prior to installation. The rate of application shall be as recommended by the manufacturer of the seal. The contact surfaces of the seal shall be cleaned with normal butyl acetate, using clean rags or mops, just prior to applying the lubricant-adhesive.

If the completed joint seal is out of position or out of shape, if it does not maintain uniform folding, if the top edges pull away from the sides of the groove, or if the seal does not satisfactorily resist the intrusion of foreign material and water, the Contractor at its expense shall remove the seal, repair or reconstruct the groove, and replace the seal.

(d) **Type "C" Seal.** At no time shall the emulsion be subjected to a temperature below 4°C (40°F). Prior to application, the joint sealant may be warmed if necessary to permit proper filling of the joints. The heating shall be carefully controlled to avoid overheating of any part of the container or mixture and under no circumstance shall the emulsion be heated to a temperature greater than 54°C (130°F).

Immediately before applying the sealant, the emulsion shall be mixed with the proper amount of pastesetting agent. The components shall be mixed, preferably with a powder mixer, for 5 minutes to produce a homogeneous material.

(e) **Type "E" Seal.** The rubber rod shall be compressed into the clean joint to a position such that the top is 32 mm (1-1/4 inches) below the level of the finished surface.

The sealing material components shall be maintained at temperatures of not less than 16°C (60°F). To ensure adequate mixing and application, they may be preheated to a maximum of 32°C (90°F), by means other than the application of direct flame.

The materials shall be power mixed for at least 8 minutes to produce a homogeneous material. When the amount of component "A" is less than 25 percent by weight of component "B", extreme care must be used to be certain that all of component "A" is incorporated in the mix.

Joint sealant in place shall comply with the following test: within 24 hours of application, a 1-cent coin shall be pressed edgewise one-half of its diameter into the joint sealer. Within 1 minute after release, the coin shall be ejected by the joint sealant, leaving the sealing compound free of abrasions or indentations deeper than 1.5 mm (1/16 in).

Joint sealant, which does not cure to a homogeneous, rubber-like compound, bond to the joint faces, or comply with any other requirements of this section, shall be removed. The joint shall be recleaned and new joint sealant placed by the Contractor at its expense.

303-1.8.8 Placing Concrete Under Adverse Weather Conditions. Concrete for structures shall not be placed on frozen ground nor shall it be mixed or placed while the atmospheric temperature is below 2°C (35°F), unless adequate means are employed to heat the aggregates and water, and satisfactory provisions have been made for protecting the work.

Concrete shall not be placed on frozen ground, nor shall concrete be mixed or placed when the
atmospheric temperature is below 2°C (35°F), or when conditions indicate that the temperature may fall to 2°C (35°F) within 24 hours, except with the written permission of the Engineer and only after such precautionary measures for the protection of the concrete have been taken as approved by the Engineer.

Concrete shall be effectively protected from freezing or frost for a period of 5 days after placing.

Concrete for structures shall not be mixed or placed while the atmospheric temperature is above
46°C (115°F) unless adequate means are employed to cool the aggregate and water and satisfactory provisions have been made for protecting the work. In any case, the temperature of the concrete as placed shall not exceed 32°C (90°F).

Concrete placement shall be stopped when rainfall is sufficient to cause damage to the work.

303-1.8.9 Concrete Deposited Under Water. When conditions render it impossible or inadvisable to dewater excavations before placing concrete, the Contractor shall deposit underwater, by means of a tremie or underwater bottom-dump bucket, a layer of concrete of sufficient thickness to thoroughly seal the cofferdam. To prevent segregation, the concrete shall be carefully placed in a compact mass and shall not be disturbed after being deposited. Water shall be maintained in a still condition at the point of deposit.

A tremie shall consist of a watertight tube having a diameter of not less than 250 mm (10 inches) with a hopper at the top. The tube shall be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie shall be supported to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work to prevent water entering the tube and shall be entirely sealed at all times, except when the concrete is being placed. The tremie tube shall be kept full of concrete. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the discharge end, always keeping it in the deposited concrete. The flow shall be continuous until the work is completed and the resulting concrete seal shall be monolithic and homogeneous.

The underwater bucket shall have an open top and the bottom doors shall open freely and outwardly when tripped. The bucket shall be completely filled and slowly lowered to avoid backwash and shall not be dumped until it rests on the surface upon which the concrete is to be deposited. After discharge, the bucket shall be raised slowly until well above the concrete.

303-1.9 Surface Finishes.

303-1.9.1 General. The classes of surface finish described herein shall be applied to various parts of concrete structures as specified. Exposed box sections and bridge decks shall be finished in conformance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 302-6.4, except that final finish shall be accomplished with a drag broom in lieu of burlap drags.

The invert of cast-in-place sewers and sewer structures shall be given a steel-trowel finish. The invert in circular conduit is defined as the unlined portion of lined conduit or the bottom 60 degrees of circumference of the inside of unlined conduit. Unless otherwise specified, the invert of cast-in-place storm drains shall be given a wood-float finish.

303-1.9.2 Ordinary Surface Finish. Immediately after the forms have been removed, all exterior form bolts shall be removed to a depth of at least 25 mm (1 inch) inside the surface of the concrete and the resulting holes or depressions cleaned and filled with mortar, except on the interior surfaces of box girders, the bolts may be removed flush with the surface of the concrete. Mortar shall be Class "C".

White cement shall be added to the mortar in an amount sufficient to tint the mortar a shade lighter than the concrete to be repaired. Mortar shall be mixed approximately 45 minutes in advance of use. Care shall be exercised to obtain a good bond with the concrete. After the mortar has thoroughly hardened, the surface shall be rubbed with a carborundum stone in order to obtain the same color in the mortar as in the surrounding concrete. All fins caused by form joints, and other projections shall be removed and all pockets cleaned and filled. Mortar for filling pockets shall be treated as specified for bolt holes.

Ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to a higher-class finish. On surfaces which are to be buried underground or surfaces which are completely enclosed (such as the cells of box girders), the removal of fins and form marks and the rubbing of a mortared surface to a uniform color will not be required. Ordinary surface finish, unless otherwise specified, shall be considered as a final finish on the following surfaces:

1) The undersurfaces of slab spans, box girders, filled-spandrel arch spans, and floor slabs between T-girders of superstructures except for grade separation structures.
2) The exposed surfaces of channel walls and the inside vertical surface of T-girders of superstructures except for grade separation structures.
3) Surfaces which are to be buried underground, covered with fill, or for surfaces of culverts above finish grade which are not visible from the traveled way.
4) Top surfaces which are to be buried underground shall be struck off and given a float finish.

303-1.9.3 Class 1 Surface Finish. Class 1 surface finish shall be applied to the following surfaces, unless otherwise specified:

1) All surfaces of superstructures for grade separation structures.
2) All surfaces of bridge piers, columns, and abutments; culvert headwalls; and retaining walls above finished ground and to at least 0.3 m (1 foot) below finished ground.
3) The outside vertical surfaces and bottom surface of outside girders, and the outside vertical surfaces and the undersurfaces of cantilever sidewalks, safety curbs, and floor slabs overhanging outside girders.
4) All surfaces of open spandrel arch rings, spandrel columns, and abutment towers.

5) Surfaces inside of culvert barrels having a height of 1.2 m (4 feet) or more for a distance inside the barrel at least equal to the height of the culvert.
6) All interior surfaces of pumping plant motor and control rooms and the engine-generator room.

After completion of the ordinary surface finish, the entire surface specified shall be sanded with a power sander or other approved abrasive means as required to obtain a uniform color and texture.

The use of power carborundum stones or discs will be required to remove unsightly bulges or
irregularities. The Class 1 surface finish shall not be applied until after the surfaces have been exposed to the elements for a period of 30 days, or until a uniform appearance of the surface can be secured.

The specifications for a Class 1 finish require a smooth, even surface of uniform appearance with unsightly bulges removed and depressions due to form marks and other imperfections repaired. The degree of care in building forms and the character of materials used in formwork are a contributing factor in the amount of such sanding and grinding required, and the Engineer shall determine the extent of such work required to meet the standard of this class of finish.

303-1.9.4 Class 2 Surface Finish. Class 2 surface finish shall be applied to the following surfaces unless otherwise specified:

All surfaces of concrete railings, including barrier railings, rail posts, rail endposts, and rail bases.

When Class 2 surface finish is specified, the ordinary surface finish and Class 1 surface finish shall be completed in succession. The process specified under Class 2 surface finish shall then be deferred until all other work which would in any way affect or mar the final finish is complete. The Contractor shall then apply a brush coat or surface film of Class “A” mortar.

303-1.10 Curing. All concrete shall be cured after the completion of the specified finishing
operations and as soon as the condition of the concrete will permit without damaging the concrete. All exposed surfaces shall be cured either by continuous application of water; or by being covered with plastic sheeting, soil, sand, or burlap; or by application of a curing compound. Curing materials shall conform to *“Greenbook” Standard Specifications for Public Works Construction, Latest Edition,* 201-4.

Concrete that is water cured shall be kept continuously wet for at least 10 days after being placed; preferably being covered with at least two layers of not lighter than 305 g/m2 (10-ounce per linear yard, 40 inches wide) burlap. Handrail, base rail, railing posts, tops of walls, and similar parts of the structure, if water cured, shall be covered with burlap as prescribed above, immediately following the finishing treatment specified therefore, and such covering shall not be removed in less than 10 days.

Roadway areas, floors, slabs, curbs, walks, and the like, that are water cured may be ponded or

covered with sand to a depth of at least 50 mm (2 inches) in lieu of the burlap as prescribed above, as soon as the condition of the concrete will permit, and such covering shall remain wet and in place for at least 10 days, unless otherwise directed by the Engineer or prescribed by the Specifications.

When the surface is covered with plastic sheeting, it shall remain covered for at least 10 consecutive days. The plastic sheeting shall be laid either with edges butted together and sealed with a 50 mm (2 inch) wide sealing tape or with edges lapped not less than 75 mm (3 inches) and fastened with waterproof adhesive.

When a membrane curing compound is used, it shall be applied in a manner and quantity to entirely cover and seal all exposed surfaces of the concrete with a uniform film. The membrane shall not be applied to any surface until finishing operations have been completed. Such surfaces shall be kept damp until the membrane is applied. All surfaces on which a bond is required, such as construction joints, shear planes, reinforcing steel, and the like, shall be adequately covered and protected before starting the application of the curing compound to prevent any of the compound from being deposited thereon; and any such surface with which the compound may have come in contact shall immediately be cleaned.
Care shall be exercised to prevent damage to the membrane seal during the curing period. Should the seal be damaged before the expiration of 10 days after the placing of the concrete, additional impervious membrane shall be immediately applied over the damaged area.

The top surface of highway bridge decks shall be cured by a combination of both the curing
compound method and the water method, except that the curing compound shall be Type 2. The curing compound shall be applied continuously and progressively during the deck finishing operations immediately after the finishing operations are completed on each individual portion of the deck. The water cure shall be applied as soon as the curing compound has formed a continuous membrane, but not later than 4 hours after completion of deck finishing or, for portions of the decks on which finishing is completed after normal working hours, the water cure shall be applied as directed by the Engineer.

Should any forms be removed sooner than 10 days after the placing of the concrete, the exposed surface shall either be immediately coated with curing compound or kept continuously wet by the use of burlap or other suitable means until such concrete has cured for at least 10 days.

When tops of walls are cured by the curing compound method, the side forms, except for metal forms, shall be kept continuously wet for the 10 days following the placing of the concrete.

If there is any likelihood of the fresh concrete checking or cracking prior to the commencement of the curing operations (due to weather conditions, materials used, or for any other reason), it shall be kept damp, but not wet, by means of an indirect fine spray of water until it is not likely that checking or cracking will occur, or until the curing operations are started in the area affected.

303-1.11 Payment. Payment for concrete structures will be made in conformance with the terms of the Contract and will be based on unit prices or lump sums as set forth in the Bid.

Where concrete is scheduled for payment on the basis of cubic meters (cubic yards), the calculation of the quantity of concrete for payment will be made only to the neat lines of the structures as shown on the Plans and on the basis of the concrete having the specified dimensions. However, all concrete shall be placed to line and grade within such tolerances, as determined by the Engineer, are reasonable and acceptable for the type of work involved. The quantity of such concrete will be calculated considering the mortar used to cover construction joints as being concrete and no deductions will be made for rounded or beveled edges, space occupied by reinforcing steel, or metal inserts or openings 0.5 m2 (5 square feet) or less in area. The cost of cement used in mortar for covering construction joints, patching, or other uses in the structure being constructed, in excess of that required for the design mix of the adjacent concrete, shall be included in the item of work of which said mortar is a part.

The quantity of reinforcing steel, when scheduled as a separate item, will be calculated for payment on the basis of the number of each type bar actually placed in accordance with the Plans and approved changes. The weight will be calculated using the actual lengths of bars placed and the unit weights per linear meter (foot) specified in ASTM A 615/615M, A 616/616M, and A 617/617M.

Steel for laps indicated on the Plans, or required by the Engineer, will be paid for at the Contract Unit Price. No payment will be made for reinforcing steel in laps (whether specified or optional) which are not used, and payment will not be made for additional steel in laps which are requested by the Contractor for its convenience, or for steel used in chairs or other devices for supporting the required reinforcement.

Payment for longitudinal steel reinforcement will be made on the basis that the longest standard mill lengths will be placed; and not more than one lap will be paid for between two consecutive construction joints, unless otherwise authorized by the Engineer. The standard mill length for bar sizes No. 13M (No. 4) and larger is shall be 18 m (60 ft).

When optional longitudinal construction joints are indicated on the Plans or specified, the Contractor will be permitted to lap the transverse reinforcing steel at said joints and the reinforcing steel used in such laps will be paid for at the Contract Unit Price.

END OF SECTION

SECTION 03 11 16
ARCHITECTURAL CAST IN PLACE CONCRETE FORMING

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Concrete forming for ADA ramp walls, bridge walls, and headwalls

C. Related Sections:

Section 03 00 00: Concrete
And Sheet C-1.08: Structural Notes

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new cast in place concrete walls with reinforcing steel are to be constructed with board formed finish.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Construct a sample 4' section of wall for Landscape Architect approval before continuing.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

PART 2 – PRODUCTS

2.1 CONCRETE FORMS

A. The concrete forms shall be comprised of 4" high framing members to achieve a result as depicted in figures 2.0 a-c.

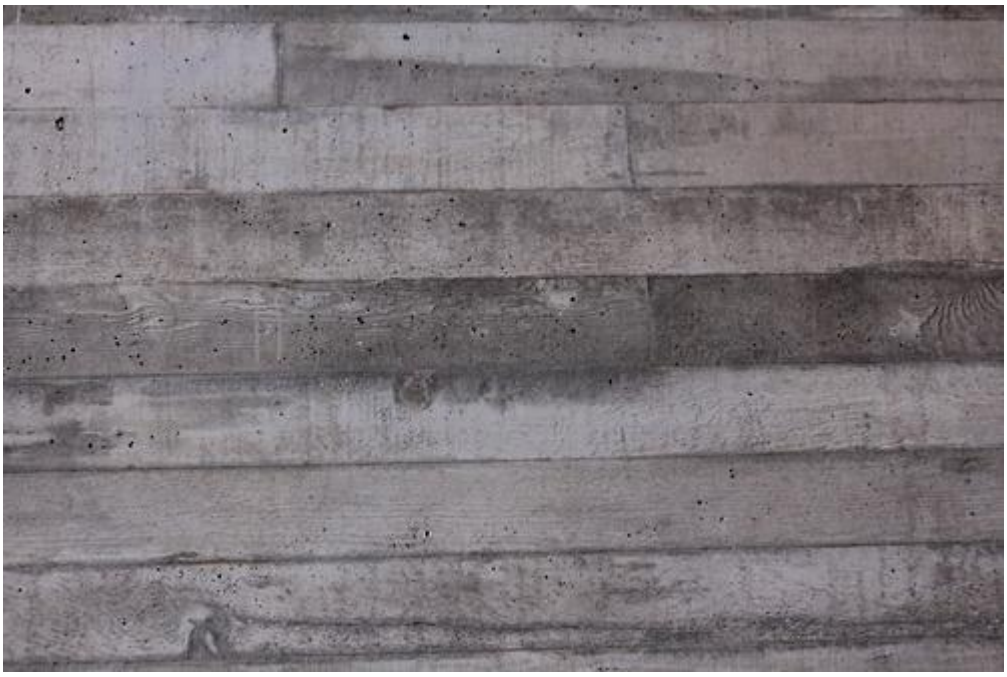


figure 2.0 a-c.

PART 3 – EXECUTION

3.1 CONSTRUCTION OF CAST-IN-PLACE CONCRETE WALLS

A. Concrete forms to use 4” high framing boards to achieve finish texture. Board ends to be staggered and not align from one row to the next. Use only full size boards. Landscape architect to review and approve formwork before concrete is poured.

B. Concrete footing – see specifications Section 03 00 00 – Concrete, Sheet C-1.08 – Structural Notes, and Engineer’s drawings.

C. Provide drainage for walls as indicated on drawings

D. All wall faces exposed to view to receive this finish

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 04 00 00
MASONRY CONSTRUCTION

(SECTION 303 *"Greenbook" Standard Specifications for Public Works Construction*)

303-4 MASONRY CONSTRUCTION.

303-4 CROSS REFERENCES

Portland Cement Concrete ..... **Greenbook* 201-1
Expansion Joint Filler and Joint Sealants ..... **Greenbook* 201-3
Concrete Curing Compound ..... **Greenbook* 201-4
Cement Mortar ..... **Greenbook* 201-5
Unit Masonry... ..... Section 04 20 00

* *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition*

303-4.1 Concrete Block Masonry.
1. Portions reprinted through courtesy of Concrete Masonry Association of California.

303-4.1.1 General. All materials for concrete block masonry shall conform to the requirements of *"Greenbook" Standard Specifications for Public Works Construction 2006 Edition,* Section 202-2.

303-4.1.2 Construction. All work shall be performed in a workmanlike manner and in full compliance with the applicable building ordinances.

All masonry walls shall be laid true, level, and plumb in accordance with the Plans.

Masonry units shall be cured, dry, and surfaces shall be clean when laid in the walls.

During construction, all partially laid walls as well as units in storage shall be protected from moisture. All concrete block units and any partially laid walls which become wet during the construction shall be permitted to dry for at least 1 week or longer, if required by weather conditions, before recommencing work.

Proper masonry units shall be used to provide for all windows, doors, bond beams, lintels, pilasters, etc., with a minimum of unit cutting. Where masonry unit cutting is necessary, all cuts shall be neat and regular and edges exposed in the finished work shall be cut with a power-driven abrasive saw.

Where no bond pattern is shown, the wall shall be laid up in straight uniform courses with regular running bond and alternate header joints in vertical alignment.

Intersecting masonry walls and partitions shall be bonded by the use of 6 mm (1/4 inch) minimum diameter steel ties at 600 mm (24 inches) on centers (maximum).

Where stack bond is indicated on the Plans, approved metal ties shall be provided horizontally at 600 mm (24 inches) on centers (maximum).

Mortar joints shall be straight, clean, and uniform in thickness. Unless otherwise specified or

detailed on the Plans, horizontal and vertical joints shall be approximately 10 mm (3/8 inch) thick with full mortar coverage on the face shells and on the webs surrounding cells to be filled. Units shall be laid with “push joints”. No slushing or grouting of a joint will be permitted, nor shall a joint be made by working in mortar after the units have been laid.

Exposed walls shall have joints tooled with a round bar (or V-shaped bar) to produce a dense, slightly concave surface well-bonded to the block at the edges. Tooling shall be done when the mortar is partially set but still sufficiently plastic to bond. All tooling shall be done with a tool which compacts the mortar, pressing the excess mortar out of the joint rather than dragging it out.

If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned, and set in fresh mortar.

303-4.1.3 Placing Reinforcing Steel. Reinforcing steel shall be placed as indicated on the Plans.Splices shall be lapped a minimum of 40 diameters, except that dowels other than column dowels need be lapped only 30 diameters. Column dowels shall lap 50 diameters.

Outside horizontal steel shall lap around corners 40 diameters and be carried through columns unless otherwise shown on the Plans. Inside horizontal steel shall extend as far as possible and bend into corner core. A dowel shall be provided in the foundation for each vertical bar.

Where horizontal courses are to be filled, metal stops shall be used. Use of paper stops will not be permitted. All horizontal reinforcing steel shall be laid in a course of bond beam blocks filled with grout.

Vertical cores containing steel shall be filled solid with grout, and thoroughly rodded. Where knockout blocks are used, steel shall be erected and wired in place before three courses have been laid. Vertical cores at steel locations shall be filled as construction progresses.

Where knockout blocks are not used, vertical cores at steel locations shall be filled in lifts of not more than 1.2 m (4 feet). The maximum height of pour shall be 2.4 m (8 feet). Cores shall be cleaned of debris and mortar and shall have reinforcing steel held straight and in place. If ordered by the Engineer, inspection and cleanout holes shall be provided at the bottom of each core to be filled.

Reinforcing steel shall be inspected prior to placing grout.

303-4.1.4 Protection and Curing. During construction operations, all adjoining work shall be protected from mortar droppings. Concrete block masonry shall be protected from the sun and rain. When approved in advance by the Engineer, completed masonry construction may be protected with a curing compound. Except in hot weather when it may be fog sprayed sufficiently to dampen the surface, finished concrete block masonry shall not be wetted.

303-4.1.5 Measurement and Payment. Payment for concrete block masonry will be made as shown in the Bid.

Unless otherwise specified, concrete block masonry walls will be measured parallel to the finished grade, deducting the widths of full-height openings.

303-4.2 Brick Masonry.

303-4.2.1 Materials. Unless otherwise specified, brick masonry shall be constructed of Grade MW brick and cement mortar as described in *"Greenbook" Standard Specifications for Public Works Construction 2006 Edition,* Section 202-1.

303-4.2.2 Bricklaying. Brick shall be clean, wetted immediately before laying, and shall be laid on a full mortar bed with "push joints". In no event will slushing or grouting of a joint be permitted, nor shall a joint be made by working in mortar after the brick has been laid. Joints between courses of bricks shall be of a uniform thickness of 10 mm (3/8 inch) as nearly as possible. Joints on surfaces which are not to be plastered, or on any surface that will be exposed upon completion of the work, shall be neatly struck and pointed. In all cases, the work shall be well-bonded, and if new work is to be joined to the existing or unfinished work, the contact surfaces of the latter shall first be properly cleaned and moistened.

Brickwork shall not be constructed upon a concrete foundation until at least 24 hours after such foundation has been placed. No brick shall be laid in water nor shall water be permitted to stand or run on any brickwork until the mortar has thoroughly set, except as provided in 303-4.2.3.

303-4.2.3 Protection and Curing. During construction operations, all adjoining work shall be protected from mortar droppings. Brickwork shall be protected from the sun and rain.

Except in hot weather when it may be fog sprayed sufficient to dampen the surface, finished brick masonry shall not be wetted.

303-4.2.4 Measurement and Payment. Payment for brick masonry will be made as shown in the Bid.

Unless otherwise specified, brick masonry walls will be measured parallel to the finished grade, deducting the width of full-height openings.

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS, AND DRIVEWAYS.

303-5 CROSS REFERENCES

Portland Cement Concrete	**Greenbook* 201-1
Expansion Joint Filler and Joint Sealants	**Greenbook* 201-3
Concrete Curing Compound	**Greenbook* 201-4
Cement Mortar	**Greenbook* 201-5
Lumber and Plywood	**Greenbook* 204-1
Subgrade Preparation	**Greenbook* 301-1
Portland Cement Concrete Pavement	**Greenbook* 302-6
Integrally Colored Concrete	Section 32 13 13

** "Greenbook" Standard Specifications for Public Works Construction, Latest Edition*

303-5.1 Requirements.

303-5.1.1 General. Concrete curbs, walks, gutters, cross gutters, alley intersections, access ramps, and driveways shall be constructed of portland cement concrete of the class and other requirements prescribed in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1. The finish coat to be applied to curbs shall consist of Class "B" mortar prepared as prescribed in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-5.1. Subgrade preparation shall conform to the requirements of 301-1.

Unless otherwise specified on the Plans, and except as otherwise prescribed in 303-5.1.3 under the heading "Driveway Entrances", the minimum thickness of walks shall be 75 mm (3 inches). The thickness of gutters, cross gutters, alley intersections, access ramps, and driveway aprons shall be as shown on the Plans.

303-5.1.2 Drainage Outlets Through Curb. Where existing building drains occur along the line of work, the new curb shall be suitably sleeved to provide for such drains. Similar sleeves shall be installed to serve low areas on adjacent property where drainage has been affected by the work.

The location and size of the sleeves and construction of connecting sidewalk drains shall be in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 306-7.

303-5.1.3 Driveway Entrances. Driveway entrances shall be provided in new curb at all existing driveways along the line of the work, at locations shown on the Plans, and at such other locations as may be designated by the Engineer.

The fully depressed curb opening at driveway entrances shall be 25 mm (1 inch) above gutter flowline at the curb face. The top of the fully depressed portion of the curb shall be finished to a transverse slope toward the gutter of 19 mm (3/4 inch).

Where walk is to be constructed across driveways to commercial establishments, the thickness thereof shall be 150 mm (6 inches) unless otherwise specified or indicated on the Plans. At residential driveways, the thickness of the walk will be 100 mm (4 inches) unless otherwise specified.

303-5.2 Forms.

303-5.2.1 Standard Forms. Form material shall be free from warp, with smooth and straight upper edges, and if used for the face of curb, shall be surfaced on the side against which the concrete is to be placed. Wooden forms for straight work shall have a net thickness of at least 38 mm (1-1/2 inches). Metal forms for such a work shall be of a gage that will provide equivalent rigidity and strength. Curb face forms used on monolithic curb and gutter construction shall be of a single plank width when the curb face is 250 mm (10 inches) or less, except for those used on curb returns. All forms used on curb returns shall be not less than 19 mm (3/4 inch) in thickness, cut in the length and radius as shown on the Plans, and held rigidly in place by the use of metal stakes and clamps. The curb face form shall be cut to conform exactly with the curb face batter as well as being cut to the required length and radius. Forms shall be of sufficient rigidity and strength, and shall be supported to adequately resist springing or deflection from placing and tamping the concrete.

Form material shall be clean at the time it is used and shall be given a coating of light oil, or other equally suitable material, immediately prior to the placing of the concrete.

All forms except back planks of curb shall be set with the upper edges flush with the specified grade of the finished surface of the improvement to be constructed, and all forms shall be not less than a depth equivalent to the full specified thickness of the concrete to be placed.

Back forms shall be held securely in place by means of stakes driven in pairs at intervals not to exceed 1.2 m (4 feet), one at the front form and one at the back. Clamps, spreaders, and braces shall be used to such extent as may be necessary to ensure proper form rigidity. Forms for walk, gutter, and similar work shall be firmly secured by means of stakes driven flush with the upper edge of the form at intervals not to exceed 1.5 m (5 feet). Form stakes shall be of sufficient size and be driven so as to adequately resist lateral displacement.

Commercial form clamps for the curb and gutter may be used provided they fulfill the requirements specified herein.

303-5.2.2 Slip-Forms. At the option of the Contractor and with the approval of the Engineer, slipform equipment may be used for the construction of concrete curb and gutter.

Slip-form equipment shall be provided with traveling side and top forms of suitable dimensions, shapes, and strength to support the concrete for a sufficient length of time during placement to produce curb and gutter of the required cross section. The equipment shall spread, consolidate, and screed the freshly placed concrete to provide a dense and homogeneous product.

The slip-form equipment shall have automatic sensor controls which operate from an offset control line. The line and grade of the slip-form equipment shall be automatically controlled.

303-5.3 Placing Concrete. Concrete shall be placed on a subgrade sufficiently dampened to ensure that no moisture will be absorbed from the fresh concrete.

Concrete shall be placed in curb, gutter, and curb and gutter forms in horizontal layers not exceeding 150 mm (6 inches) in thickness, each layer being spaded along the forms and thoroughly tamped. Concrete may be placed in layers of more than 150 mm (6 inches) in thickness only when authorized by the Engineer and the spading and tamping is sufficient to consolidate the concrete for its entire depth.

After the concrete for walk has been placed, a strikeoff shall be used to bring the surface to the proper elevation when compacted. It shall be spaded along the form faces and tamped to assure a dense and compact mass, and to force the larger aggregate down while bringing to the surface not less than 10 mm (3/8 inch) of the free mortar for finishing purposes.

Concrete shall be placed in cross gutters in horizontal layers of not more than 100 mm (4 inches) in thickness, each layer being spaded along the form faces and thoroughly tamped into a dense and compact mass. If internal vibrators are used, the full specified thickness may be placed in one operation.

After the concrete has been placed and tamped, the upper surface shall be struck off to the specified grade.

303-5.4 Joints.

303-5.4.1 General. Joints in concrete curb, gutter, and walk shall be designated as expansion joints and weakened plane joints.

303-5.4.2 Expansion Joints. Expansion joints shall be constructed in curb, walk, and gutter as shown on the Plans or as specified herein. Such joints shall be filled with premolded joint filler conforming with the requirements prescribed in Standard *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-3.2. No such joints shall be constructed in crossgutters, alley intersections, access ramps, or driveways except as may be approved by the Engineer.

Six (6) mm (1/4 inch) joints shall be constructed in curb and gutter at the end of all returns except where cross gutter transitions extend beyond the curb return, in which case they shall be placed at the ends of the cross gutter transition. No joints shall be constructed in returns. Where monolithic curb and gutter is constructed adjacent to concrete pavement, no expansion joints will be required except at the EC and BC of curb returns.

Expansion joint filler 6 mm (1/4 inch) thick shall be placed in walk at the EC and BC of all walk returns and around all utility poles which may project into the concrete along the line of the work. 6 mm (1/4 inch) joints shall be constructed in walk returns between the walk and the back of curb returns when required by the Engineer. At the EC and BC and around utility poles, the joint filler-strips shall extend the full depth of the concrete being placed. Joint filler-strips between walk and curb shall be the depth of the walk plus 25 mm (1 inch) with the top set flush with the specified grade of the top of curb.

All expansion joint filler strips shall be installed vertically, and shall extend to the full depth and width of the work in which they are installed, and be constructed perpendicular to straight curb or radially to the line of the curb constructed on a curve. Expansion joint filler materials shall completely fill these joints to within 6 mm (1/4 inch) of any surface of the concrete. Excess filler material shall be trimmed off to the specified dimension in a neat and workmanlike manner. During the placing and tamping of the concrete, the filler strips shall be held rigidly and securely in proper position.

303-5.4.3 Weakened Plane Joints.

(a) **General.** Weakened plane joints shall be straight and constructed in accordance with Subsections (b) or (c) below, unless otherwise shown on the Plans. In walks, joints shall be transverse to the line of work and at regular intervals not exceeding 3 m (10 feet). At curves and walk returns, the joint shall be radial. In gutter, including gutter integral with curb, joints shall be at regular intervals not exceeding 6 m (20 feet). Where integral curb and gutter is adjacent to concrete pavement, the joint shall be aligned with the pavement joints where practical.

(b) **Control Joint.** After preliminary troweling, the concrete shall be parted to a depth of 50 mm (2 inches) with a straightedge to create a division in the coarse aggregate. The concrete shall then be refloated to fill the parted joint with mortar. Headers shall be marked to locate the weakened plane for final joint finishing, which shall be accomplished with a jointer tool having a depth of 13 mm (1/2 inch) and a radius of 3 mm (1/8 inch). The finished joint opening shall not be wider than 3 mm (1/8 inch).

(c) **Plastic Control Joint.** The joint material shall be a T-shaped plastic strip at least 25 mm (1 inch) deep, having suitable anchorage to prevent vertical movement, and having a removable stiffener with a width of at least 19 mm (3/4 inch). After preliminary troweling, the concrete shall be parted to a depth of 50 mm (2 inches) with a straightedge. The plastic strip shall be inserted in the impression so that the upper surface of the removable stiffener is flush with the concrete. After floating the concrete to fill all adjacent voids, the removable stiffener shall be stripped. During final troweling, the edges shall be finished to a radius of 3 mm (1/8 inch), using a slit jointer tool.

303-5.5 Finishing.

303-5.5.1 General. Finishing shall be completed as specified herein for the type work being performed.

303-5.5.2 Curb. The front forms may be stripped as soon as the concrete has set sufficiently. Class "B" mortar, as prescribed in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-5.1 and thinned to the consistency of grout, shall be immediately applied to the top and face of the curb. If monolithic curb and gutter is being constructed, this mortar shall be applied to the full exposed curb face; otherwise, it shall extend 50 mm (2 inches) below the gutter surface.

The face and top of the curb shall then be carefully troweled to a smooth and even finish; the top being finished to a transverse slope of 6 mm (1/4 inch) toward the gutter, with both edges rounded to a radius of 13 mm (1/2 inch). The troweled surface shall be finished with a fine-hair broom applied parallel with the line of the work. The edge of the concrete at all expansion joints shall be rounded to a 6 mm (1/4 inch) radius. The surface of the work shall be finished as prescribed; after which the name of the Contractor, together with the year in which the improvement is constructed, shall be stamped therein to a depth of 6 mm (1/4 inch) in letters not less than 19 mm (3/4 inch) high, at the BC and EC of curb returns.

Joints shall conform to 303-5.4.

303-5.5.3 Walk. The forms shall be set to place the finished surface in a plane sloping up from the top of curb 2 percent when measured at right angles to the curb.

Following placing, the concrete shall be screeded to the required grade, tamped to consolidate the concrete and to bring a thin layer of mortar to the surface, and floated to a smooth, flat, uniform surface. The concrete shall then be edged at all headers, given a preliminary troweling and provided with weakened plane joints.

Walk shall be steel troweled to a smooth and even finish. All formed edges shall be rounded to a radius of 13 mm (1/2 inch). Edges at expansion joints shall be rounded to a radius of 3 mm (1/8 inch). Preliminary troweling may be done with a longhandled trowel or "Fresno", but the finish troweling, shall be done with a hand trowel. After final troweling, walk on grades of less than 6 percent shall be given a fine-hair-broom finish applied transversely to the centerline. On grades exceeding 6 percent, walk shall be finished by hand with a wood float. Walk shall be remarked as necessary after final finish, to assure neat uniform edges, joints, and score lines.

Scoring lines, where required, shall have a minimum depth of 6 mm (1/4 inch) and a radius of 3 mm (1/8 inch). When longitudinal scoring lines are required, they shall be parallel to, or concentric with, the lines of the work. Walk 6 m (20 feet) or more in width shall have a longitudinal center scoring line. In walk returns, one scoring line shall be made radially midway between the BCR and ECR. When directed by the Engineer, longitudinal and transverse scoring lines shall match the adjacent walk. The Contractor shall have sufficient metal bars, straightedges, and joint tools on the project.

Headers shall remain in place for at least 16 hours after completion of the walk but must be removed before the Work is accepted.

303-5.5.4 Gutter. After the concrete has been thoroughly tamped to force the larger aggregate into the concrete and bring to the top sufficient free mortar for finishing, the surface shall be worked to a true and even grade by means of a float, troweled with a longhandled trowel or “Fresno”, and wood-float finished. The flowline of the gutter shall be troweled smooth for a width of approximately 100 mm (4 inches) for integral curb and gutter and 100 mm (4 inches) on either side of the flowline on cross gutters and longitudinal gutters. The outer edges of the gutter shall be rounded to a radius of 13 mm (1/2 inch).

Side forms shall remain in place for at least 24 hours after completion of the gutter, but must be removed before the work will be accepted.

Joints shall conform to 303-5.4.

303-5.5.5 Alley Intersections, Access Ramps, and Driveways. Alley intersections, access ramps, and driveways shall be constructed as specified for concrete pavement in 302-6, except final finishing for alley intersections, access ramps, and the sloping portion of driveways shall be done by hand with a wood float and the remaining portion of the driveway finished as specified for walks in accordance with 303-5.5.3.

303-5.6 Curing. Immediately after finishing operations are completed, curing compound conforming to *“Greenbook” Standard Specifications for Public Works Construction, Latest Edition,* 201-4.1 shall be applied.

The curing compound shall be applied in a manner to entirely cover all exposed surfaces of the concrete with a continuous membrane.

No power equipment used for the preparation of subgrade will be permitted adjacent to concrete curb, gutter, or alley intersections until the fourth day following placement of the concrete. The placement of bituminous pavement adjacent to concrete curb, gutter, or alley intersections will not be permitted until the seventh day following the placement of concrete nor will concrete paving operations be permitted until the seventh day where placing or finishing equipment will ride on the previously placed concrete. If admixtures, additional cement or Type III cement is used to obtain high early strength concrete in accordance with *“Greenbook” Standard Specifications for Public Works Construction, Latest Edition,* 201-1, grading operations will be permitted on the second day following the placement of the concrete and paving operations on the third day.

303-5.7 Repairs and Replacements. Any new work found to be defective or damaged prior to its acceptance shall be repaired or replaced as approved by the Engineer.

303-5.8 Backfilling and Cleanup. Backfilling to the finished surface of the newly constructed improvement must be completed before acceptance of the Work.

Upon completion of the work the surface of the concrete shall be thoroughly cleaned and the site left in a neat and orderly condition.

303-5.9 Measurement and Payment. Payment for concrete curbs, walks, gutters, cross gutters, alley intersections, access ramps, and driveways will be made as shown in the Bid.

END OF SECTION

SECTION 04 22 00
CONCRETE MASONRY UNIT WALLS
(RESTROOM)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Additional specifications to be provided by Romtec for pre-engineered restroom.

B. Provisions of Division 01, Drawings, General conditions, Supplementary General Conditions, and Special Conditions apply to this section.

C. Deviations from the plans and specifications shall not be made without the written approval of the architect and/or engineer.

D. Related Sections:

Portland Cement Concrete ..... **Greenbook* 201-1
Expansion Joint Filler and Joint Sealants ..... **Greenbook* 201-3
Concrete Curing Compound ..... **Greenbook* 201-4
Cement Mortar ..... **Greenbook* 201-5
Unit Masonry... ..... Section 04 20 00

1.2 SYSTEM DESCRIPTION

A. Furnish and install concrete masonry units, mortar, grout, and masonry reinforcing steel. Provide equipment necessary for their installation.

B. Install items furnished by others: bolts, anchor bolts, shelf angles, and built-ins.

C. Arrange for adequate bracing, forming, and shoring required in conjunction with and in the course of constructing the concrete masonry.

D. Advise the general contractor as to the position of all dowels for the masonry. The general contractor shall be responsible for the placement of all dowels in any adjoining construction.

E. Arrange for inspections.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Certificates of compliance with all applicable ASTM and UBC standards shall be submitted on all products specified herein.

C. Construct a sample 4' section of wall for Landscape Architect approval before continuing.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.6 DELIVERY, STORAGE AND HANDLING

A. Materials of this section shall be protected to maintain quality and physical requirements.

B. All masonry units shall be stored on the jobsite so that they are protected from rain, stored off the ground and kept clean from contamination.

C. Handle units carefully to avoid breakage and damage to finished faces

D. Cold Weather Conditions (40ºF or below):
   1. Wet or frozen units shall not be laid. Temperature of units when laid shall not be less than 20ºF.
   2. Aggregates and mixing water shall be heated to produce mortar and grout temperatures between 40ºF and 120ºF.
   3. Maintain mortar temperature on boards above 32ºF.

PART 2 – PRODUCTS

2.0 CONCRETE MASONRY UNITS

A. Loadbearing concrete masonry units shall conform to UBC Standard 21-4, Grade N, and ASTM C 90. All units shall be Mediumweight, 1900 net psi, as manufactured by Angelus Block Co., Inc.

2.1 MORTAR

A. Mortar shall be Spec Mix Preblended Masonry Mortar, Type S, conforming to the proportion and property specifications of ASTM C 270, as manufactured by E-Z Mix Inc., Sun Valley, CA.

B. Mortar Materials:
   1. Admixtures: Use no admixtures, air-entraining agents, plasticizers, salts, or antifreeze compounds unless specified and approved in advance by the Building Official and E-Z Mix, Inc.
   2. Water: Use clean, potable and free of deleterious amounts of acids, alkalies or organic materials.

2.2 GROUT

A. Preblended Grout: PRE-MIX Products, Spec Concrete 30/70, 2000 psi. Grout Mix manufactured by E-Z Mix Inc. may be used per manufacturer's specifications.

B. Grout shall conform to UBC Standard 21-19 or ASTM C 476, proportions per UBC Table 21-B.

C. Use of fine or course grout shall be per UBC Table 21-C.

D. Minimum compressive strength shall be 2000 psi

E. Grout shall be of fluid consistency with an 8 inch to 10 inch slump. Lower slump may be used for large grout spaces.

F. Admixtures: PRE-MIX Products Grout Additive. Use per manufacturer's specifications.

2.3 REINFORCING STEEL

A. Reinforcing bars shall conform to ASTM A 615, Grade 60.

B. Joint Reinforcement shall conform to UBC Standard 21-10.

C. Metal Ties and Anchors shall meet the requirements of UBC Section 2102.2.7.

D. All metal reinforcement shall be free from loose rust and other matter or coatings detrimental to bond.

3.1 CONSTRUCTION OF CONCRETE MASONRY UNIT WALLS

A. Masonry units shall be cured, sound, dry, and clean from all foreign matter when placed in the wall.

B. Reinforcement bars shall be free of kinks or bends, except for bends detailed in the drawings.

C. All work shall be performed in a workmanlike manner and in full compliance with the applicable building ordinances.

D. All masonry walls shall be laid true, level, and plumb in accordance with the Plans.

E. During construction, all partially laid walls as well as units in storage shall be protected from moisture. All concrete block units and any partially laid walls which become wet during the construction shall be permitted to dry for at least 1 week or longer, if required by weather conditions, before recommencing work.

F. Proper masonry units shall be used to provide for all windows, doors, bond beams, lintels, pilasters, etc., with a minimum of unit cutting. Where masonry unit cutting is necessary, all cuts shall be neat and regular and edges exposed in the finished work shall be cut with a power-driven abrasive saw.

G. Where no bond pattern is shown, the wall shall be laid up in straight uniform courses with regular running bond and alternate header joints in vertical alignment.

H. Intersecting masonry walls and partitions shall be bonded by the use of 6 mm (1/4 inch) minimum diameter steel ties at 600 mm (24 inches) on centers (maximum).

I. Where stack bond is indicated on the Plans, approved metal ties shall be provided horizontally at 600 mm (24 inches) on centers (maximum).

J. Mortar joints shall be straight, clean, and uniform in thickness. Unless otherwise specified or detailed on the Plans, horizontal and vertical joints shall be approximately 10 mm (3/8 inch) thick with full mortar coverage on the face shells and on the webs surrounding cells to be filled. Units shall be laid with "push joints". No slushing or grouting of a joint will be permitted, nor shall a joint be made by working in mortar after the units have been laid.

K. Exposed walls shall have joints tooled with a round bar (or V-shaped bar) to produce a dense, slightly concave surface well-bonded to the block at the edges. Tooling shall be done when the mortar is partially set but still sufficiently plastic to bond. All tooling shall be done with a tool which compacts the mortar, pressing the excess mortar out of the joint rather than dragging it out.

L. If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned, and set in fresh mortar.

M.

3.2 LAYOUT AND FOUNDATION

E. If site conditions or layout is in any way improper, masonry work shall not begin until cleared by the governing authority.

F. Foundation shall be level and at correct grade so that the initial bed joint shall not be less than 1/4 inch nor more than 1 inch.

G. Surface of foundation shall be clean and free of deleterious materials. Surface shall be roughened to a full amplitude of 1/16 inch.

H. If a foundation dowel must be bent to align with a vertical cell, it shall not slope more than 1 inch horizontally to 6 inches vertically.

3.3 PLACING REINFORCING STEEL

A. Reinforcing steel shall be placed as indicated on the Plans. Splices shall be lapped a minimum of 40 diameters, except that dowels other than column dowels need be lapped only 30 diameters. Column dowels shall lap 50 diameters.

B. Outside horizontal steel shall lap around corners 40 diameters and be carried through columns unless otherwise shown on the Plans. Inside horizontal steel shall extend as far as possible and bend into corner core. A dowel shall be provided in the foundation for each vertical bar.

C. Where horizontal courses are to be filled, metal stops shall be used. Use of paper stops will not be permitted. All horizontal reinforcing steel shall be laid in a course of bond beam blocks filled with grout.

D. Vertical cores containing steel shall be filled solid with grout, and thoroughly rodded. Where knockout blocks are used, steel shall be erected and wired in place before three courses have been laid. Vertical cores at steel locations shall be filled as construction progresses.

E. Where knockout blocks are not used, vertical cores at steel locations shall be filled in lifts of not more than 4 feet. The maximum height of pour shall be 8 feet. Cores shall be cleaned of debris and mortar and shall have reinforcing steel held straight and in place. If ordered by the Engineer, inspection and cleanout holes shall be provided at the bottom of each core to be filled.

F. Reinforcing steel shall be inspected prior to placing grout.

3.4 PROTECTION AND CURING.

A. During construction operations, all adjoining work shall be protected from mortar droppings. Concrete block masonry shall be protected from the sun and rain. When approved in advance by the Engineer, completed masonry construction may be protected with a curing compound. Except in hot weather when it may be fog sprayed sufficiently to dampen the surface, finished concrete block masonry shall not be wetted.

B. Mortar

C. Top to match face. All sides exposed to match, if wall is freestanding

3.5 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 04 43 00
STONE MASONRY – NATURAL STONE COLUMNS AND BENCHES

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes construction of natural stone columns and benches for park shelter structure.

C. Related Sections:

Section 00 31 24.14	Structural Calculations for El Encanto Park Shelter
Section 00 03 00	Concrete
Section 00 04 00	Masonry
And Sheet C-1.08	Structural Notes

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new stone columns and benches are to be constructed with blocky, angular granite stone to reflect the site's existing rock walls.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit 3 sample pieces of blocky, angular granite stone to Landscape Architect for approval.

C. Construct a sample 4' section of stone masonry which includes corner of column, top of bench (seat cap) and wall face, for Landscape Architect approval before continuing.

D. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, anchorages, and jointing methods.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for preceding 20 years, in manufacture of stone of similar type to that specified.

B. Installer's Qualifications: Installer regularly engaged, for preceding 10 years, in installation of stone similar type to that specified.

C. Stone and workmanship shall comply with the Masonry Institute of America.

1.6 DELIVERY, STORAGE AND HANDLING

A. Lift using wide-belt type slings. Do not use wire rope or ropes containing tar or other substances which may cause staining. Do not use pinch or wrecking bars on stone.

B. Store and handle stone to prevent damage due to moisture, contaminants, breakage, chipping or other causes.

C. Store stone on wood skids or pallets, covered with non-staining, waterproof membrane.

D. Protect stored stone from weather with waterproof, non-staining covers or enclosures.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install natural veneer stone under environmental conditions outside manufacturer's limits

B. During temporary storage on site, at the end of working day, or during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored. Extend covering 2 feet minimum below top of wall.

PART 2 – PRODUCTS

2.1 THICK, BLOCKY, ANGULAR GRANITE STONE

A. The stone shall be local, natural rock to be approved by Landscape Architect, or may be "Bouquet Canyon", AKA "High Desert" or "Red Mountain" or Landscape Architect approved substitute.

B. Stones shall generally be a minimum of 4" thick, 6" wide, and 12"-18" long, angular blocks with predominantly right angles.

C. Stones shall have a flat face for the exposed wall side, and a stackable shape.

D. The stone is not to be rounded river rock stones, which will not stack well.

2.2 STONE SUPPLIER

Sunburst Rock
282 Live Oak Avenue
Irwindale, CA 91706
626.446.4994

or approved equal

2.3 MORTAR

A. Mortar to meet or exceed latest ASTM standards

B. Setting: Type N mortar or mortar consisting of one part Portland cement, one part hydrated lime or lime putty and six parts sand by volume.

C. Mix in as stiff a consistency as can be worked into joints.

D. Water: Clean, potable, non-alkaline.

E. Chloride: Not permitted.

F. Admixtures: Do not add products that are not specified.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify stone assembly pattern and start point.

C. Verify that items built-in under other sections are properly located and sized.

3.2 PREPARATION

A. Protection: Protect stone from exposure to rain, ice, and staining from mortar droppings, sealant and other substances or sources that may cause staining.

B. Establish lines, levels and coursing. Protect from disturbance.

C. Clean stone prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces.

3.3 INSTALLATION

A. Stone for columns and benches to be laid with mortar after footings, slabs, and steel framing is in place. Interior of columns and benches to be backfilled with concrete and steel reinforcing per engineer's specifications. Embed first stone course in wet concrete slab or footing – depth to be minimum 4" and maximum 8".

B. Finished stone columns and benches to approximate the blocky, right angled treatment of the largest stone pieces in the photograph above.

C. Set stones to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure stonework in place. Shim and adjust as necessary. Top to match face. All sides exposed to match.

D. Execute dimension stonework by skilled mechanics, and employ skilled stone fitters at site to do necessary field cutting as stones are set.

E. At cavity walls, install weep holes as indicated using plastic or other weep tubes at joints where water may accumulate.

F. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

G. Do not impair appearance or strength of stone work by cutting.

3.4 CLEANUP

A. As a general rule, stone should be cleaned only with water or with light detergent.

B. Keep stone work as clean as possible as work progresses. Upon completion clean stone thoroughly with water or detergent and water and fiber brushes. Thoroughly rinse when complete with clean water. Do not use acids or wire brushes.

C. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 04 43 00.5
STONE MASONRY – COBBLE RETAINING WALLS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes construction of cobble faced retaining walls.

C. Related Sections:

Section 03 00 00	Concrete
Section 04 00 00	Masonry

1.2 SYSTEM DESCRIPTION

A. Where indicated on Drawings, construct new cobble walls grouted with concrete.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit 3 sample pieces of cobble stone to Landscape Architect for approval.

C. Construct a sample 4' section of wall which includes top edge for Landscape Architect approval before continuing.

1.5 QUALITY ASSURANCE

A. Installer's Qualifications: Installer regularly engaged, for preceding 10 years, in installation of stone similar type to that specified.

B. Stone and workmanship shall comply with the Masonry Institute of America.

1.6 DELIVERY, STORAGE AND HANDLING

A. Lift using wide-belt type slings. Do not use wire rope or ropes containing tar or other substances which may cause staining. Do not use pinch or wrecking bars on stone.

B. Store and handle stone to prevent damage due to moisture, contaminants, breakage, chipping or other causes.

C. Store stone on wood skids or pallets, covered with non-staining, waterproof membrane.

D. Protect stored stone from weather with waterproof, non-staining covers or enclosures.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits for optimum results.

B. During temporary storage on site, at the end of working day, or during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored. Extend covering 2 feet minimum below top of wall.

PART 2 – PRODUCTS

2.1 COBBLE

A. The stones shall be hard, sound, and free from decay and weathering. Shape shall be round smooth cobble (river rock) 6”-18”.

B. Stone shall be hard, sound, free from decay and weathering. Stones with porous matter or with boulder skin shall be rejected.

2.2 STONE SUPPLIER

Sunburst Rock
282 Live Oak Avenue
Irwindale, CA 91706
626.446.4994

or approved equal

2.3 MORTAR

A. Mortar to meet or exceed latest ASTM standards and Greenbook Standards, section 202.

B. Setting: Type N mortar or mortar consisting of one part Portland cement, one part hydrated lime or lime putty and six parts sand by volume.

C. Mix in as stiff a consistency as can be worked into joints.

D. Water: Clean, potable, non-alkaline.

E. Chloride: Not permitted.

F. Admixtures: Do not add products that are not specified.

2.4 WALL GROUT

A. Backfill wall cavity with concrete and steel reinforcing as shown in Drawings. Materials to meet Greenbook specifications section 202.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify stone assembly pattern and start point.

C. Verify that items built-in under other sections are properly located and sized.

3.1 PREPARATION

A. Protection: Protect stone from exposure to rain, ice and staining from mortar droppings, sealant and other substances or sources that may cause staining.

B. Establish lines, levels, and coursing. Protect from disturbance.

C. Clean stone prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces

3.2 INSTALLATION

A. Stone for walls to be laid with mortar after footings, slabs, and steel reinforcing is in place. Wall cavities to be backfilled with concrete per engineer's specifications. Embed first stone course in wet concrete slab or footing –depth to be minimum 4" and maximum 8".

B. Set stones to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure stonework in place. Shim and adjust as necessary.

C. *Stonework to include stone cap along top edge; (top to match face*); All sides exposed to match.

Desired aesthetic for new cobble walls – however, *add stone cap along top* to match face.

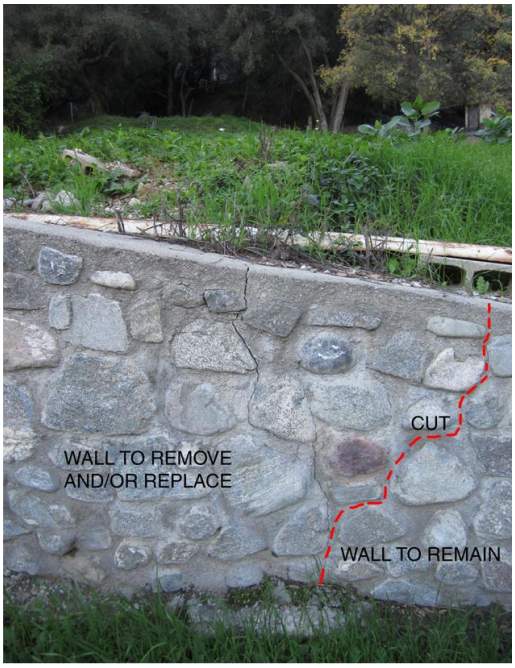
D. Execute dimension stonework by skilled mechanics, and employ skilled stone fitters at site to do necessary field cutting as stones are set.

E. At cavity walls, install weep holes as indicated using plastic or other weep tubes at joints where water may accumulate.

F. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

G. Do not impair appearance or strength of stone work by cutting.

H. Where new cobble wall abuts existing wall to remain, do not cut wall at a straight vertical, but as pictured below. Remove all mortar surrounding surface where new stone is to be added and clean existing stones prior to placing new mortar.



3.3 CLEANUP

A. As a general rule, stone should be cleaned only with water or with light detergent.

B. Keep stone work as clean as possible as work progresses. Upon completion clean stone thoroughly with water or detergent and water and fiber brushes. Thoroughly rinse when complete with clean water. Do not use acids or wire brushes.

C. Remove rubbish, debris, and waste materials and legally dispose of these off the Project site.

END OF SECTION

SECTION 04 43 00.8
RECYCLED CONCRETE RETAINING WALLS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes construction of recycled concrete walls.

C. Related Sections:

Section 02 42 00	Salvage of Concrete for Broken Concrete Retaining Walls
Section 03 00 00	Concrete
Section 04 00 00	Masonry
and Sheet C-1.08	Structural Notes

1.2 SYSTEM DESCRIPTION

A. Where indicated on Drawings, construct recycled concrete walls grouted with concrete.

B. Recycled concrete is to be salvaged from the site. However, if recycled concrete is not of suitable quality to meet construction standards outlined in Section 02 42 00 or meet approval of Landscape Architect, recycled concrete is to be procured.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Construct a sample 4' long section of wall including top of wall for Landscape Architect approval before continuing.

1.5 QUALITY ASSURANCE

A. Installer's Qualifications: Installer regularly engaged, for preceding 10 years, in installation of masonry similar type to that specified.

B. Workmanship shall comply with the Masonry Institute of America.

1.6 DELIVERY, STORAGE AND HANDLING

A. Lift where necessary using wide-belt type slings. Do not use wire rope or ropes containing tar or other substances which may cause staining. Do not use pinch or wrecking bars on recycled concrete.

B. Store and handle recycled concrete to prevent damage due to moisture, contaminants, breakage, chipping, or other causes.

C. Store recycled concrete on wood skids or pallets, covered with non-staining, waterproof membrane.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits for optimum results.

B. During temporary storage on site, at the end of working day, or during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored. Extend covering 2 feet minimum below top of wall.

PART 2 – PRODUCTS

2.0 RECYCLED CONCRETE

A. See Section 02 42 00 – Salvage of Concrete for Recycled Concrete Retaining Walls

2.01 MORTAR

A. Mortar to meet or exceed latest ASTM standards and Greenbook Standards, section 202.

B. Setting: Type N mortar or mortar consisting of one part Portland cement, one part hydrated lime or lime putty and six parts sand by volume.

C. Mix in as stiff a consistency as can be worked into joints.

D. Water: Clean, potable, non-alkaline.

E. Chloride: Not permitted.

F. Admixtures: Do not add products that are not specified.

2.02 WALL GROUT

A. Backfill wall cavity with concrete and steel reinforcing as shown in Drawings. Materials to meet Greenbook specifications section 202.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify assembly pattern and start point.

C. Verify that items built-in under other sections are properly located and sized.

3.01 PREPARATION

A. Protection: Protect recycled concrete from exposure to rain, ice, and staining from mortar droppings, sealant, and other substances or sources that may cause staining.

B. Establish lines, levels, and coursing. Protect from disturbance.

C. Clean recycled concrete prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces.

3.02 INSTALLATION

A. Recycled concrete for walls to be laid with mortar after footings, slabs, and steel reinforcing is in place. Wall cavities to be backfilled with concrete per engineer's specifications. Embed first stone course in wet concrete slab or footing –depth to be minimum 4" and maximum 8".

B. Set recycled concrete to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure work in place. Shim and adjust as necessary. Top to match face unless noted otherwise on Drawings. All sides exposed to match. See photo below for desired aesthetic.

C. Execute work by skilled mechanics, and employ skilled fitters at site to do necessary field cutting as recycled concrete pieces are set.

D. At cavity walls, install weep holes as indicated using plastic or other weep tubes at joints where water may accumulate.

E. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

G. Where new wall abuts existing wall to remain, do not cut wall at a straight vertical. Remove all mortar surrounding surface where new recycled concrete is to be added and clean existing stones prior to placing new mortar.

3.03 CLEANUP

A. As a general rule, recycled concrete should be cleaned only with water or with light detergent.

B. Keep concrete work as clean as possible as work progresses. Upon completion clean thoroughly with water or detergent and water and fiber brushes. Thoroughly rinse when complete with clean water. Do not use acids or wire brushes.

C. Remove rubbish, debris, and waste materials and legally dispose of these off the Project site.

END OF SECTION

SECTION 05 52 13
METAL RAILINGS

PART 1 – GENERAL

1. Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.
2. Furnish all labor, material, tools, equipment and services for all metal railing as indicated, in accord with the provisions of the Contract Documents. The metal railing installer will provide all components required for a complete system to include handrails, posts, escutcheons, end caps, sealants, fillers and any other required items.
3. Completely coordinate with work of all other trades.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Metal Railings

1.2 SYSTEM DESCRIPTION

A. Where indicated on drawings, install new metal handrails with oxidized finish, to withstand loads and comply with standards established by City of Azusa building code.

1.3 REGULATORY REQUIREMENTS

A. Comply with latest edition of City of Azusa's building code and any applicable ADA requirements.

1.4 REFERENCES

A. A 500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. E 894 Standard Test Methods for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.

C. E 935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

1.5 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit shop drawings and product data showing plans and sections, dimensions, and assembly of components:

   1. Handrail
   2. Brackets
   3. Reinforcements
   4. Anchors
   5. Welded and bolted connections

2. Show all field connections

3. Provide setting diagrams for installation of anchors, location of pockets, weld plates for attachment of rails to structure, and blocking for attachment of wall rail.
4. Specify adequate back up support for anchoring handrail bracket.
5. Indicate all required field measurements.
6. Submit three 3 sets of drawings for approval.

C. Indicate component details, materials, finishes, connection and joining methods, and the relationship to adjoining work.

D. Samples: Contractor to coat 2 lineal feet of pipe rail and one connector/fitting piece with finish for Landscape Architect to review before proceeding with installation.

1.6 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

PART 2 – PRODUCTS

2.1 METAL RAILING

A. Steel – galvanized with brown patina finish.

B. Use Brown-G liquid solution, see following spec sheet. Manufactured by Triple-S Chemical Products, Inc. 3464 Union Pacific Avenue. Los Angeles, CA 90023. (800) 862-5958.

PART 3 – EXECUTION

3.1 CONSTRUCTION OF METAL RAILINGS

A. Metal railings to be attached as shown on drawings.

B. Brown patina finish to be created with application of Brown-G liquid solution.

C. Provide escutcheons and end caps for all locations

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

TRIPLE –S
CHEMICAL PRODUCTS, INC.

3464 Union Pacific Avenue
Los Angeles, CA 90023
Toll Free: 1(800) 862-5958

Tel: (323) 261-7301
Fax: (323) 261-5567

BROWN –G

For Galvanized Steel

DESCRIPTION:

Brown- G is a liquid solution for producing oxidized color tones on Galvanized Zinc & Zinc Dicasts at room temperature. **Brown- G** is used primarily for decorative purposes to produce brown finishes.

OPERATING CONDITIONS:

Concentration:	Use as is.
Temperature:	65-75° F.
Time:	10-20 seconds by immersion spray or brush.
Tank:	Acid resistant containers (plastic, P.V.C. or Polyethylene.)

COLOR FORMATION:

Color formation depends upon the time of immersion and concentration of solution. For a dark brown finish, the immersion time should be 1-2 minutes depending on the desired color.

SURFACE PREPARATION:

Parts should be free of grease, alkalinity or acidity when immersed in **Brown- G** solution.

1. Clean the part with **Cleaner 104**
2. Water rinse.
3. Spray, brush, or dip in **Brown- G** for 10 seconds – 2 minutes depending on concentration.
4. Rinse with water.
5. It is recommended that a clear water base lacquer (e.g. WSL-55) be applied to the coating to provide maximum life.

CAUTION:

Brown- G is a mildly acidic solution. Avoid contact with the skin or eyes. Protective clothing, gloves, and a face shield should be worn when operating. In case of contact, flush skin or eyes with plenty water. For eyes, call a physician. **Brown- G** liquid is poisonous.
DO NOT TAKE INTERNALLY!

The information stated herein is based on information and tests we believe to be reliable. The accuracy or completeness thereof is not guaranteed. Since conditions of use are outside our control, user shall, before using, determine the suitability of the product for his intended use and user assumes all risk and liability in connection therewith.

SECTION 07 13 53
ELASTOMERIC WATERPROOFING
(PLANTER AREAS)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: waterproofing for planter areas adjacent to buildings

C. Related Sections:

Cast In Place Concrete Walls: Section 03 11 16
Planting Natives: Section 32 90 01

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, provide waterproof coating to protect existing structure from moisture emanating from planting area.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a brochure with product information to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store at 40 - 90°. Shelf life is approximately 18 months. Scratch Kote 2000®/POND KOTE is furnished in 65-lb bags. Shelf life is approximately 24 months. Store in a dry environment.

PART 2 – PRODUCTS

2.1 WATERPROOFING PAINT

A. Waterproof coating shall be Mulasticoat Waterproofing with Scratch Kote as manufactured by Multicoat (http://multicoat.com/pwf.html) phone: (877) 685-8426.

PART 3 – EXECUTION

3.1 SURFACE PREPARATION

A. Substrate must be structurally sound and free from grease, oil, dirt, dust, sealers, water repellents and other foreign materials which may interfere with proper bonding. Shot Blasting or sand blasting may be necessary over some surfaces to achieve proper bonding. On concrete block or slump stone walls, all head and bed joints must be free of holes and finished flush with block substrate. For poured in place walls, a water-based form release must be used. If an oil base form release is used, it must be completely removed with tri sodium phosphate (TSP), power wash and rinse. Substrate must be thoroughly dry before application to prevent gassing or bubbling.

3.2 APPLICATION

A. Roll, brush or spray SCRATCH KOTE 2000® to entire substrate to be waterproofed at a coverage rate not to exceed 175 sq. ft. per bag and allow to dry overnight. Gently hand stir Mulasticoat ® and apply two coats at a coverage rate of 80 to 100 sq. ft. per gallon. Allow to dry between coats. Broadcast 16-20 silica sand onto second coat of MULASTICOAT® while still wet and allow to dry. Apply a coat of Scratch Kote 2000® or POND KOTE and allow a minimum of 5 days drying time before filling.

B. All corners require use of Multicoat's stitch bond polyester fabric mesh. Large cracks should be filled Multicoat's Speed Mix 2000® prior to application of Scratch Kote 2000. Mist final coat of SCRATCH KOTE/POND KOTE with water once daily during the 5 day curing period.

C. Do not apply if substrate temperature is below 40°F or above 100°F, or if ambient temperature below 40°F above 100°F. Do not apply if precipitation is expected within a twenty four (24) hour period. Do not allow product to become wet or to be left exposed more than 2 days in extreme UV Ray areas. Do not use if substrate is subject to negative side water or water vapor pressure.

3.3 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 07 32 13
CLAY ROOF TILES
(RESTROOM)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements as well as any applicable regulatory agency requirements.

1.1 SUMMARY

A. *Additional specifications to be provided by Romtec.*

B. Provisions of Division 01 apply to this section.

C. Section includes installation of clay tile roofing and moisture proofing accessories.

D. Related Sections:
Section 01 35 00: Special Procedures: Romtec Restroom

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, install new clay tile roof.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a full size sample piece clay roof tile to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the latest edition of the City of Azusa's building code.

B. Refer and adhere to the Tile Roofing Institute's Installation Manual for Moderate Climate Regions.

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 CLAY ROOF TILES

A. Clay roof tiles shall be Redland Clay Tile Two-Piece Mission, color: Café Antigua.

B. Provide all necessary flashing and waterproofing, including but not limited to bituminous sheeting and 26 gauge metal flashing and trim to protect the structure from effects of moisture and positively direct water away from the structure.

PART 3 – EXECUTION

3.1 CONSTRUCTION OF CLAY ROOF TILES

A. Refer to Redland Clay Tile installation guide and Tile Roofing Institute Installation Manual for Moderate climate Regions for layout, coursing and spacing.

B. Insure that roof decking, battens and underlayment are clean and free of damage before commencing work.

C. Install an equal number of tile rows from eave to ridge, with minimum row lap of 3”.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

REDLAND®
CLAY TILE

redlandclaytile.com 1.800.354.5983

LIMITED LIFETIME PRODUCT WARRANTY

All Redland Clay Tile colors and blends have natural color variations due to the inherent characteristics of the raw materials used. To avoid excess color patterning, checker-boarding or stair stepping, the installer should periodically check the overall roof color from ground level at a reasonable distance.

012009 © REDLAND CLAY TILE 2009

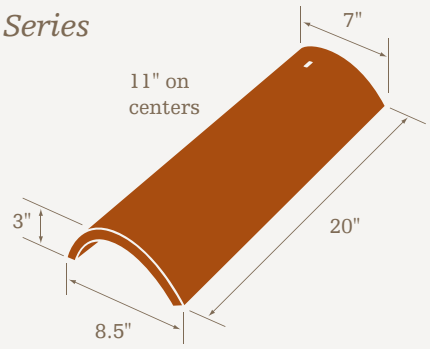
U.S. GREEN BUILDING COUNCIL MEMBER

CRRC COOL ROOF RATING COUNCIL ® MEMBER

Exhibit H - Plan Specifications for the Special Use Area

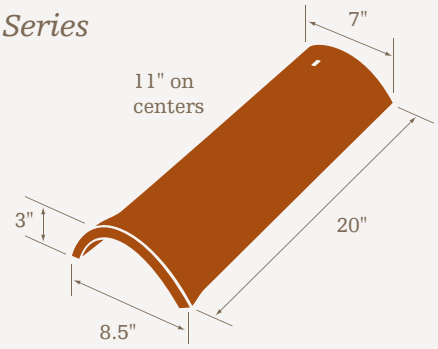
Two-Piece Mission

2000 Series



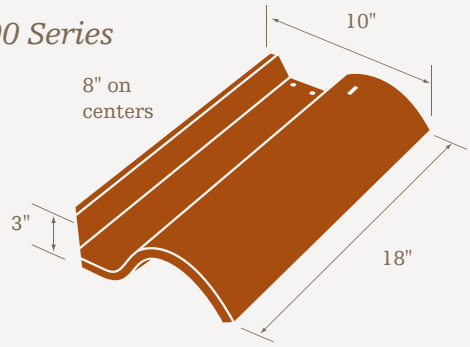
Two-Piece Mission Sandcast

2300 Series



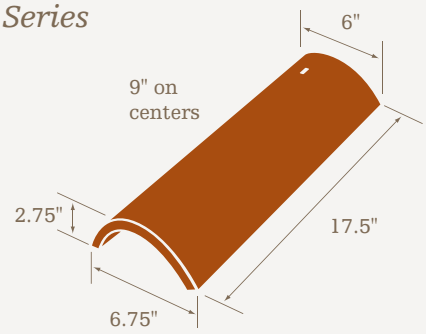
Alfaro

3000 Series



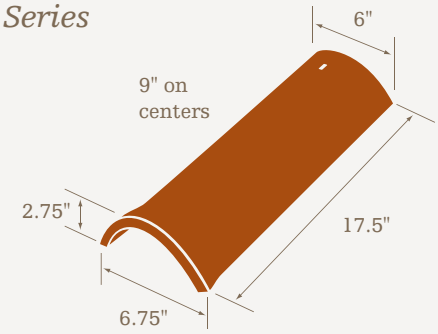
Baja Mission

4000 Series



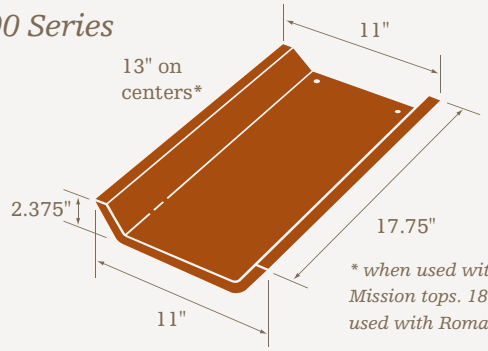
Baja Mission Sandcast

4300 Series



Roman Pan

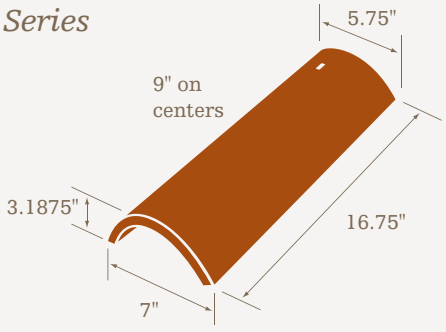
6000 Series



** when used with Baja Mission tops. 18" when used with Roman tops.*

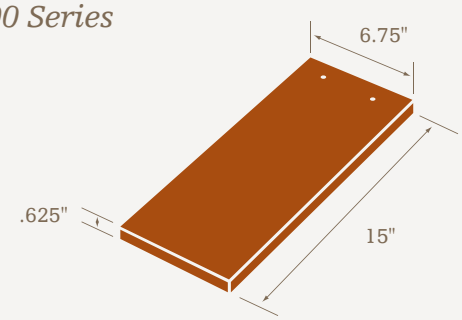
Junipero

9000 Series

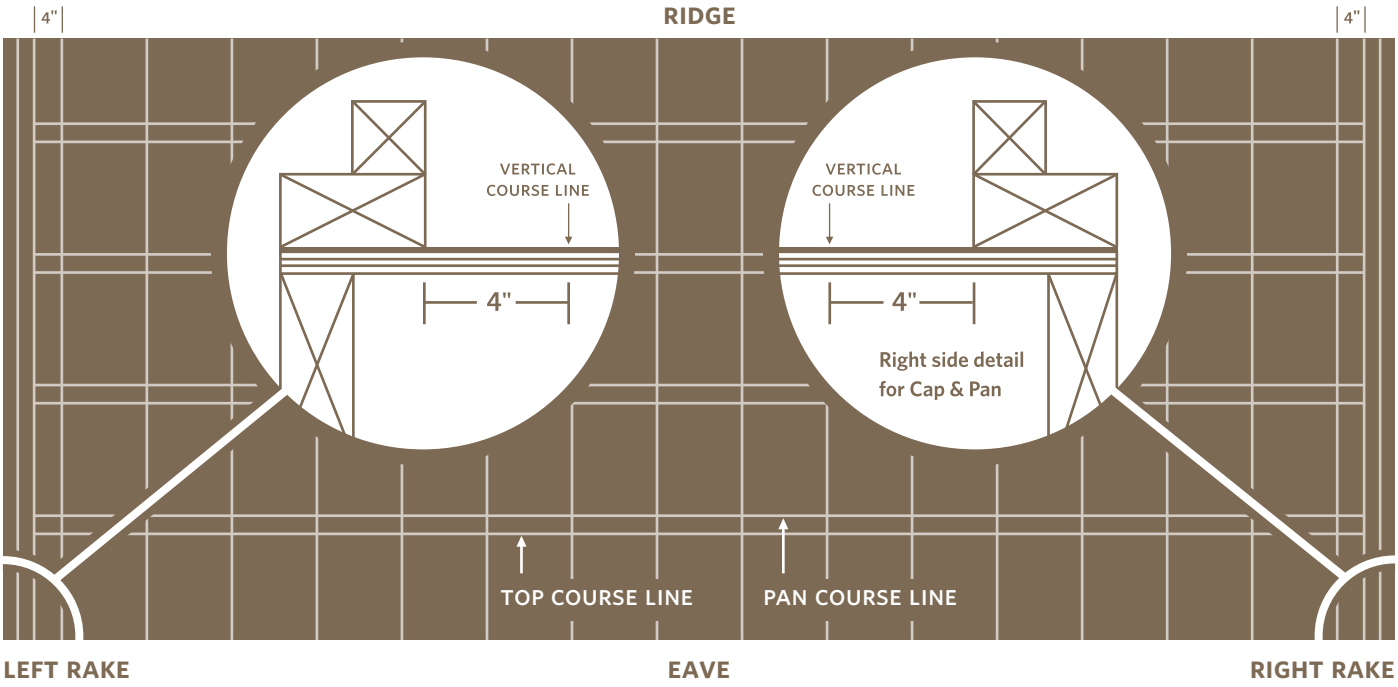


Cambridge Shingle

10000 Series



Layout, Coursing and Spacing



Horizontal or course lines for two-piece tile

Two-piece, or cap and pan tile require lines for both the tops and pans. The first course lines are determined by subtracting the overhang from the length of the tile. The pan lines will be marked first, then the cap line marked 3" lower. The rest of the courses will be marked by measuring from the cap lines to the ridge and dividing that distance by the exposure to get the number of courses. The pan tile will be cut at the ridge, so the final course of tops will end at the ridge nailer. Mark all lines starting at the eave course up to the ridge and snap with a chalk line.

	MAX. HORIZONTAL TOP COURSE LINE	MAX. VERTICAL RUN LINE
TWO-PIECE MISSION	17"	11"
TWO-PIECE MISSION SANDCAST	17"	11"
ALFARO	15"	8"
BAJA MISSION	14.5"	9"
BAJA MISSION SANDCAST	14.5"	9"
ROMAN PAN*	14.5"	13"
JUNIPERO	13.75"	9"
CAMBRIDGE SHINGLE	6.5"	†

** Dimensions shown are for use with Baja Mission tops. For Roman tops: Max. Horizontal = 14.75" and Max. Vertical is 18".*
† Placed with gaps in adjacent course staggered 1.5" minimum and spaced approximately .375" between tiles in each course.

Vertical or run lines

The first run lines in from the rake boards are at 4". The balance of the runs can be laid out with on-center distances being equal. The range in the on-center distances varies with profile.

To view complete instructions, refer to the Tile Roofing Institute manuals in the Redland binder, or visit www.redlandclaytile.com.

SECTION 07 55 51
ROOFING UNDERLAYMENT
(PARK SHELTER)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements, as well as all regulatory agency requirements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Roofing underlayment for park shelter.

C. Related Sections:
Section 07 61 13 – Standing Seam Metal Roof

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, install waterproofing membrane over wood decking.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a product brochure

C. Submit a 12" x 12" sample of material

1.5 QUALITY ASSURANCE

A. Comply with latest edition of the City of Azusa Building Code.

B. Material to meet ICBO Report No. 3997

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 ROOF UNDERLAYMENT

A. Grace Ultra - 30 mil. thick self-adhering roofing comprised of a butyl rubber based adhesive backed by a layer of high density cross laminated polyethylene as manufactured by Grace Construction, Cambridge, MA. www.graceconstruction.com. Phone: 866.333.3726.

PART 3 – EXECUTION

3.1 INSTALLATION OF ROOF UNDERLAYMENT

A. Roofing underlayment should be installed after metal flashing and trim.

B. Install product directly on a clean, dry, continuous structural deck. Remove dust, dirt, loose nails, and old roofing materials. Protrusions from deck area must be removed. Decks shall have no voids, damaged, or unsupported areas. Repair deck areas before installing membrane.

C. Prime wood with Perm-A-Barrier WB Primer if adhesion is found to be marginal. Apply at a rate of 250-350 sq. ft. per gallon. Priming not required if adhesion of underlayment to decking is sufficient.

D. Apply underlayment in fair weather when air, roof deck, and membrane are at temperatures of 40 degrees F or higher. Apply roof covering material at temperatures of 40 degrees F or higher.

E. Cut membrane into 10 - 15 foot lengths and reroll loosely. Tack/secure the end of the roll with a nail. Peel back 1 -2 feet of release liner, align the membrane, and continue to peel the release liner from membrane. Press membrane in place with heavy hand pressure. Side laps must be a minimum of 3.5 inches, and end laps a minimum of 6 inches. For valley and ridge application, peel release liner, center sheet over ridge or valley, drape, and press in place. Work from center of valley or ridge outward in each direction, and start at the low point of the roof and work up

F. Install membrane such that all laps shed water.

G. Do not leave permanently exposed to sunlight. Maximum recommended exposure is 60 days.

H. Check with manufacturer of metal roofing system for special requirements when used under metal roofs.

I. Repair holes, tears, and damage to membrane with a round patch of membrane extending past the damaged area 6 inches in all directions. If fasteners are removed leaving holes in the membrane, they must be patched.

J. Do not install fasteners through the membrane over unsupported areas of the structural deck, such as over the joints between adjacent structural panels.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 07 61 13
STANDING SEAM CORTEN STEEL ROOFING
(PARK SHELTER)

PART 1 – GENERAL

1. Furnish all labor, material, tools, equipment and services for all preformed roofing as indicated, in accord with the provisions of the Contract Documents. The Metal Roofing Manufacturer will provide all components required for a complete metal roofing system to include panels, panel clips, trim/flashing, fascias, ridge, closures, sealants, fillers and any other required items.
2. Completely coordinate with work of all other trades.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Standing Seam Metal Roofing

C. Related Sections:

Section 07 55 51 Roofing Underlayment (Park Shelter)

1.2 SYSTEM DESCRIPTION

A. Where indicated on drawings, install new standing seam metal roof panels, trim and flashing.

1.3 REGULATORY REQUIREMENTS

QUALITY ASSURANCE
Comply with latest edition of City of Azusa's building code.

A. Applicable standards include, but not limited to:
   2. ASTM E1514, *Standard Specification for Structural Standing Seam Steel Roof Panel Systems,* American Society for Testing and Materials, West Conshohocken, PA, 1998(2003).
   3. ASTM E1592, *Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference*, American Society for Testing and Materials, West Conshohocken, PA, 2001.
   4. ASTM E1646, *Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference*, American Society for Testing and Materials, West Conshohocken, PA, 1995(2003).
   5. MBMA, *Metal Building Systems Manual*, Metal Building Manufacturers Association, Inc., Cleveland, OH, 2006 with 2010 Supplement.
   6. MBMA, *Metal Roofing Systems Design Manual,* Metal Building Manufacturers Association, Inc., Cleveland, OH, 2000.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a minimum 12" long sample piece of metal panel to Landscape Architect for approval.

1.5 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 ROOFING PANELS

A. Panels shall be CorTen 22 gauge Standing Seam Panels SS675, A606 finish without battens and using concealed stainless steel fastener system. Metal roof system shall include all necessary 22 gauge A606 finish flashing.

B. Manufacturer: Western Metal Deck, Ontario, CA. Contact Paul Rubio: 949-929-1020

PART 3 – EXECUTION

3.1 INSTALLATION OF METAL ROOF PANELS

A. Metal roof panels to be attached to wood framing and sheathing per drawing details and manufacturer recommendations.

B. Provide flashing and trim at ridge, eave, and gable locations. Lap panels and secure per manufacturer's details. Use sealants recommended by manufacturer.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 09 24 33
STUCCO PARGING
(RESTROOM)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements, as well as any regulatory agency requirements.

1.1 SUMMARY

A. *Additional specifications to be provided by Romtec.*

B. Provisions of Division 01 apply to this section.

C. Section includes: Application of stucco parging on concrete masonry unit restroom.

D. Related Sections:

Romtec Pre-engineered Restroom: Section 01 35 00
Concrete Unit Masonry: Section 04 22 00

1.2 SYSTEM DESCRIPTION

A. Where indicated on Drawings, stucco parging is to be applied over concrete masonry units.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Construct a sample 4' section of wall for Landscape Architect approval before continuing.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein, as well as any regulatory agency requirements.

B. Comply with all applicable ASTM standards.

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 CEMENTITIOUS PARGING MIX

A. The CMU at the restroom building is to be finished with Water Resistant Parging Mix as manufactured by Target Corporation. (http://www.targetproducts.com/prod-detail.aspx?id=115525) phone: 888.484.1258 - or approved equal.

PART 3 – EXECUTION

3.1 APPLICATION OF PARGING MIX

A. Surface Preparation - Surfaces must be structurally sound. Remove all sand, dirt, dust, paint, etc. by brushing vigorously with a broom or stiff brush and water. If small amounts of oil or grease are present, scrub vigorously with a strong detergent solution and rinse thoroughly with water to remove all detergent residue. Use clean water to thoroughly saturate the area to be parged. Remove any free standing water. Very porous concrete may require several applications of water to ensure complete saturation.

B. Mixing - Empty contents of bag into a clean mixing container. Add 5 litres (1.3 US gallon) of clean water per 30 kg bag and mix thoroughly. Add up to ¼ litre (½ pint) of water if necessary to adjust the consistency of the mix. Avoid using too much water.

C. Application and finishing - Using a trowel, apply not more than ⅜ inch thick. Owner to select finish texture using normal concrete or plaster finishing procedures.

D. Curing - After final set, keep damp for 72 hours by misting occasionally with water. Protect from freezing for at least 72 hours.

E. Do not install Water Resistant Parging Mix when temperature is below 5°C (41°F) or above 30°C (86°F).

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

Exterior Stucco Aggregates

Coarse

Medium

Fine

WESTERN BLENDED PRODUCTS

Rio Grande Stucco Co.
9151 Roseway Drive, El Paso, Texas 79907
(915) 858-3494

Sacramento Stucco Co.
860 Riske Lane, West Sacramento, CA 95691
(916) 372-7442

Western Blended Products
3201 W. 67th Street, Los Angeles, CA 90043
(323) 759-3855

Western Stucco Products Co.
6101 N. 53rd Drive, Glendale, AZ 85311
(623) 939-9455

Ask us about these other quality systems and coatings . . .

WESTERN 1 KOTE

Fiber reinforced, modified portland cement plaster.

Rapid Coatings

pH resistant paint coatings for portland cement surfaces.

www.westernblended.com
mailbox@westernblended.com

Color will vary. Color chips are approximate and slight variation of shade is to be expected, depending upon porosity of the surface, environment, job condition and method of application. Color chips on chart will darken with age. For best color results do not use this chart after 12-31-05. Contact any of the manufacturers listed above for the most recent color chart.

Description:
Western 1-Kote Gray Concentrate is a fiber reinforced, modified portland cement exterior plaster. The product may be used in conjunction with various foam substrates to create wall assemblies with higher R-values and improved crack and water resistance. Western 1-Kote Gray Concentrate may also be used over wood or gypsum backing and may be utilized for a scratch and / or brown coat application for a conventional stucco system. It is available in a “regular” as well as a “premium” blend.

Packaging:
Western 1-Kote Gray Concentrate is packaged in 80 lb / 36.29 kg bags

Benefits:
The system may be utilized over a variety of substrates affording architects and builders design flexibility.
The system provides the architect and builder with a cost-effective means of providing a hard wall substrate plus higher insulation characteristics.

Coverage:
Approximately 72 square feet @ (3/8”) three-eighths inch
Approximately 54 square feet @ (½”) one-half inch

Mixing:
Western 1-Kote Gray Concentrate is mixed with two hundred pounds (200#), approximately 16 #2 shovels, of ASTM rated plaster sand and approximately 4 gallons of water. Each sack shall mix for a minimum of five (5) minutes. Continuous batching is an acceptable practice. Care shall be taken to provide enough time for additional sacks added to the batch, to thoroughly mix.

Application:
Western 1-Kote Gray Concentrate is applied by approved applicators. The material may be applied by hand or plaster pump. Specific minimum thickness is required for application over various substrates. Consult product specifications and the ICC report for specific details. The minimum thickness over any substrate, when used in conjunction with the Western 1-Kote Gray Concentrate System, is three-eighths (3/8”) of an inch.

Curing:
The product requires a minimum of forty-eight (48) hours moist curing. Environmental conditions such a heat, wind and low humidity will require additional curing.

Finishing:
A variety of finishes such as Western Exterior Stucco, standard acrylic paint and Premium Acrylic Finish 'Elastomeric formula' may be applied over Western 1-Kote Gray Concentrate. The recommendations of the finish coat manufacturer shall be followed regarding base coat preparation, bonding, application and curing of their product.

Limitations:
Do not apply when surface or ambient temperatures are at or below 40°F / 4.4°C or above 100°F / 34°C. Do not apply to surfaces that are contaminated with bond breakers, oils or other matter that may affect the performance of the product. Do not apply Western 1-Kote Gray Concentrate if conditions are expected to be above or below the specified temperature range within 24 hours of application. Do not add additional ingredients to Western 1-Kote Gray Concentrate without specific written approval from an authorized manufacturer of Western Blended Products.

Storage:
Western 1-Kote Gray Concentrate shall be kept indoors or if stored outdoors, shall be adequately covered to keep dry and be stored off the ground.

CONTINUE ON BACK

Applicable Standards, Specifications and Codes: ICC-ESR 1607

Exhibit H - Plan Specifications for the Special Use Area

2003 IBC
2003 IRC
1997 UBC

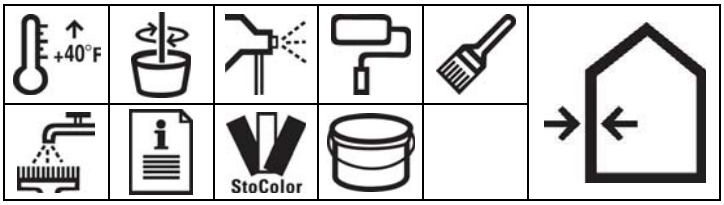
Warranty:

Manufacturers of Western Blended Products (WBP) warrant its products to be of merchantable quality and suitable for the general purpose for which they were intended, when applied in accordance with WBP instructions. Manufacturers of WBP do not warrant its products to be suitable for any purpose or use other than for which they were intended. Liability under this warranty is limited to supplying new material without charge, or at manufacturers of WBP option, to a refund of the purchase price. In the event of a claim under this warranty, written notice must be given to the originating plant of the WBP goods at the address shown hereon. This limited warranty is issued and accepted in lieu of all other expressed warranties, and expressly excludes liability for consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Product Bulletin

Sto Primer Sand

80801 Sto Primer Sand



Technical Data

REPORT	TEST METHOD	TEST CRITERIA	TEST RESULTS
Surface Burning	ASTM E-84	< 25 Flame Spread < 450 Smoke Developed	Pass Pass
VOC (g/L)	This product complies with US EPA (40 CFR 59) and South Coast AQMD (Rule 1113) VOC emission standards for architectural coatings. VOC less than 100 g/L.		

Features		Benefits
1	**Acrylic-based**	Excellent adhesion; improves finish coat adhesion
2	**Vapor permeable**	Allows substrate to breathe naturally
3	**Water-based**	Safe, non-toxic; cleans up with water
4	**Promotes uniform substrate absorption**	Improves water resistance, improves finish coat coverage, reduces the chance of efflorescence
5	**Tinted to same color as finish**	Improves finish color uniformity
6	**Low VOC**	Safe for workers and the environment

Sto Primer Sand is used for priming prepared concrete, masonry, plaster, StoTherm® and StoQuik® base coat or drywall surfaces prior to application of Sto Finishes and Coatings.

Coverage

Sto Primer: 750-1100 ft² (70-102 m²) per pail.

Coverage may vary depending on application technique and surface conditions.

Packaging

5 gallon (19 L) pail.

Shelf Life

12 months, if properly stored and sealed.

Storage

Protect from extreme heat [90ºF (32ºC)], freezing, and direct sunlight.

Product Bulletin

Sto Primer Sand

Surface Preparation

Concrete and masonry surfaces: Surfaces must be free of frost, damage, and all bond-inhibiting materials, including dirt, efflorescence, form oil and other foreign matter. Loose or damaged material must be removed by water blasting, sandblasting or mechanical wire brushing and repaired. Avoid application over irregular surfaces. Resurface, patch or level surfaces to required tolerance and smoothness with appropriate Sto leveling materials. Fill surface voids. Refer to ASTM D-4258 and ASTM D-4261 for complete details on methods of preparing cementitious substrates for coatings.

StoTherm® Exterior Insulation Finish Systems (EIFS): Surface must be free of all bond-inhibiting materials, including dirt and efflorescence.

Gypsum wallboard surfaces: Wallboard must be taped and fasteners spotted with joint compound. Refer to ASTM C-840 and gypsum wallboard manufacturer's literature. Surface must be free of dust, dirt and other bond-inhibiting materials.

Mixing

Mix with a clean, rust-free electric drill and paddle.

Sto Primer Sand is applied full strength (no dilution).

Application

Apply only to sound and clean, dry, properly prepared, frost-free surfaces. Apply Sto Primer Sand with brush, roller, or proper spray equipment in a continuous coat. Allow to dry before applying Sto finishes.

Curing/Drying

Sto Primer Sand will dry within 4 hours under normal conditions [70ºF (21ºC), 50% RH].

Drying time varies with temperature/humidity and surface conditions. Protect from rain, freezing, and continuous high humidity until completely dry.

Clean Up

Clean tools and equipment with water immediately after use. Dried material can only be removed mechanically.

Limitations

- Use Sto Primer Sand only when surface and ambient temperatures are above 40°F (4°C) during application and drying period.
- Not recommended as a finish coat.
- Sto Primer Sand should not be used on horizontal surfaces unless protected with appropriate Sto decorative floor coating or finish.
- Sloped surfaces: Refer to Sto details.

Health And Safety

Health Precautions

Product is water-based. As with any chemical construction product, exercise care when handling.

Safety Precautions

Use adequate ventilation. Safety goggles and protective gloves are recommended. Remove contaminated clothing immediately.

First Aid

SKIN CONTACT: Wash thoroughly with soap and water.

EYE CONTACT: Flush immediately with water for 10-15 minutes and contact a physician.

RESPIRATORY PROBLEMS: Remove affected person to fresh air immediately and contact a physician.

HYGIENE: Wash hands immediately after use. Wash clothing before re-use.

Spills

Collect with suitable absorbent material such as cotton rags.

Disposal

Dispose of in accordance with local, state or federal regulations.

Warning

KEEP CONTAINER CLOSED WHEN NOT IN USE. KEEP OUT OF THE REACH OF CHILDREN. NOT FOR INTERNAL CONSUMPTION. FOR INDUSTRIAL USE ONLY. Consult the Material Safety Data Sheet for further health and safety information.

Material Safety Data Sheet (MSDS) is available at www.stocorp.com

LIMITED WARRANTY

This product is subject to a written limited warranty which can be obtained free of charge from Sto Corp.

Refer to Sto Specifications for more complete information on proper use and handling of this product.

Sto Corp.
3800 Camp Creek Parkway
Building 1400, Suite 120
Atlanta, GA 30331

Tel: 404-346-3666
Toll Free: 1-800-221-2397
Fax: 404 346-3119

www.stocorp.com

S155-80801
Revision: 001
Date: 06/2009

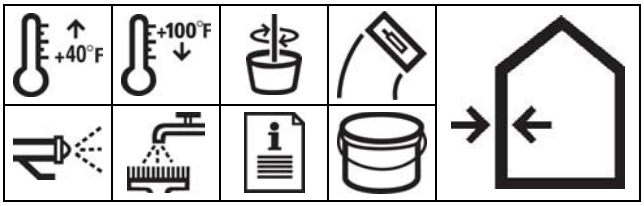
Attention

This product is intended for use by qualified professional contractors, not consumers, as a component of a larger construction assembly as specified by a qualified design professional, general contractor or builder. It should be installed in accordance with those specifications and Sto's instructions. Sto Corp. disclaims all, and assumes no, liability for on-site inspections, for its products applied improperly, or by unqualified persons or entities, or as part of an improperly designed or constructed building, for the nonperformance of adjacent building components or assemblies, or for other construction activities beyond Sto's control. Improper use of this product or use as part of an improperly designed or constructed larger assembly or building may result in serious damage to this product, and to the structure of the building or its components. **STO CORP. DISCLAIMS ALL WARRANTIES EXPRESS OR IMPLIED EXCEPT FOR EXPLICIT LIMITED WRITTEN WARRANTIES ISSUED TO AND ACCEPTED BY BUILDING OWNERS IN ACCORDANCE WITH STO'S WARRANTY PROGRAMS WHICH ARE SUBJECT TO CHANGE FROM TIME TO TIME.** For the fullest, most current information on proper application, clean-up, mixing and other specifications and warranties, cautions and disclaimers, please refer to the Sto Corp. website, www.stocorp.com.

Product Bulletin

Stolit® Acrylic Textured Finish

80130 Stolit 1.0
80131 Stolit 1.5
80132 Stolit 2.0
80135 Stolit 3.0
80141 Stolit R1.5
80142 Stolit R2.0
80143 Stolit R3.0
80156 Stolit Freeform
80175 Stolit .75
81130 Stolit 1.0 D



Technical Data

REPORT	TEST METHOD	TEST CRITERIA	TEST RESULTS
Surface Burning	ASTM E-84	< 25 Flame Spread < 450 Smoke Developed	0 5
Flexibility	ASTM D-522	4" mandrel bend	Pass
Water Vapor Transmission (U.S. perms)	ASTM E-96 Modified	28 days	37
Accelerated Weathering	ASTM G-53	2000 hours	No deleterious effects @ 4000 hrs
Chalk Rating	ASTM D-4214	2000 hours 5000 hours	9 (10 = best on scale 1-10) 8
Yellowness Index	ASTM E-313	5000 hours	1.50 (0 = no change; 2 = barely discernable change
Freeze-thaw Resistance	EIMA 101.01	60 cycles	No deleterious effects @ 90 cycles
Mildew Resistance	ASTM D-3273	No growth @ 28 days	No growth @ 42 days
Salt Spray Resistance	ASTM B-117	300 hours	No deleterious effects @ 500 hrs
Wind Driven Rain	Fed TT-C 555B	24 hour driving rain	No water penetration
Water resistance	ASTM D-2247	14 days	No deleterious effects @ 28 days
Abrasion resistance	ASTM D-968	528 qts. sand	No cracking, checking or loss of film integrity @ 1057 qts.
Tensile Adhesion (psi)	EIMA 101.03	No failure in the EIFS adhesive, basecoat or finish; minimum 5 psi	Pass
Adhesion (psi)	ASTM D-4541	28 days	> 90 to concrete
Fire Resistance	ASTM E-119	No effect on fire resistance rating of existing rated wall assembly	Pass
VOC (g/L)	This product complies with US EPA (40 CFR 59) and South Coast AQMD (Rule 1113) VOC emission standards for architectural coatings. VOC less than 50 g/L.		

Features / Benefits

	Features	Benefits
1	**Sto Optilink® Enhanced Polymer Technology**	Higher resistance to dirt pick-up, mildew and algae growth; Easier to apply and texture
2	**Vapor Permeable**	Allows substrate to breathe naturally; resists blisters caused by trapped vapor
3	**Ready Mixed**	Ready to use; no additive needed
4	**Integral Color**	Lasting uniform color
5	**Moisture Resistant**	Repels water; resists wind driven rain
6	**Water-based**	Safe, non-toxic; cleans up with water
7	**Low VOC**	Meets South Coast Air Quality Management District Requirements

Surface Preparation

Concrete and masonry surfaces: Surfaces must be clean, dry, and free of frost, damage, and all bond-inhibiting materials, including dirt, efflorescence, form oil and other foreign

Stolit® is a ready-mixed, acrylic-based exterior or interior textured wall finish. Stolit is used as a decorative and protective wall coating over prepared vertical concrete, masonry and plaster substrates and in Sto Wall Claddings, including StoTherm® Classic and StoTherm Classic Next®. Stolit is available in a variety of textures and aggregate sizes. Stolit is enhanced by the addition of Optilink®, a remarkable polymer technology development by Sto that improves the curing and film formation process.

Coverage

Stolit 1.0: 140-165 ft² per pail (13-15.3 m²).
Stolit 1.5: 120-145 ft² per pail (11.1-13.5 m²).
Stolit 2.0: 75-100 ft² per pail (7-9.3 m²).
Stolit 3.0: 55-70 ft² per pail (5.1-6.5 m²).
Stolit R1.5: 135-160 ft² per pail (12.5-14.9 m²).
Stolit R2.0: 75-100 ft² per pail (7-9.3 m)
Stolit R3.0: 55-75 ft² per pail (5.1-7 m²).
Stolit Freeform 40-130 ft² per pail (3.7-12.1 m²).
Stolit .75: 160-190 ft² per pail (14.9-17.7 m²).
Stolit 1.0 Dark: 140-165 ft² per pail (13-15.3 m²).

Coverages may vary depending on application technique and surface conditions.

Packaging

5 gal pail (19L).

Shelf Life

12 months, if properly sealed and stored.

Storage

Protect from extreme heat [90ºF (32ºC)], freezing, and direct sunlight.

Product Bulletin

Stolit® Textured Finishes

Surface Preparation cont.

matter. Loose or damaged material must be removed by water-blasting, sandblasting or mechanical wire brushing and repaired. Avoid application over irregular surfaces. Resurface, patch or level surfaces to required tolerance and smoothness with appropriate Sto leveling materials. Refer to ASTM D-4258 and ASTM D-4261 for complete details on methods of preparing cementitious substrates for coatings.

StoTherm® Exterior Insulation and Finish Systems (EIFS): Surface must be free of all bond-inhibiting ma terials. Sto recommends priming cementitious substrates using the appropriate Sto primer prior to application of finish. For Stolit .75 and Stolit 1.0 Dark finishes, the surface must be primed with the appropriate Sto primer, tinted to the same color as the finish coating.

Gypsum wallboard surfaces: Wallboard must be taped and fasteners spotted with joint compound. Refer to ASTM C-840 and gypsum wallboard manufacturer's literature. Surface must be free of dust, dirt and other bond inhibiting materials. Surface must be primed with appropriate Sto Primer.

Mixing

Mix with a clean, rust-free electric drill and paddle. A small amount of clean water may be added to aid workability. Limit addition of water to amount needed to achieve the finish texture.

Application

Apply only to sound and clean, dry, properly prepared, frost-free surfaces.

Stolit Freeform: Apply with a clean, stainless steel trowel. Application thickness varies depending on the pattern or texture desired, (maximum thickness not more than 3⁄16" [4.8 mm]). Texturing may be achieved by trowel, special roller or putty knife. Maintain uniform texture and minimum 1⁄16" (1.6 mm) thickness to help promote consistent color.

All Other Stolits: Apply with a clean stainless steel trowel to a rough thickness slightly more than the largest aggregate size. Use the trowel to scrape the material down to a uniform thickness no greater than the largest aggregate size. Achieve final texture by floating with trowel in a figure eight motion; stainless steel trowel for Stolit (pebbled texture finishes) and plastic float for Stolit R (rilled texture finishes). Once applied, the working time is up to 20 minutes depending upon material, ambient temperatures and surface conditions.

Spray: Apply Stolit with a hand-held gravity feed hopper-type sprayer, texture spray pump machine, or other appropriate equipment such as the StoSilo System or Sto's M-8 Spray Pump. Apply an even coat to ensure full coverage of the surface. Spray application is not recommended for Stolit R (rilled texture finishes). IMPORTANT: ALWAYS check color for proper match. If color does not match, STOP-call your Sto representative. For best results always prime cementitious substrates. Apply coating in a continuous application, always working from a wet edge or architectural break to eliminate cold joints. Minor shade variations may occur from batch to batch (refer to batch no. on pail). Avoid installing separate batches side-by-side and avoid application in direct sunlight. Avoid installing new finish adjacent to weathered or aged finish. Sto Corp. will not be responsible for shade or color variation from batch to batch, variation caused by application or substrate deficiencies, or fading resulting from natural causes such as weather. See Tech Hotline Nos. 0694-C, 0893-EC and 1202-CF for helpful tips on prevention of color problems. Protect installed product from rain, freezing, and continuous high humidity until completely dry.

Curing/Drying

Stolit dries within 24 hours under normal drying conditions [70ºF (21ºC), 50% RH]. Drying time varies with temperature/humidity and surface conditions. Thicker textures require extended drying time and protection.

Clean Up

Clean tools and equipment with water immediately after use. Dried material can only be removed mechanically.

Limitations

- Use Stolit only when surface and ambient temperatures are above 40°F (4°C) and below 100ºF (38ºC) during application and drying period.
- Use Stolit D only when surface and ambient temperatures are above 50°F (10°C) and below 100ºF (38ºC) during application and drying period. For Exterior Insulation and Finish Systems (EIFS), select colors with a lightness value of 20 or greater. Please consult Sto Tech Hotline No. 0893- EC (featuring in EIFS and Architectural Coatings) when considering dark, intense colors and colors requiring organic pigments.
- Stolit should not be used on weather-exposed horizontal, below grade or water immersed surfaces.
- For Exterior Insulation and Finish Systems (EIFS), select colors with a lightness value of 20 or greater.
- Sloped surfaces: Refer to Sto details.

Health And Safety

Health Precautions

Product is water-based. As with any chemical construction product, exercise care when handling

Safety Precautions

Use adequate ventilation. Safety goggles and protective gloves are recommended. Remove contaminated clothing immediately.

First Aid

SKIN CONTACT: Wash thoroughly with soap and water.

EYE CONTACT: Flush immediately with water for 10-15 minutes and contact a physician.

RESPIRATORY PROBLEMS: Remove affected person to fresh air immediately and contact a physician.

HYGIENE: Wash hands immediately after use. Wash clothing before re-use.

Spills

Collect with suitable absorbent material such as cotton rags.

Disposal

Dispose of in accordance with local, state or federal regulations.

Warning

KEEP CONTAINER CLOSED WHEN NOT IN USE. KEEP OUT OF THE REACH OF CHILDREN. NOT FOR INTERNAL CONSUMPTION. FOR INDUSTRIAL USE ONLY. Consult the Material Safety Data Sheet for further health and safety information. Material Safety Data Sheet (MSDS) is available at www.stocorp.com

LIMITED WARRANTY

This product is subject to a written limited warranty which can be obtained free of charge from Sto Corp.

Refer to Sto Specifications for more complete information on proper use and handling of this product.

Sto Corp.
3800 Camp Creek Parkway
Building 1400, Suite 120
Atlanta, GA 30331

Tel: 404-346-3666
Toll Free: 1-800-221-2397
Fax: 404 346-3119

www.stocorp.com

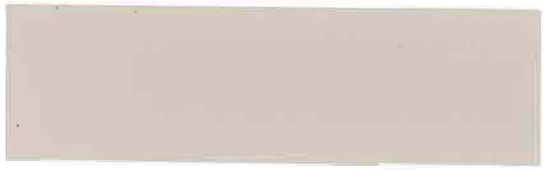
S155-80130 - 81130
Revision Number: 02
Date: 12/2009

Attention

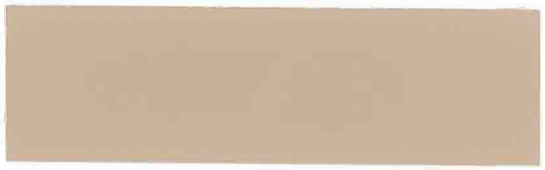
This product is intended for use by qualified professional contractors, not consumers, as a component of a larger construction assembly as specified by a qualified design professional, general contractor or builder. It should be installed in accordance with those specifications and Sto's instructions. Sto Corp. disclaims all, and assumes no, liability for on-site inspections, for its products applied improperly, or by unqualified persons or entities, or as part of an improperly designed or constructed building, for the nonperformance of adjacent building components or assemblies, or for other construction activities beyond Sto's control. Improper use of this product or use as part of an improperly designed or constructed larger assembly or building may result in serious damage to this product, and to the structure of the building or its components. **STO CORP. DISCLAIMS ALL WARRANTIES EXPRESS OR IMPLIED EXCEPT FOR EXPLICIT LIMITED WRITTEN WARRANTIES ISSUED TO AND ACCEPTED BY BUILDING OWNERS IN ACCORDANCE WITH STO'S WARRANTY PROGRAMS WHICH ARE SUBJECT TO CHANGE FROM TIME TO TIME.** For the fullest, most current information on proper application, clean-up, mixing and other specifications and warranties, cautions and disclaimers, please refer to the Sto Corp. website, www.stocorp.com.

Exhibit H - Plan Specifications for the Special Use Area

STUCCO COLOR CHART



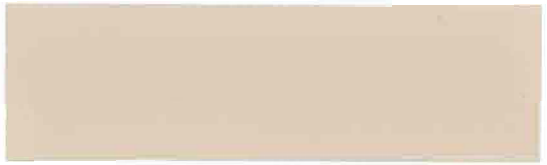
32234 45 Natural



1015 35 Mocha Cream

32132 23 Spectral

20822 56 Diamond Dust



10612 55 Autumn Wheat

20905 55 Oatmeal

10611 64 Moonlit Sand

10622 60 Indiana Limestone

10522 61 Ivory Key

93330 69 Champagne

10511 66 Pacific Sand

20506 70 Desert Sun

10308 86 Pearl

10609 79 French Vanilla

10606 71 Plateau

Whites; Blancos

9433 80 Sto White

6050 73 White Linen

20001 82 ITS White

21614 79 Silver Lining

32138 78 Cotton

20824 73 Winter White

SECTION 09 93 13.13
EXTERIOR STAINING
(PARK SHELTER)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Stain for exterior wood members

C. Related Sections: Wood Framing

1.2 SYSTEM DESCRIPTION

A. Stain for park shelter wood members.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a 12" x 12" sample piece of stained wood to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 EXTERIOR WOOD STAIN

A. Stain to be Benjamin Moore Premium Exterior Stain or Landscape Architect approved equal

PART 3 – EXECUTION

3.1 SURFACE PREPARATION

A. Surfaces to be stained must be clean, dry, and free of dirt, mildew, oil, or grease.

3.2 APPLICATION

A. Product should be self-priming on most wood substrates.

B. Apply two coats stain on exposed wood surfaces. Stir thoroughly before using and often during application. Apply using a synthetic bristle brush. To help eliminate lap marks, keep leading edge “wet”. Do not stain when temperature of air and surface is below 50 degrees F.

3.3 CLEAN-UP

A. Clean up with warm, soapy water. Use complete cans or dispose of properly. Dry empty containers may be recycled in a can recycling program.

END OF SECTION

SECTION 10 14 26
POST AND PANEL SIGNAGE

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Frames and posts for interpretive signage

C. Related Sections:

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new frame and post units are to be installed.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a color chip.

C. Verify location of fixtures in field with Landscape Architect before proceeding with installation.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

B. Comply with the latest edition of City of Azusa's building codes.

PART 2 – PRODUCTS

2.1 SIGNAGE DISPLAY CASES

A. Display cases to be KVO Industries "Outline" Low Profile – Double Leg Pedestal bases, Model # 3826 OL DLP in Corten Weathering Steel, finish to be rusted and waxed. Manufactured by KVO Industries. info@kvoindustries.com phone: 800.657.6412.

B. Two signage display cases are needed. See Landscape Construction Plan – sheet L-1.00 for locations on site.

1. One display case is to be free-standing, with posts in the ground.

2. One display case is to be installed into the top of a cobble seat wall, requiring manufacturer's recommendation on installation and post height. Contact manufacturer before placing order for recommendation on specific model required for this purpose.

PART 3 – EXECUTION

3.1 INSTALLATION OF FIXTURES

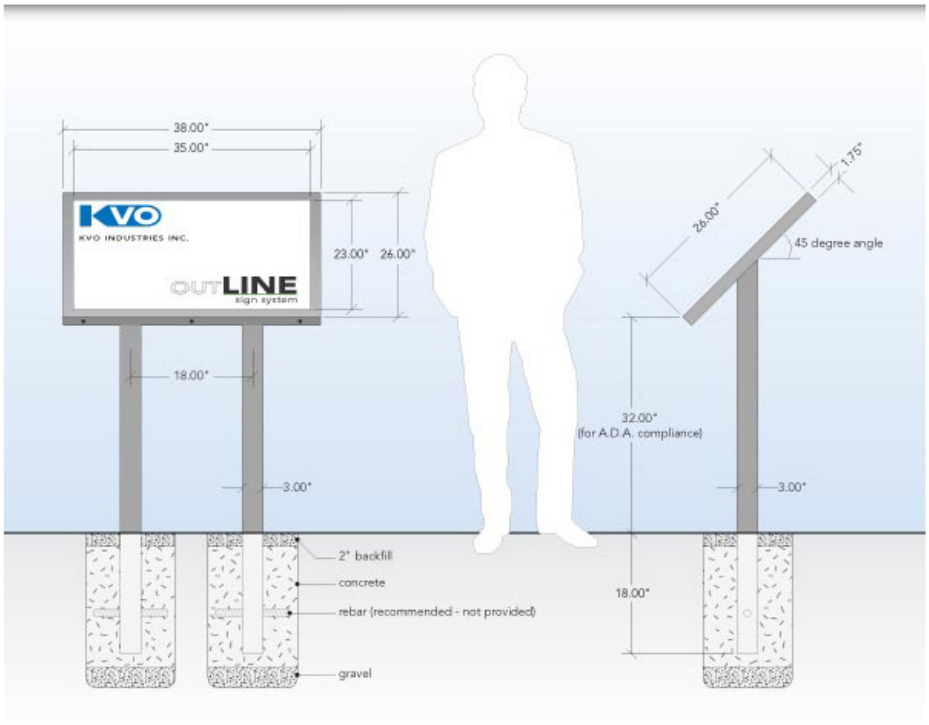
A. Install per manufacturer's recommendation.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

Exhibit H - Plan Specifications for the Special Use Area



SECTION 10 28 13.13
COMMERCIAL TOILET ACCESSORIES
(RESTROOM)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements, and with the latest edition of the City of Azusa building code.

1.1 SUMMARY

A. *Additional specifications to be provided by Romtec.*

B. Provisions of Division 01 apply to this section.

C. Section includes: Accessories for restrooms and outdoor lavatory.

D. Related Sections:

Section 01 35 00	Special Procedures – Romtec pre-engineered restroom
Section 04 22 00	Concrete Masonry Units

1.2 SYSTEM DESCRIPTION

A. Where indicated on Drawings, install new toilet accessories.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a sample of material to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition and the latest editions of the City of Azusa building codes, except as modified herein.

PART 2 – PRODUCTS

2.1 ACCESSORIES

A. Grab bars at toilets

B. Mirror

C. Toilet paper dispenser

D. Restroom Entry signs

E. Soap Dispenser

F. Hand Dryer

G. Napkin/Tampon Disposal

H. Seat cover Dispenser

I. Waste Receptacle

J. Diaper Deck

PART 3 – EXECUTION

3.1 INSTALLATION OF TOILET ACCESSORIES

A. Securely attach accessories to wall at mounting heights in accordance with ADA guidelines and standards.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

Guide specifications

Section 10 28 13.14
Electric Hand Dryers

Part 1 – General

1.1 Conditions And Requirements

A. The General Conditions, Supplementary Conditions, and Division 01 – General Requirements apply.

1.2 Section Includes

A. Electric hand dryers.

1.3 Related Sections

Specifier Note: In this article, specify work specified in other sections that is related to work of this section.

A. Division 26-Electrical: Electrical systems and components.

Specifier Note: The following paragraph is a sample that may be used in this article. Add to or delete from the following as appropriate for the specific project.

B. Section [xxxxx] – [Section Title]: [Include brief description of work specified in another section that is related to the work of this section.]

1.4 Submittals

Specifier Note: In this article, specify various types of data to be furnished by the contractor before, during, or after construction. Topics included in this article are: product data, shop drawings, samples, design data, test reports, certificates, manufacturers' instructions, manufacturers' field reports, qualification statements, and closeout submittals.

A. Submit under provisions of Section [01 33 00] [_____].

B. Product Data: Provide construction details, dimensions, anchoring and mounting requirements, material and finish descriptions, electrical requirements, and manufacturer's warranty.

C. Operation and Maintenance Data: Provide for electric hand dryers to include in maintenance manuals.

D. Warranty: Provide sample of manufacturer's standard warranty for parts and labor.

1.5 Quality Assurance

Specifier Note: In this article, describe qualifications, regulatory requirements, certifications, field samples, mock-ups, and pre-installation meetings.

A. Product Certification: ETL listed in accordance with UL 507. National Sanitation Foundation (NSF) Protocol P335 "Hygienic Commercial Hand Dryers" compliant.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by a qualified testing agency, and marked for intended location and application.

Guide specifications

1.6 Delivery, Storage And Handling

A. Deliver, store, and handle electric hand dryers in manufacturer's protective packaging.

B. Store electric hand dryers off of ground, under cover, and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration, or soiling.

1.7 Coordination

A. Coordinate locations of electric hand dryers with other work to prevent interference with clearances required for access, and for proper installation, adjustment, operation, cleaning, and servicing of electric hand dryers.

1.8 Warranty

A. Manufacturer's Standard Warranty: Manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective electric hand dryer components and labor within specified warranty period.

1. Warranty Period: First (1) year limited for labor and five (5) years for parts.

Part 2 – Products

2.1 Manufacturers

A. Basis-of-Design Product: Subject to compliance with requirements, provide Dyson Airblade ™ Electric Hand Dryers manufactured by Dyson B2B, Inc., 600 W. Chicago, Suite 275, Chicago, IL 60610; 888-397-6622, www.dysonairblade.com or comparable product by one of the following:

1. Mitsubishi Electric; Jet Towel.

2. Saniflow Corporation; Dualflow Hand Dryers.

B. Substitutions will be considered under provisions of Section 01 60 00.

2.2 Electric Hand Dryers

Specifier Note: In this article, select either the first or second paragraph and delete the other one. The first paragraph includes a hand dryer with an aluminum casing while the second paragraph includes a hand dryer with a polycarbonate-ABS casing.

Specifier Note: Retain one of the two options in the first paragraph below depending on the voltage of the hand dryer required for a specific project. If both voltages are required on the same project retain both options below and indicate locations for each type on the Drawings.

A. Electric Hand Dryers: Dyson Airblade ™ Electric Hand Dryer Model AB02; [Item No. 13043-01, 120V silver].

1. Mounting: Surface mounted on pressed anti-rust steel backplate.

2. Construction: Die-cast aluminum casing with anti-microbial scuff resistant lacquer coating on exterior surfaces. Anti-microbially integrated external plastics and seals. Tamper-proof T30 type exterior screws. Water ingress protection to IPX5.

Guide specifications

3. Color Finish: Metallic silver, gloss lacquer.
4. Filtration: 99.9 percent particulate efficiency HEPA filter with anti-microbial coating.
5. Operation: Touch-free infra-red activation.
   a. Hand dry time: 12 seconds
   b. Airspeed at nozzle: 400 mph
   c. Operating airflow: 66 cfm
   d. Rated Operating Noise Power: 85 db(A)
6. Motor: Dyson Digital Motor (DDM), switched reluctance brushless type; 81,000 rpm motor speed; one (1) watt standby power consumption.
7. Electrical Requirements: 110-120V AC, 12 A, 1400 W.

Specifier Note: Retain one of the two options in the first paragraph below depending on the color of the hand dryer casing required for a specific project. If both colors are required on the same project retain both options below and indicate locations for each type on the Drawings.

B. Electric Hand Dryers: Dyson Airblade ™ Electric Hand Dryer Model AB04; [Item No. 14225-01, 120V gray] [Item No. 19808-01, 120V white].
   1. Mounting: Surface mounted on galvanized steel backplate.
   2. Construction: Polycarbonate-ABS casing with homogenous anti-microbial additive. Anti-microbially integrated external plastics, seals, and air ducts. Tamper-proof T30 type exterior screws. Water ingress protection to IPX5.
   3. Color Finish: Metallic steel finish PC-ABS; color [grey] [white].
   4. Filtration: 99.9 percent particulate efficiency HEPA filter with anti-microbial coating.
   5. Operation: Touch-free infra-red activation.
      a. Hand dry time: 12 seconds
      b. Airspeed at nozzle: 400 mph
      c. Operating airflow: 66 cfm
      d. Rated Operating Noise Power: 85 db(A)
   6. Motor: Dyson Digital Motor (DDM), switched reluctance brushless type; 81,000 rpm motor speed; one (1) watt standby power consumption.
   7. Electrical Requirements: 110-120V AC, 12 A, 1400 W.

Guide specifications

Part 3 – Execution

3.1 Examination

A. Verify availability and characteristics of electrical power. Drill minimum two (2) inch diameter holes for electrical service entrance through backplate.

B. Do not begin installation until substrates are complete and ready for installation of electric hand dryers.

3.2 INSTALLATION

A. Locate and install mounting bracket in accordance with manufacturer's written instructions. Use minimum 0.25-inch anchors to mount bracket. Mount electric hand dryer at height above finished floor recommended by manufacturer.

B. Install electric hand dryer in accordance with manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer. Install electric hand dryers level, plumb, and firmly anchored in locations and at heights indicated.

3.3 CLEANING AND PROTECTION

A. Adjust electric hand dryers for smooth operation. Replace damaged or defective components.

B. Remove protective coverings from finished surfaces.

C. Clean exposed surfaces using materials and methods recommended by manufacturer.

End of section

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dyson airblade

SECTION 22 47 00
DRINKING FOUNTAINS
(RESTROOM)

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. *Additional specifications to be provided by Romtec*.

B. Provisions of Division 01 apply to this section.

C. Related Sections:

Section 01 35 00	Romtec Pre-Engineered Restroom
Section 04 22 00	Concrete Unit Masonry

1.2 SYSTEM DESCRIPTION

A. Wall mounted barrier free drinking fountain as indicated on Drawings. Provide plumbing as necessary to provide water supply and connect to existing septic system.

1.3 REGULATORY REQUIREMENT

A. Meet all current Federal Regulations for the disabled including those in the Americans with Disabilities Act. Drinking fountain to be lead-free by all known definitions including NSF/ANSI Standard 61, Section 9, California Proposition 65, and the Federal Safe Drinking Water Act. Product must be in compliance with California Health and Safety Code 116875 (AB 1953-2006).

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and all applicable building and plumbing codes, except as modified herein.

PART 2 – PRODUCTS

2.1 DRINKING FOUNTAIN AND PLUMBING

A. As indicated on Sheets A-2.00 and A-2.01, install HAWS Model 1025 drinking fountain. Wall mounted, barrier free, single bubbler 11 gauge fabricated steel drinking fountain with brown powder-coated finish over a galvanized substrate.

B. Piping to conform to latest plumbing code edition.

PART 3 – EXECUTION

3.1 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

Haws®

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

1455 Kleppe Lane ◆Sparks, NV 89431-6467 ◆(775) 359-4712 ◆Fax (775) 359-7424
E-mail: haws@hawsco.com ◆ website: www.hawsco.com

No. 2076415 (13)

Model 1025/1025G Drinking Fountain

NOTE TO INSTALLER: Please leave this information with the Maintenance Department.

LIMITED WARRANTY

HAWS warrants that all of its products are guaranteed against defective material or poor workmanship for a period of **one year from date of shipment.** HAWS liability under this warranty shall be discharged by furnishing without charge F.O.B. HAWS Factory any goods, or part thereof, which shall appear to the Company upon inspection to be of defective material or not of first class workmanship, provided that claim is made in writing to company within a reasonable period after receipt of the product. Where claims for defects are made, the defective part or parts shall be delivered to the Company, prepaid, for inspection. HAWS will not be liable for the cost of repairs, alterations or replacements, or for any expense connected therewith made by the owner or his agents, except upon written authority from HAWS, Sparks, Nevada. HAWS will not be liable for any damages caused by defective materials or poor workmanship, except for replacements, as provided above. Buyer agrees that Haws has made no other warranties either expressed or implied in addition to those above stated, except that of title with respect to any of the products or equipment sold hereunder and that HAWS shall not be liable for general, special, or consequential damages claimed to arise under the contract of sale. The drinking fountain manufactured by HAWS is warranted to function if installation and maintenance instructions provided are adhered to. The units also must be used for the purpose for which they were intended.

NO OTHER WARRANTIES EXPRESSED OR IMPLIED ARE AUTHORIZED, PROVIDED OR GIVEN BY HAWS.

SHOULD YOU EXPERIENCE DIFFICULTY WITH THE INSTALLATION OF THIS MODEL PLEASE CALL:

TECHNICAL SUPPORT: 1-800-766-5612

FOR CUSTOMER SERVICE: 1-888-640-4297

RECOMMENDED TOOLS: Hack saw, pipe joint sealant, screwdriver, level, 12" adjustable wrench, 10" pipe wrench, 5/64" hex key wrench, 9/16", 1/2", 7/16" socket wrench or open end wrench.

LOCATION OF UNIT: The Model 1025/1025G Drinking Fountain is a wheelchair accessible drinking water facility. The height dimensions shown meet current ADA requirements. When installing this unit, local, state or federal codes should be adhered to. If height other than shown is required, then dimensions must be adjusted accordingly.

SUPPLY LINE: The minimum recommended line size is 1/2"IPS with 30-90 psi (2-6 ATM) pressure. Where sediment or mineral content is a problem, an inlet filter is recommended.

PLUMBING CONNECTIONS: Inlet is 3/8"O.D. compression fitting. Waste outlet is female
1-1/2"IPS.

MAINTENANCE: Periodically clean the strainer. Refer to 5874SS Valve Operation and Maintenance sheet for more information.

TROUBLESHOOTING

PROBLEM	REPAIR CHECKLIST
1. Insufficient bubbler flow.	1a. Check that inlet screwdriver stop valve (not supplied) is wide open. 1b. Verify minimum 30 psi supply pressure. 1c. Clean strainer. See 5874SS Valve Manual. 1d. Adjust valve to increase flow. Use front adjust screw or see 5874SS Valve Manual.

General Notes:

Before tightening nut and ferrule assembly, push tubing into fitting until it bottoms out to ensure correct engagement with O-Ring.

For more information about Haws products, see our website: www.hawsco.com

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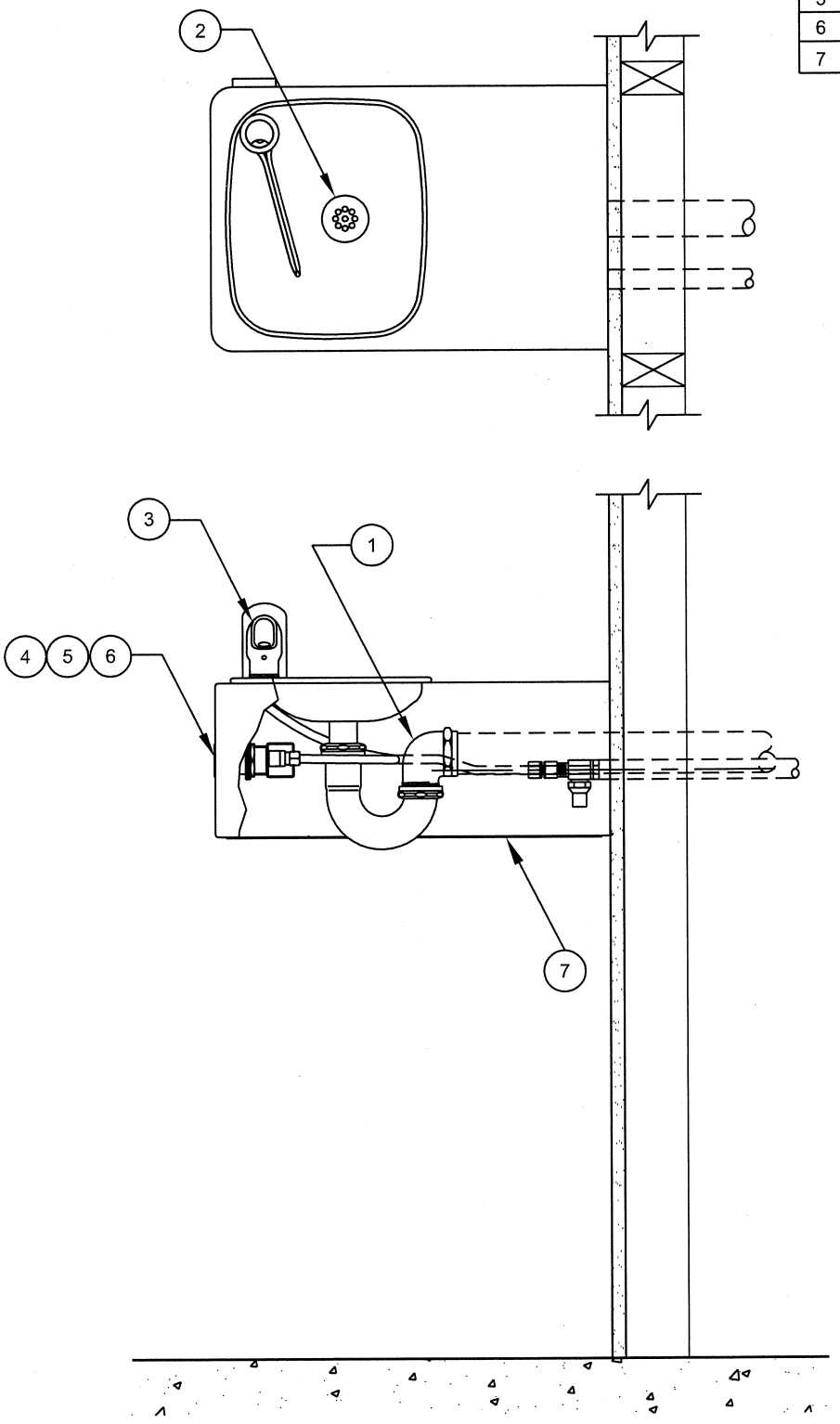
PARTS BREAKDOWN

ITEM	DESCRIPTION
1	TRAP, P/N 0005987000
2	STRAINER ASSY 6466
3	HEAD 5703 0002848703
4	PUSH BTN ASS'Y PBA7
5	CARTRIDGE HF 0001632151
6	GASKET W/SCREEN 0002568123
7	ACCESS PLATE PBM1025



WHEN ORDERING PARTS PLEASE SPECIFY YOUR MODEL NUMBER

Haws corporation
1455 KLEPPE LANE
SPARKS, NEVADA 89431
(775) 359-4712 FAX (775) 359-7424
E-MAIL: HAWS@HAWSCO.COM
WEBSITE: WWW.HAWSCO.COM

DRAWN BY:	DATE:	CHECK BY:	APPVD BY:	SCALE:
D. OLLOM	11/25/95			1:4

TITLE:	PART NUMBER:	
1025/1025G	0002076415	
DRAWING TYPE:	DRAWING NUMBER:	REV.
PARTS BREAKDOWN	12780C00	13

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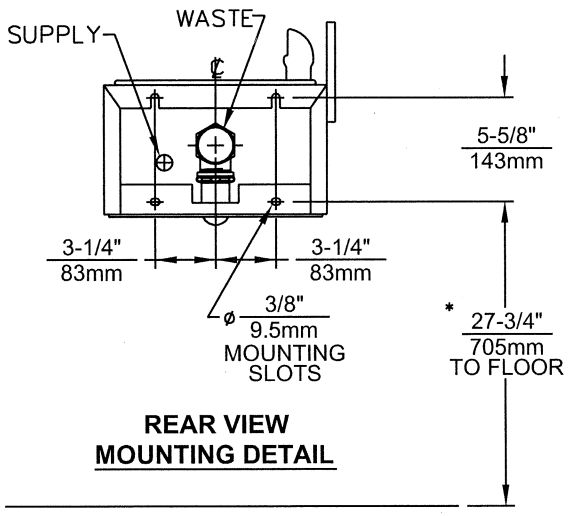
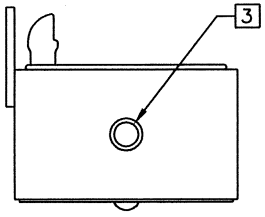
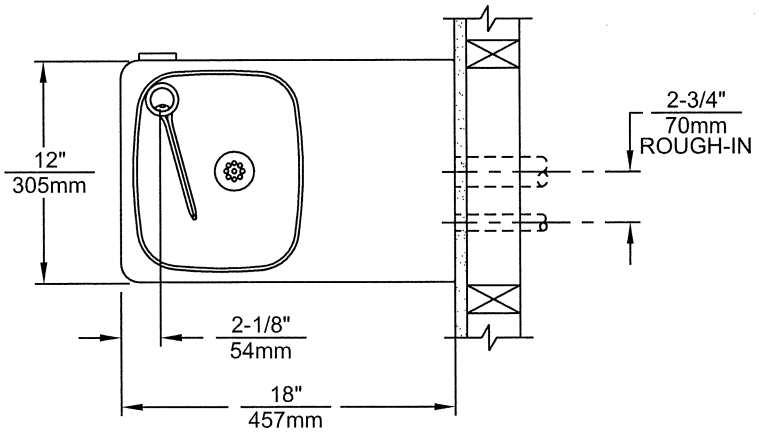
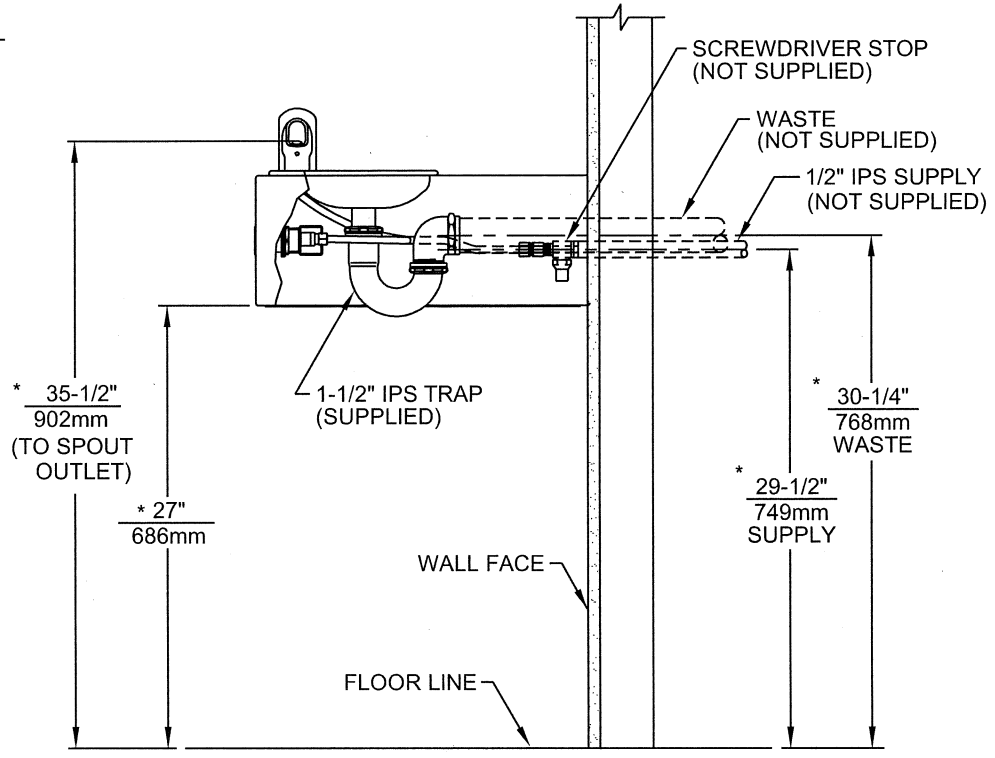


REAR VIEW
MOUNTING DETAIL







NOTES:

1. HOLD ROUGH-IN DIMENSIONS ±1/4" (6.4mm).

2. WHEN INSTALLING THIS UNIT LOCAL, STATE OR FEDERAL CODES SHOULD BE ADHERED TO. FOR INSTALLATION HEIGHTS OTHER THAN SHOWN, DIMENSIONS MARKED(*) MUSHT BE ADJUSTED ACCORDINGLY.

3. REFER TO 5874SS OPERATION AND MAINTENANCE MANUAL FOR PUSH BUTTON AND VALVE INSTALLATION/ MAINTENANCE INSTRUCTIONS. (NOTE:THIS FOUNTAIN UTILIZES A HIGH FLOW CARTRIDGE TO ENSURE PROPER WATER FLOW).

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ECN NO.	REVISED PER	BY:
	ECN: 4620	HM

DRAWN:	DATE:	CHKD
CJL	09/92	

APPROVED: DATE: 6/21/11

MODEL(S):
1025/1025G
INFO FAX DOC #: 21025/210254
SCALE: 1:10 DRAWING TYPE: INSTALLATION/FAXBACK

PART NUMBER: 0002076415.D
DRAWING NUMBER: 10371C00 REV: 13
SIZE: A SHEET 1 OF 1

DWG NO. 10371C00

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model 1025

Wall Mounted Drinking Fountain

FEATURES & BENEFITS

PUSH BUTTON

With its patented (Pat.# 6,981,692) push-button valve assembly which allows for front access stream adjustment as well as cartridge and strainer access, this fountain offers the ultimate in ease of maintenance.

INTEGRATED TRAP

Spacious fountain design allows for the trap to be internally mounted which allows for easy access, and aids and reduces the installation process.

QUALITY CONTROL

Fountain is pre-built and fully water and pressure tested to ensure no leaks and proper function for reduced installation time and added peace of mind.

DRAIN CLEAN-OUT

Top-down access to the drain allows the fountain to be cleaned without taking the unit apart, which is ideal for outdoor settings that are high in drain-clogging sediment like leaves, garbage, and other debris.

CONSTRUCTION

Heavy-duty 11 gauge galvanized steel with a green powder-coat finish incorporates a recessed push-button and welded bubbler guard to provide extra durability, and a vandal-resistant bottom plate for added peace of mind. Stainless steel basin with a high-polished finish compliments almost any setting, and it also resists stains and corrosion.

PUSH BUTTON

With its patented (Pat.# 6,981,692) stainless steel, push-button activated valve assembly which allows for front access stream adjustment as well as cartridge and strainer access, this fountain offers 100% lead free waterways. The valve works at an operating pressure range of 30 to 90 psi.

OPTIONS

- ☐ Filter: Model 6426, 12" x 2", in-line lead removal element that reduces lead from incoming water supply.
- ☐ Mounting: Model 6700 universal mounting plate for most wall mounted fountains.
- ☐ Support Carrier: Model 6800 universal in-wall mounting support for use with most fountains.
- ☐ Chiller: Model HCR8, 8 gph remote water chiller provides instantaneous cooling to meet a continuous demand for chilled water.

To see all options for this model, visit www.hawsco.com

SPECIFICATIONS

Model 1025 wall mounted barrier-free drinking fountain shall include a stainless steel basin contained in an 11 gauge green powder-coated galvanized steel wall bracket, push-button operated stainless steel valve with front-accessible cartridge and flow adjustment, polished chrome-plated brass vandal-resistant sheilded bubbler head, 100% lead-free waterways, polished chrome-plated brass vandal-resistant waste strainer with top-down access, vandal-resistant bottom plate, and chrome-plated 1-1/2" IPS trap.

APPLICATIONS

Perfect for either public or private outdoor settings, Model 1025 is a great fit in areas where aesthetics are important to the overall appeal of the architecture. Suitable in areas where weather conditions exist, this series is precisely mounted to make it a nice addition. Powder-coated finish help to maintain the fountains overall appeal so it always remains looking as new as it did when it was installed. Specifically, this type of wall mounted drinking fountain may be placed in settings such as: parks, schools, and other outdoor environments where the temperature remains above freezing.

Model meets all current Federal Regulations for the disabled including those in the Americans with Disabilities Act. Haws manufactures drinking fountains and electric water coolers to be lead-free by all known definitions including NSF/ANSI Standard 61, Section 9, California Proposition 65, and the Federal Safe Drinking Water Act. Product is compliant to California Health and Safety Code 116875 (AB 1953-2006) as evaluated by CSA International.

DISCLAIMER: Continued product improvements make specifications subject to change without notice. Check www.hawsco.com for the latest product information and updates.

SECTION 26 56 26
LANDSCAPE LIGHTING

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Landscape lighting fixtures

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new landscape lighting is to be installed.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a sample (piece) of each fixture to be installed.

C. Submit a color chip.

D. Verify location of fixtures in field with Landscape Architect before proceeding with installation.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

B. Comply with the latest edition of City of Azusa's building and electrical codes.

PART 2 – PRODUCTS

2.1 PATH LIGHTS

A. See Landscape Construction Plan – sheet L-1.00 for fixture type and locations on site.

B. Manufacturer: Philips Gardco Round full cutoff bollard BR842, height 42" school bollard with steel base tenon with motion response. Finish to be bronze. Available from Prudential Lighting (213) 746-0360.

2.2 POLE LIGHT FIXTURE

A. See Landscape Construction Plan – sheet L-1.00 for fixture type and locations on site.

B. Manufacturer: Sternberg Omega R 1527R 27" diameter night sky downlight with LED. Mounted on wood pole with custom size Sternberg OB bracket. Finish to be old iron. Available from Prudential Lighting (213) 746-0360.

C. Mount on 8" diameter wood utility pole.

PART 3 – EXECUTION

3.1 INSTALLATION OF FIXTURES

A. Installation of all fixtures to be carried out under the supervision of a licensed electrician

B. Conduit to be used at all locations as required by local building codes

C. All fixtures to be grounded

D. All cable to be buried per code requirements

E. Protect all circuits with ground fault interruptors

F. Provide additional outlets where indicated on Drawings for Public Address System, etc.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

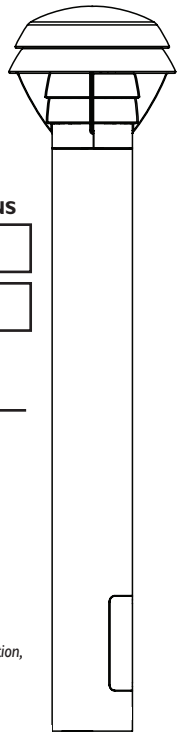
Job:
Type:
Notes:

Exhibit H - Plan Specifications for the Special Use Area

Bollard LED

Round Full Cutoff Bollard
BR840 Series, Including Motion Response

The Philips Gardco LED Bollard family features the round full cutoff bollard, the BR840 series. This sleek series features LEDs concealed below cast louvers to provide down lighting for landscape and pathway applications. The BR840 series features 4" diameter extruded aluminum shafts. Available mountings include the standard shaft, with a welded cast base mounted firmly to anchor bolts. The BR840 series also is available with a galvanized steel base tenon reinforced shaft (BR842) for applications requiring additional support, such as schools. BR840 series bollards provide full cutoff performance.



PREFIX	HEIGHT	LED CONTROL	LED SELECTION	LIGHTED COVERAGE / LED WATTAGE	VOLTAGE	FINISH	OPTIONS

Enter the order code into the appropriate box above. Note: Gardco reserves the right to refuse a configuration. Not all combinations and configurations are valid. Refer to notes below for exclusions and limitations. For questions or concerns, please consult the factory.

PREFIX / HEIGHT

BR840	Standard Shaft	**42" 36" 30"**
BR841	Head Only	**7.1"**
BR842	School Bollard Reinforced Shaft with Galvanized Steel Tenon	**42" 36" 30"**

LED CONTROL

CWL Constant Wattage Full Light Output
Full wattage and light output only.

DIM 0 - 10V Dimming
Dimming controls by others. The dimming driver utilized permits dimming control via a potentiometer (by others) or via 0 - 10V control (by others.) Consult installation instructions for more information.

MR Motion Response
Featuring two (2) integral Passive Infrared (PIR) sensors. In the absence of motion, luminares operate at 20% of normal power and light output (80% dimmed.) See page 3 for more information on Motion Response luminaires.

LED SELECTION

CW *5,700°K , 75CRI*
NW *4,000°K , 75CRI*
WW *3,000°K , 75CRI*

Solid Colors
LA *Amber*

LIGHTED COVERAGE / LED WATTAGE

360° lighted louvers - 14 LEDs

360 -10	10 watts at 225mA
360 -18	18 watts at 350mA
360 -26	26 watts at 500mA

Note: A variation of LED wattage (+/- 8%) may occur due to LED manufacturer's forward volt specification and ambient temperature.

180° lighted louvers - 7 LEDs[1,2] *(Provides reduced backside light.)*

180 -10	10 watts at 450mA
180 -18	18 watts at 700mA

1. 180° achieved by populating half of LEDs.
2. 180° distributions include an internal house side shield to limit the amount of backlight.

VOLTAGE

UNIV *120V through 277V, 50hz to 60hz input.*

FINISH

BRP Bronze Paint
BLP Black Paint
WP White Paint
NP Natural Aluminum Paint

OC Optional Color Paint
Specify RAL designation as ex: OC-RAL7024.

SC Special Color Paint
Specify. Must supply color chip.

OPTIONS

PCB[3] Button Photocontrol
SPR Surge Protector

3. Not available in BR841.

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(800) 227-0758 (512) 753-1000 FAX: (512) 753-7855 sitelighting.com
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PHILIPS
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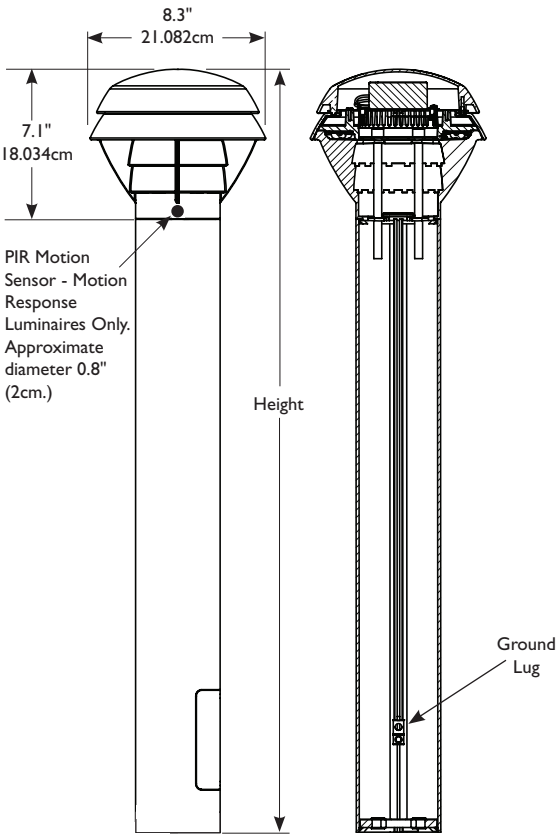
Bollard LED

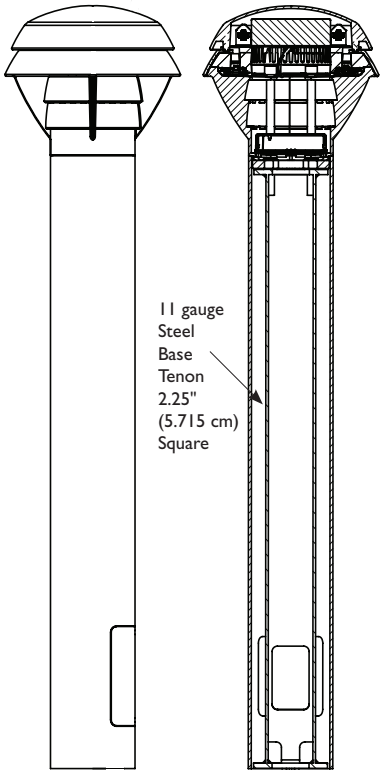
Round Full Cutoff Bollard
BR840 Series, Including Motion Response

DIMENSIONS

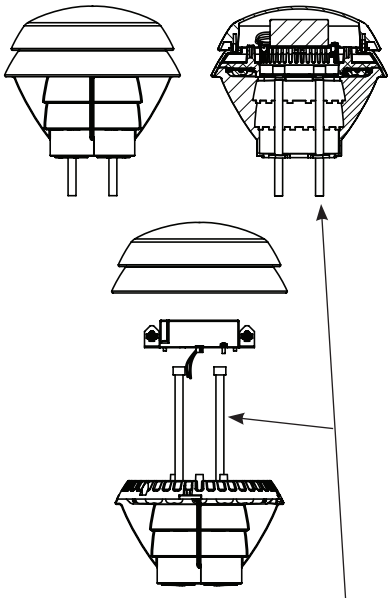
BR840

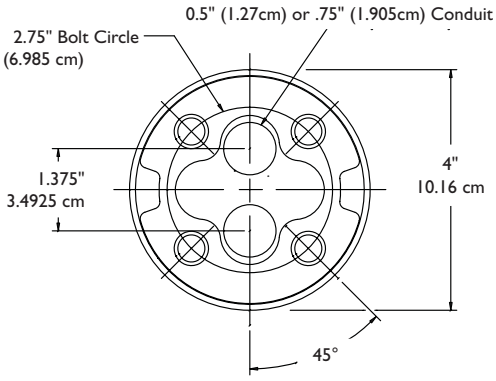


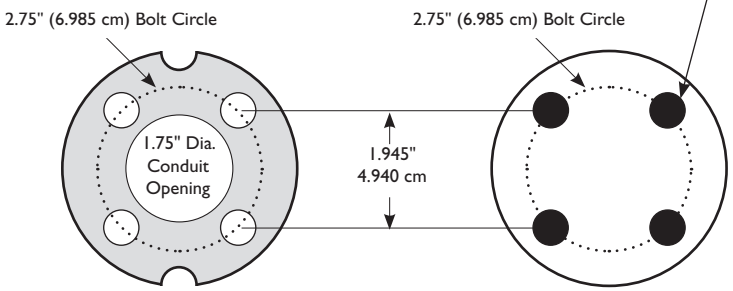
BR842
School Bollard with Steel Base Tenon



BR841
Head Only







NOTE: Factory supplied template must be used when setting anchor bolts. Philips Gardco will not honor any claim for incorrect anchorage placement from failure to use factory supplied templates.

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PHILIPS
GARDCO

Round Full Cutoff Bollard
BR840 Series, Including Motion Response

SPECIFICATIONS

UPPER HOUSING: Die cast aluminum upper housing featuring shielding louvers to provide down light.

LOWER HOUSING:

BR840 : The lower housing assembly consists of a .140" wall by 4" diameter high strength 6063-T6 extruded aluminum section incorporating a flush, weather-tight gasketed hand hole cover.

BR41 : Louver head assembly is suitable for attachment to architectural elements (by others).

BR842 : The lower housing assembly consists of a .140" wall by 4" diameter high strength 6063-T6 extruded aluminum section, incorporating a flush, weather-tight gasketed hand hole cover, for placement over the galvanized steel tenon support structure. Tenon support structure is made from a .12" thick wall, 11 gauge steel, 2.25" square tube, welded to top and bottom round steel support plates. The steel tenon support structure includes an opening aligned with the aluminum shaft hand hole to permit wiring. The entire steel tenon support structure is hot dipped galvanized after fabrication.

LED PERFORMANCE:

PREDICTED LUMEN DEPRECIATION DATA[4]		
Ambient Temperature °C	Driver mA	L_{70} Hours[5]
25 °C	225	230,000
	350	220,000
	450 / 500	165,000
	700	150,000
40 °C	225	212,000
	350	188,000
	450 / 500	150,000
	700	137,000

4. Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions.
5. L_{70} is the predicted time when LED performance depreciates to 70% of initial lumen output.

OPTICAL SYSTEM: Philips Gardco LED Bollards feature advanced Philips Gardco LED technology, assuring maxmimized light output. LED arrays are replaceable.

ANCHORAGE:

BR840: Base assembly consists of an internal welded cast ring section that provides for mounting to the foundation with four (4) 3/8" X 8" X 1½" anchor bolts on a 2¾" bolt circle.

BR841: The luminaire head mounts to a concrete structure utilizing four (4) 3/8" #16 hex head bolts inserted into threaded concrete inserts (provided by others) on a 2¾" bolt circle.

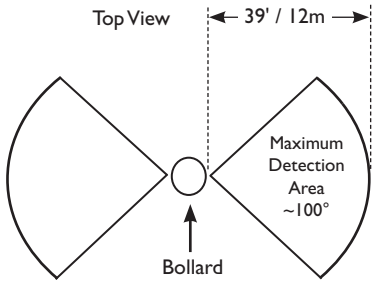
BR842: A high strength steel mounting tenon, hot-dip galvanized after fabrication, is secured to the concrete footing with (4) 3/8" x 8" x 1 1/2" anchor bolts on a 2¾" bolt circle.

IP RATING: IP66 is the rating for the optical compartment.

ELECTRICAL: The LED power supply is located within the bollard head. Bollards accept from 120 Volts through 277 Volts, 50hz to 60 hz, input. supply. The LED driver is located in the upper dome. LED drivers are replaceable. LEDs provided as specified. Power factor is not less than 90%. Luminaires consume 0.0 watts in the off state.

MOTION RESPONSE LUMINAIRES: Each Motion Response (MR) luminaire includes two (2) Panasonic EKMB1203112 Passive Infrared (PIR) sensors to detect motion. When motion is not detected for a 5 minute period, luminaires automatically dim to 20% power and light, gradually over a 2 minute period. Once Motion is detected, luminaires immediately ramp to full power and light output until motion is not detected for a 5 minute period.

PIR sensors are able to detect motion in the approximate patterns shown below:



Note: Motion sensors rely on specific zonal crossings to detect motion. It is possible for a person to directly approach the bollard motion sensor without crossing between zones until 15 feet from the motion sensor. The actual motion detection distance may vary based on specific application characteristics.

LUMINAIRE FINISH: Each luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured textured powdercoat finish

LABELS: All luminaires bear UL or CUL (where applicable) Wet Location labels.

WARRANTY: Philips Gardco luminaires feature a 5 year limited warranty. Philips Gardco LED luminaires with LED arrays or modules feature a 5 year limited warranty covering the LED arrays or modules. LED drivers carry a 5 year limited warranty. See Warranty Information on www.sitelighting.com for complete details and exclusions.

FULL CUTOFF PERFORMANCE: Full cutoff performance means a luminaire distribution where zero candela intensity occurs at an angle at or above 90° above nadir . Additionally, the candela per 1000 lamp lumens does not numerically exceed 100 (10 percent) at a vertical angle of 80° above nadir. This applies to all lateral angles around the luminaire.

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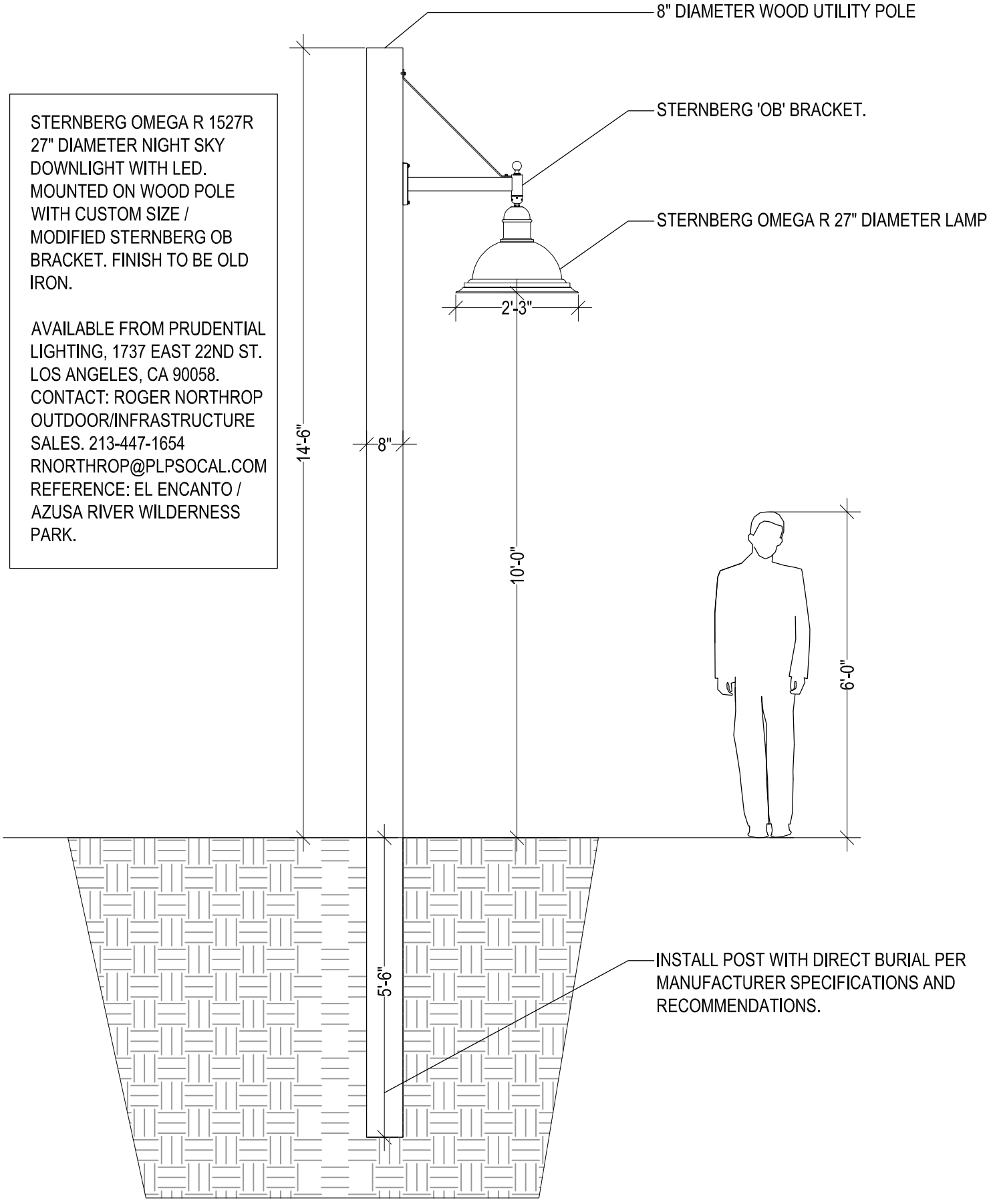
Exhibit H - Plan Specifications for the Special Use Area



STERNBERG OMEGA R 1527R 27" DIAMETER NIGHT SKY DOWNLIGHT WITH LED. MOUNTED ON WOOD POLE WITH CUSTOM SIZE / MODIFIED STERNBERG OB BRACKET. FINISH TO BE OLD IRON.

AVAILABLE FROM PRUDENTIAL LIGHTING, 1737 EAST 22ND ST. LOS ANGELES, CA 90058. CONTACT: ROGER NORTHROP OUTDOOR/INFRASTRUCTURE SALES. 213-447-1654 RNORTHROP@PLPSOCAL.COM REFERENCE: EL ENCANTO / AZUSA RIVER WILDERNESS PARK.

SECTION 31 00 00
EARTHWORK

(Section 300 *"Greenbook" Standard Specifications for Public Works Construction*)

300-1.0 CLEARING AND GRUBBING

300 -1.1 General. Clearing and grubbing operations preceding construction of debris dams and basins shall comply with 300 - 6.2.

Clearing and grubbing shall consist of removing all natural and artificial objectionable materials from the right-of-way in construction areas, road approaches, material sites within the right-of-way, areas through which ditches and channels are to be excavated, and such other areas as may be shown in the Specifications. This work shall be performed in advance of grading operations and in accordance with the requirements herein specified, subject to erosion control requirements. Demolition of building and structures, other than foundations or slabs, shall be as shown in the Plans or in the Specifications.

The natural ground surface shall be cleared of all vegetable growth, such as trees, logs, upturned stumps, roots of downed trees, brush, grass, weeds, and all other objectionable materials, within the limits of construction.

Grubbing shall extend to the outside excavation and fill slope lines, except that where slopes are to be rounded, the areas shall extend to the outside limits of slope rounding. Within the limits of clearing, all stumps, roots 40 mm (1-1/2 inches) in diameter or larger, buried logs, and all other objectionable material shall be removed 1 m (3 feet) below the existing ground surface or subgrade, whichever is deeper.

No payment will be made to the Contractor for clearing and grubbing outside the stated limits, unless such work is authorized by the Project Manager.

Trees and plants that are not to be removed shall be fully protected from injury by the Contractor at its expense. Trees shall be removed in such a manner as not to injure standing trees, plants, and improvements which are to be preserved.

Tree branches which hang within 4.1 m (13.5 feet) above finished roadway grade or within 2.7 m (9 feet) above finished sidewalk or parkway grade shall be cut off to the boles in a workmanlike manner.

The Contractor shall remove additional tree branches under the direction of the Project Manager , in such a manner that the tree will present a balanced appearance. Scars resulting from the removal of branches shall be treated with a heavy coat of an approved tree sealant.

300 -1.2 Preservation of Property. Existing improvements, adjacent property, utility and other facilities, and trees and plants that are not to be removed shall be protected from injury or damage as provided for in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 7-9.

300 -1.3 Removal and Disposal of Materials

300 -1.3.1 General. All materials removed shall be disposed of outside of the right-of-way. No accumulation of flammable material shall remain on or adjacent to the right-of-way. The roadway and adjacent areas shall be left with a neat and finished appearance.

300 -1.3.2 Requirements

(a) Bituminous Pavement. Bituminous pavement shall be removed to clean, straight lines. Saw cutting of edges to be joined is optional. Where only the surface of existing bituminous pavement is to be removed, the method of removal shall be approved by the Project Manager, and a minimum laying depth of 25 mm (1 inch) of new pavement material shall be provided at the join line. Where bituminous pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before resurfacing to ensure that all areas to be resurfaced are accessible to the rollers used to compact the subgrade or paving materials.

(b) Concrete Pavement. Concrete pavement shall be removed to neatly sawed edges. Saw cuts shall be made to a minimum depth of 38 mm (1-1/2 inches). If a saw cut in concrete pavement falls within 1 m (3 feet) of a construction joint, cold joint, expansion joint, or edge, the concrete shall be removed to the joint or edge. The edges of existing concrete pavement adjacent to trenches, where damaged subsequent to saw cutting of the pavement, shall again be saw cut to neat, straight lines for the purpose of removing the damaged pavement areas. Such saw cuts shall be either parallel to the original saw cuts or shall be cut on an angle which departs from the original saw cut not more than 25 mm (1 inch) in each 150 mm (6 inches).

(c) Concrete Curb, Walk, Gutters, Cross Gutters, Driveways, and Alley Intersections. Concrete shall be removed to neatly sawed edges with saw cuts made to a minimum depth of 38 mm (1-1/2 inches). Concrete sidewalk or driveway to be removed shall be neatly sawed in straight lines either parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than 750 mm (30 inches) in either length or width. If the saw cut in sidewalk or driveway would fall within 750 mm (30 inches) of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge, except that where the saw cut would fall within 300 mm (12 inches) of a score mark, the saw cut shall be made in and along the score mark. Curb and gutter shall be sawed to a depth of 38 mm (1-1/2 inches) on a neat line at right angles to the curb face.

300 -1.4 Payment. The lump sum price, or the price per acre, bid for clearing and grubbing shall include full compensation for removal and disposal of all the resulting materials. When the Contract does not include a pay item for clearing and grubbing as specified above, and unless otherwise provided in the Specifications, full compensation for any necessary clearing and grubbing required to perform the construction operations specified shall be included in the price bid for other items of work and no additional compensation will be allowed therefore.

300 -2.0 UNCLASSIFIED EXCAVATION

300 -2.1 General. Unclassified excavation shall consist of all excavation, including roadways, unless separately designated.

300 -2.2 Unsuitable Material.

300 -2.2.1 General. Material that is unsuitable for its planned use shall be excavated and disposed of as directed by the Engineer.

The removal and disposal of such unsuitable material will be paid for as unclassified excavation for the quantities involved if the removal of such material is shown on the Plans or in the Specifications.

If the removal of unsuitable material is not shown on the Plans or in the Specifications, the removal and disposal of such unsuitable materials will be paid for at the Contract Unit Price for unclassified excavation. However, if due to the character of the work, the removal and disposal of the unsuitable material is not properly compensable at the Contract Unit Price for unclassified excavation, the work may be paid for in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Section 3.

300 -2.2.2 Wet Material. If required excavated material is unsatisfactory for the specified use on the project solely because of high moisture content, the Contractor may be directed by the Project Manager to either process the material to reduce the moisture content to an optimum condition, or to remove the material and replace it with suitable material. If such high moisture content is not the result of any action on the part of the Contractor, or inaction in protecting the work during the course of the Contract, the work involved will be paid for in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Section 3. Otherwise, the Contractor shall submit to the Project Manager for approval, a plan for drying or removing and replacing the wet material, and such work and material shall be at the expense of the Contractor.

300 -2.3 Overshooting. Excessive blasting will not be permitted. Material outside the authorized cross section which may be shattered or loosened because of blasting shall be removed at the Contractor's expense. The Contractor shall discontinue any method of blasting which leads to overshooting, is hazardous to the public, or is destructive to property or natural features.

300 -2.4 Slides and Slipouts. Material outside the planned excavation limits which is unstable and constitutes a potential slide as determined by the Engineer, material which has come into the planned excavation limits, and material which has slipped out of new or old fills shall be excavated to designated lines or slopes either by benching or in such manner as directed by the Engineer. Such material may be used in the construction of an unclassified fill or disposed of as directed by the Engineer.

The removal and disposal of slide and slipout material as above specified, not resulting from overshooting as specified in 300 - 2.3 and not resulting from any act or failure to act on the part of the Contractor, will be paid for at the Contract Unit Price for unclassified excavation for the quantities involved.

However, if due to the character of the work, the removal and disposal of such material is not properly compensable at the Contract Unit Prices for unclassified excavation, the work may be paid for as provided in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Section 3.

Payment will be made only for those quantities of slide or slipout material which are actually removed as ordered by the Engineer.

300 -2.5 Slopes. Excavation slopes shall be finished in conformance with the lines and grades shown on the Plans. All debris and loose material shall be removed. When completed, the average plane of the slopes shall conform to the slopes indicated on the Plans and no point on the completed slopes shall vary from the designated plane by more than 150 mm (6 inches) measured at right angles to the slope. Where excavation is in rock, no point shall vary more than 600 mm (2 feet) from the designated plane of the slope. In no case shall any portion of the slope encroach so as to interfere with the planned use of the facility.

The tops of excavation slopes and the ends of excavations shall be rounded where shown on the Plans, and these quantities will not be included in the quantities to be paid for as excavation. This work will be considered as a part of finishing slopes and no additional compensation will be allowed therefore.

300 -2.6 Surplus Material. Unless otherwise shown on the Plans or in the Specifications, no surplus excavated material may be disposed of within the right-of-way. The Contractor shall make all arrangements for disposal of the material at offsite locations and shall, upon request, file with the Project Manager the written consent of the owner of the property upon which it intends to dispose of such material.

Quantities of surplus material, if shown on the Plans or in the Specifications, are approximate only.

The Contractor shall satisfy itself that there is sufficient material available for the completion of the fills before disposing of any indicated surplus material inside or outside the right-of-way. Any shortage of material, caused by premature disposal of the indicated surplus material by the Contractor, shall be replaced by it and no compensation will be allowed for such replacement.

300 -2.7 Selected Material. Selected material encountered in excavation within the right-of-way shall be used as shown on the Plans, in the Specifications, or as directed by the Engineer. Topsoil excavated within the limits of the project may be considered as a selected material only for the purpose of backfilling areas to be planted.

300 -2.8 Measurement. The following earthwork operations will be measured as unclassified excavation for the quantities of material involved:

1) Excavating the roadway prism including public and private road approaches;
2) Connections and driveways;
3) Excavating unsuitable material when shown on the Plans or in the Specifications;
4) Excavating slides and slipouts not resulting from overshooting;
5) Excavating surplus material;
6) Excavating selected material and topsoil from within the limits of project and removing such materials from stockpiles when stockpiling is ordered;
7) Excavating local borrow.

Measurement of material removed from required stockpiles will be based on the volume it occupies in its final position after compaction.

Excavation in excess of the planned or authorized cross section will not be paid for, except as provided in 300 - 2.2 and 2.4. The Contractor shall backfill and compact unauthorized excavated areas to the original ground elevation or authorized section at its expense.

Care shall be exercised to prevent excavating below grade. Areas excavated below grade shall be filled with suitable material and compacted by the Contractor at its expense.

300 -2.9 Payment. Payment for all unclassified excavation will be made at the Contract Unit Price per cubic meter (cubic yard). Payment for unclassified excavation shall include compensation for excavating, sloping, rounding tops and ends of excavations, loading, disposing of surplus material, stockpiling, and hauling it to its final location.

Where required by the Plans or Specifications or where directed by the Engineer, the excavating and stockpiling of selected material will be paid for at the Contract Unit Price for unclassified excavation. Removing such selected material from the stockpile and placing it in its final position will also be paid for at the Contract Unit Price for unclassified excavation. The Contractor may stockpile material; however, no separate payment will be made for excavating material from an optional stockpile and placing it in its final position.

No separate payment will be made for excavating topsoil temporarily stockpiled along the top of slopes and placing it in its final position on the slope for erosion control planting work, whether or not required by the Contract Documents or by the Engineer.

300 -3.0 STRUCTURE EXCAVATION AND BACKFILL

300 -3.1 General. Structure excavation shall consist of the removal of material for the construction of foundations for bridges, retaining walls, headwalls, culverts, or other structures, and other excavation designated on the Plans or in the Specifications as structure excavation. Excavation and backfill for underground conduit construction, including box conduit, shall be in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Section 306.

Structure backfill shall consist of furnishing material, if necessary, and placing and compacting backfill material around structures to the lines designated on the Plans.

Structure excavation and structure backfill shall include the furnishing of all materials and equipment; the construction or installation of all cofferdams and other facilities which may be necessary to perform the excavations and to place and compact the backfill; and the subsequent removal of such facilities, except where they are required or permitted by the Plans or Specifications to remain in place.

300 -3.2 Cofferdams. Cofferdams for foundation construction shall be carried well below the bottom of the footings and shall be well braced and reasonably watertight. The interior dimensions of cofferdams shall provide sufficient clearance inside the wales for constructing forms and driving piles and to permit pumping outside the forms.

If in the judgment of the Contractor, the clearance provided on the Plans between the outside line of the footing and any pile or interior wall or surface is not sufficient to permit the driving of piles or building of forms, it may provide such necessary clearance by constructing the cofferdam sufficiently large to provide such clearances as may be deemed necessary. Any such enlargement in excess of 0.3 m (1 foot) outside the dimensions of the footing as shown on the Plans shall be considered as being for the sole purpose of expediting the work of the Contractor and such excavation and backfill shall be at the Contractor's expense.

Cofferdams which are tilted or moved out of position by any cause during the process of sinking shall be plumbed or enlarged to provide the necessary clearance and proper pier location and such work shall be at the Contractor's expense.

In tidal waters or in streams at a time of probable flood, cofferdam walls shall be vented at low water elevation to ensure equal hydrostatic head both inside and outside of the cofferdam during the period of pouring and setting of seals.

No shoring will be permitted in cofferdams which will induce stress, shock, or vibration in the permanent structure.

When permitted by the Engineer, cross struts or bracing may extend through foundation concrete. Such struts or bracing below low water will be permitted to remain in place, except in navigable streams or, when shown on the Plans or in the Specifications to be removed. Struts or bracing above low water shall be removed and the resulting space filled with concrete of the same mix as that specified for the surrounding concrete.

For substructure work, the Contractor shall, in accordance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 2-5.3, submit drawings showing the proposed method of cofferdam construction and other details left open to choice or not fully shown on the Plans. The type and clearance of cofferdams, insofar as such details affect the character of the finished work, will be subject to the approval of the Engineer, but other details of design will be left to the Contractor, who shall be responsible for the successful construction of the work.

After completion of the substructure, the cofferdams with all sheeting and bracing shall be removed to at least 0.6 m (2 feet) below the level of the streambed by the Contractor at its expense and such removal shall be performed in a manner that will not disturb or mar the finished concrete or masonry.

300 -3.3 Foundation Material Treatment. When footing concrete or masonry is to rest upon rock, the rock shall be fully uncovered and the surface thereof shall be removed to a depth sufficient to expose sound rock. The rock shall be roughly leveled off or cut to approximate horizontal and vertical steps, and shall be roughened. Seams in the rock shall be grouted under pressure or treated as the Project Manager may direct and the cost thereof will be paid for as extra work.

When no piles are used and footing concrete or masonry is to rest on an excavated surface other than rock, care shall be taken not to disturb the bottom of the excavation. Final removal of the foundation material to grade shall not be made until just before the concrete or masonry is placed. Except when over excavation is directed by the Engineer, excavation below grade shall be replaced at the Contractor's expense with the same class of concrete specified for the structure and at the time the concrete for the structure is being placed. Where it is determined by the Project Manager that it will not be detrimental to the structure, the Contractor may backfill above grade with not less than 90 percent relative compaction and then trim to the specified grade.

Where the original ground is below the specified elevation for footings, the Contractor shall backfill to 150 mm (6 inches) above grade with not less than 90 percent relative compaction and then excavate to the prescribed grade prior to placing concrete.

The excavation for piers and abutments shall be completed to the bottom of the footings before any piles are driven therein, and excess material remaining in the excavation after pile driving shall be removed to the elevation of the bottom of the footings.

When piles are used and ground displacement results from pile driving operations, the Contractor shall at its expense excavate or backfill the footing area to the grade of the bottom of the footing as shown on the Plans with structure backfill material.

300 -3.4 Inspection. Whenever any structure excavation is completed, the Contractor shall notify the Project Manager who will make an inspection of the foundation. No concrete or masonry shall be placed until the foundation has been approved by the Project Manager.

300 -3.5 Structure Backfill

300 -3.5.1 Requirements. Structure backfill shall not be placed until the structure has been inspected by the Project Manager and approved for backfilling. No backfill material shall be deposited against the back of concrete abutments or concrete retaining walls, until the concrete has developed not less than the specified 28-day compressive strength. Backfill at the inside of bridge wingwalls shall be placed before railing bases on the wingwalls are constructed.

Material used for structure backfill shall have a sand equivalent of not less than 20 and shall have the following grading:

TABLE 300 - 3.5.1 (A)

Sieve Size	Percent Passing
100 mm (4 in)	100
4.75 mm (No. 4)	35 - 100
600 µm (No. 30)	20 – 100

Structure backfill shall be placed in accordance with 300 - 4.5 and shall be mechanically compacted to a minimum relative compaction of 90 percent.

Where consolidation of structure backfill by jetting is permitted by the Plans or Specifications, the following conditions shall apply:

1) Backfill material shall be placed and consolidated in layers not exceeding 1.2 m (4 feet) in thickness.
2) The jetting shall be performed without softening the embankment and in a manner that excess water will not be impounded.
3) Jetting methods shall be supplemented by the use of vibratory or other consolidation equipment when necessary to obtain 90 percent relative compaction.
4) The upper 0.9 m (3 feet) below finished subgrade shall be mechanically compacted in roadway areas.

300 -3.5.2 Pervious Backfill. Pervious backfill material shall be placed behind bridge abutments, wingwalls, and retaining walls as shown on the Plans and in accordance with the following requirements.

Pervious backfill material shall consist of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations thereof and shall conform to the following grading requirements:

TABLE 300 - 3.5.2 (A)

Sieve Size	Percent Passing
19 mm (3/4 in)	100
9.5 mm (3/8 in)	80 - 100
150 µm (No. 100)	0 - 8
75 µm (No. 200)	0 – 3

That portion of filter material passing a 4.75 mm (No. 4) sieve shall have a sand equivalent of not less than 60.

All weep holes shall be backed with 0.06 m^3 (2 cubic feet) of material conforming to the requirements for No. 3 Concrete Aggregate as specified in 200-1.4; securely tied in a burlap sack; and placed in such a manner that the backing covers the weep holes and extends at least 300 mm (12 inches) above the bottom of the opening. A 200 mm (8 inch) square section of 6 mm (1/4 inch) galvanized or aluminum screen having a minimum wire diameter of 0.8 mm (0.03 inch) shall be firmly attached at the back of each weep hole before the material is placed.

Pervious backfill material shall be placed in layers along with and by the same methods specified for structure backfill. Pervious backfill material at any one location shall be approximately the same grading, and, at locations where the material would otherwise be exposed to erosion, shall be covered with at least a 0.3 m (1 foot) layer of earthy material approved by the Project Manager.

300 -3.6 Payment. Unless otherwise provided in the Specifications of the Bid, no payment will be made for structure excavation or backfill. The cost thereof shall be considered as included in the price bid for the construction or installation of the item to which such excavation or backfill is incidental or appurtenant. Unless otherwise shown on the Plans, the quantity of the structure excavation, where paid for as a separate item or not, shall be that volume in place included within the vertical plane 0.3 m (1 foot) outside of and parallel with the outermost horizontal dimensions of the structure and the surface of the existing ground, final ground surface, or proposed street subgrade, whichever is lower, and the footing subgrade. Structure backfill will be measured to the finished ground surface, or to the proposed street subgrade, whichever is lower, within the limits specified above.

300 -4.0 UNCLASSIFIED FILL

300 -4.1 General. Unclassified fill shall consist of all fill unless separately designated. Construction of unclassified fill includes preparing the area on which fill is to be placed, and the depositing, conditioning, and compacting of fill material.

Rocks, broken concrete, or other solid materials which are larger than 100 mm (4 inches) in greatest dimension shall not be placed in fill areas where piles are to be placed or driven.

Clods or hard lumps of earth of 150 mm (6 inches) in greatest dimension shall be broken up before compacting the material in fill, except when the fill material originating from the project contains large rocks, boulders, or hard lumps (such as hardpan or cemented gravel which cannot be broken readily) over 300 mm (12 inches) in greatest dimension, such materials may be incorporated in the fill. The location and depth of its placement in the fill and the method to be used shall be subject to the approval of the Engineer.

Fills shall not be constructed when material is frozen or a blanket of snow prevents proper compaction.

300 -4.2 Preparation of Fill Areas. Areas over which fills are to be placed shall first be cleared and grubbed in accordance with the provisions of 300 - 4.1. The areas shall then be scarified to provide a bond between the existing ground and the material to be deposited thereon.

When fills are designated to be placed over existing surface improvements which are to remain in place, 100 mm (4 inch) drainage holes shall be made through the structure on 1.5 m (5 foot) centers each way or the pavement shall be broken in a grid pattern of 1.5 m (5 feet) each way.

300 -4.3 Other Fill Materials. Brick rubble, broken asphalt pavement, and broken concrete originating from the project may be disposed of at the Contractor's expense off the Work site, or incorporated in the fill in conformance with 300 - 4.1. Unless otherwise provided, no such materials may be imported from outside the project limits.

300 -4.4 Benching. When fill is to be made and compacted against hillsides or existing fill, the slopes of original hillsides and old or new fills shall be horizontally benched to key the fill material to the underlying ground. A minimum of 0.6 m (2 feet) normal to the slope of the original hillside and old or new fill shall be removed and recompacted, as the fill is brought up in layers, to ensure that the new work is constructed on a firm foundation free of loose or disturbed material. For the purpose of this subsection, fill slopes or hillsides shall be defined as steeper than 1 vertical in 4 horizontal. Slopes 1 vertical in 4 horizontal or flatter shall be prepared in conformance with 300 - 4.2.

Material thus cut shall be recompacted along with new fill material at the Contractor's expense, unless additional excavation is ordered by the Engineer. The additional excavation will be measured and paid for as unclassified excavation.

300 -4.5 Placing Materials for Fills. Fill material shall be placed in horizontal layers of depths compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread and moistened or aerated, as necessary. Unless otherwise approved by the Engineer, each layer spread for compaction shall not exceed 200 mm (8 inches) of compacted thickness.

Unless otherwise permitted by the Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next higher layer of material is placed. The top surface of each layer shall be approximately level, but with a crown or crossfall of at least 1 vertical in 50 horizontal, but no more than 1 vertical in 20 horizontal, to provide adequate drainage at all times during the construction period.

When fill material contains by volume over 25 percent of rock larger than 150 mm (6 inches) in greatest dimension, the fill below a plane 1 m (3 feet) from finished grade may be constructed in layers of a loose thickness before compaction up to the maximum size of rock in the material, but not exceeding 1 m (3 feet) in thickness. The interstices around the rock in each layer shall be filled with earth or other fine material and compacted.

Broken portland cement concrete and bituminous type pavement obtained from the project excavation will not be permitted in the fill.

300 -4.6 Application of Water. At the time of compaction, the moisture content of fill material shall be such that the specified relative compaction will be obtained and the fill will be firm, hard, and unyielding. Fill material which contains excessive moisture shall not be compacted until the material is dry enough to obtain the required relative compaction.

Subject to the approval of the Engineer, the Contractor may use chemical additives in water to be applied to fill material. Where reasonable grounds exist for concern that the use of a chemical additive will be in any way detrimental, the Project Manager may prohibit its use.

The furnishing and application of such additives shall be at the Contractor's expense.

300 -4.7 Compaction. Each layer of earth fill shall be compacted by approved tamping or sheepsfoot rollers, pneumatic-tired rollers, or other mechanical means acceptable to the Engineer, to such extent as will produce the specified relative compaction. At locations where it would be impractical because of inaccessibility to use such compacting equipment, fill layers shall be compacted to the specified requirements by hand-directed compaction equipment.

Unless otherwise specified, each layer of earth fill shall be compacted to a relative compaction of at least 90 percent.

When soil types, or a combination of soil types, are encountered which tend to develop densely packed surfaces as a result of spreading or compacting operations, the surface of each layer of fill shall be sufficiently roughened after compaction to ensure bond to the succeeding layer.

300 -4.8 Slopes. Fill slopes shall be finished in conformance with the lines and grades shown on the Plans. When completed, the average plane of the slopes shall conform to the slopes indicated on the Plans and no point on the completed slopes shall vary from the designated plane by more than 150 mm (6 inches) measured at right angles to the slope.

300 -4.9 Measurement and Payment. The Contract Unit Price bid for unclassified fill shall include full compensation for the all grading, shaping, compacting or consolidating, or other work that is required under this subsection. The quantities used in determining payment for unclassified fill shall be those of the completed fills within the limits shown on the Plans or as directed by the Engineer.

300 -5.0 BORROW EXCAVATION

300 -5.1 Local Borrow. Local borrow shall consist of material excavated and used in the construction of fills, for use as selected material or for other construction purposes. Local borrow shall be obtained by widening cuts or by excavating from other sources outside the planned or authorized cross section within the right-of-way and within the limits of the project. Local borrow shall be material which is excavated from sources specified or designated by the Engineer. The sources of material to be excavated shall be approved in advance by the Engineer. Local borrow shall be excavated to the lines and grades established by the Engineer.

300 -5.2 Imported Borrow. Imported borrow shall consist of material required for construction of fills, and unless otherwise designated in the Specifications, the Contractor shall make arrangements for obtaining imported borrow and shall pay all costs involved.

The Contractor shall notify the Project Manager sufficiently in advance of opening any borrow site so that adequate time will be allowed for testing the material and establishing cross section elevations and measurements of the ground surface.

300 -5.3 Placing and Compacting. Borrow shall be placed and compacted as specified in 300 - 4. The Contractor shall satisfy itself that there is sufficient space available in fill locations for placing any excavated material before placing imported borrow. Any excess excavation which develops as a result of placing imported borrow in advance of completing excavations shall be disposed of at the Contractor's expense in accordance with the provisions of 300 - 2.6. A corresponding reduction in the quantity of imported borrow to be paid for will be made, for which the Contractor will have no claim for compensation.

300 -5.4 Measurement and Payment. Quantities of local borrow will be measured and paid as specified for unclassified excavation in 300 - 2.8 and 2.9.

Quantities of imported borrow will be measured and paid in accordance with the Specifications.

300 -6.0 EARTHWORK FOR DEBRIS DAMS AND BASINS

300 -6.1 General. Earthwork for debris dams and basins shall include clearing, stripping, excavation, fill, backfill, grading, and disposal of excess excavated material.

300 -6.2 Clearing and Grubbing. Unless otherwise specified, the entire area of all rights-of-way shall be cleared of all trees and brush by cutting at the ground surface. All main root clusters shall be entirely removed from areas upon which improvements are to be constructed, and in addition, those areas upon which compacted fills are to be constructed shall be grubbed as follows:

Individual roots of diameters between 13 mm (1/2 inch) and 40 mm (1-1/2) inches shall be removed to a depth of not less than 0.3 m (1 foot) below natural ground. Larger roots shall be removed down to the level at which the root diameter is 40 mm (1-1/2 inches) or less. Regardless of diameter, no roots need to be removed to a depth greater than 1 m (3 feet).

All bulking of soil resulting from the grubbing operations shall be compacted and holes filled and compacted to subgrade for subsequent compacted fills.

300 -6.3 Stripping. When stripping is indicated on the Plans or in the Specifications, the Contractor shall strip the soil from the designated areas to the depths specified.

The material obtained from stripping operations shall be disposed of away from the site unless otherwise specified.

Soil loosened below the stripping depth specified shall be compacted. Soil removed below stripping depth shall be replaced and compacted to subgrade. All such filling and compacting shall be at the Contractor's expense.

300 -6.4 Basin Excavation. Unless otherwise specified, material obtained from the basin excavation shall be used for compacted fills. The Project Manager will designate the exact limits of basin excavation and the depths thereof in order to obtain a material suitable for use in the compacted fills. Rocks over 150 mm (6 inches) in greatest dimension will not be permitted in compacted fills and shall be disposed of away from the Work site unless otherwise specified.

300 -6.5 Compacted Fills. Unless otherwise specified, the relative compaction of all fills shall be at least 90 percent.

Compacted fills shall be constructed of materials obtained from the onsite excavation unless otherwise specified.

The work of preparing subgrades, placing fill materials, watering, and compacting shall be performed only in the presence of the Project Manager.

On hillsides and at abutments where the existing natural slope is steeper than 1 vertical in 4 horizontal, the existing ground shall be benched as the fill is brought up in layers. The benches shall be approximately horizontal and shall extend below the surface of the cleared and stripped ground a minimum depth of 0.6 m (2 feet) normal to the slope unless otherwise specified. The material cut from the slope shall be incorporated in the fill.

Before placing the materials for the compacted fills, the subgrade therefore shall be moistened, compacted, and scarified in accordance with the requirements hereinafter set forth for subsequent layers of fill. The Project Manager may determine the locations at which each load of fill shall be placed in order to obtain the best possible blending of materials. The fill material shall be placed in approximately horizontal, evenly distributed layers not exceeding 200 mm (8 inches) in depth, except that where the Contractor clearly demonstrates that it can attain the required relative density with the type of equipment being used, a greater lift may be authorized. Unless otherwise permitted by the Engineer, each layer of fill material shall cover the full length and width of the entire area to be filled before the next higher layer of material is placed, and each layer shall be sufficiently scarified, after compaction, to provide bond with the succeeding layer. The top surface of each layer shall have sufficient crown to provide adequate drainage for water at all times during the construction period.

Before rolling or tamping, sufficient water shall be evenly applied to each layer of loose material so as to provide proper moisture content for satisfactory compaction to the specified relative compaction. The material shall be disc harrowed, or otherwise similarly worked, as the water is applied. The moisture content at the time of compaction shall be subject to the approval of the Engineer. In case any layer of fill shall prove to be too wet to permit the attainment of the specified relative compaction, the compacting work shall be delayed until the material has dried sufficiently to permit the attainment of said relative compaction.

After each layer has been spread, worked, and properly moistened, it shall be compacted by approved tamping or sheepsfoot rollers, pneumatic-tired rollers, mechanically operated hand tampers, or other mechanical means acceptable to the Engineer, to such extent as will produce the specified relative compaction.

Compacted fill which is to become subgrade for concrete channel or basin facing slabs, spillways, or other hydraulic structures, shall be overfilled sufficiently to permit the trimming thereof to an even and firm subgrade for the concrete to be placed thereon. No direct payment will be made for such overfill. Any costs involved therefore shall be included in the price bid for the compacted fill.

300 -6.6 Payment. Clearing and grubbing shall be paid for on a lump sum or per hectare (acre) basis as provided in the Specifications.

Stripping, excavation, and compacted fill shall be measured and paid for on a cubic meter (cubic yard) basis as provided for in the Specifications.

300 -7.0 EARTHWORK FOR CHANNELS

300 -7.1 General. Earthwork for channels shall consist of clearing, stripping, excavation, fill, backfill, grading, and disposal of excess excavated and removed material.

Channels for the purposes of this section shall mean open rectangular concrete channels and lined or unlined trapezoidal channels.

300 -7.2 Stripping. When stripping is indicated on the Plans or otherwise specified, the Contractor shall strip the soil from the designated areas to the depths specified.

The material obtained from stripping operations shall be disposed of away from the site unless otherwise specified.

Soil loosened or removed below the stripping depth specified shall be replaced and compacted to not less than 90 percent relative compaction. All such filling and compacting shall be at the Contractor's expense.

300 -7.3 Excavation. Excavation in an open cut for lined channels may be made so as to place concrete directly against excavated surfaces, provided the faces of the excavation are firm, hard, and unyielding; are such as will stand or can be made to stand without sloughing; and are at all points outside the concrete lines shown on the Plans.

Excavated surfaces becoming subgrade for lined channels, or subdrainage material, shall be excavated to the lines indicated on the drawings. Excavation made below subgrade shall be backfilled and compacted to a relative compaction of not less than 90 percent or, with the approval of the Engineer, with concrete or other materials being placed. However, no payment will be made for such overexcavation or material used for the backfill.

Where it becomes necessary to excavate beyond the normal lines of excavation in order to remove boulders or other interfering objects, the voids remaining after the removal of such boulders or interfering objects shall be backfilled as hereinafter specified, or as otherwise approved by the Engineer.

When the void is below the subgrade for reinforced concrete channel, suitable material approved by the Project Manager shall be compacted to a relative compaction of not less than 90 percent or as specified. With the approval of the Engineer, concrete of the same mix as that used in the concrete channel may be used.

The removal of all boulders or other interfering objects and the backfilled of voids caused by such removals shall be at the expense of the Contractor and no direct payment for the cost of such work will be made by the Agency. The cost of such work shall be included in the prices bid for the various items of work.

If, during the progress of excavation, material is encountered which, in the opinion of the Engineer, is unsuitable for subgrade for the structure to be constructed thereon, the Project Manager will direct the Contractor to excavate beyond the pay lines shown on the Plans. However, the suitability of subgrade will be determined by the Project Manager on the basis of its ability to withstand the load of the proposed channel and not upon the capacity to withstand the loads which may be placed thereon by the Contractor's equipment. Should the Contractor be directed to excavate beyond the pay lines shown on the Plans, said pay lines will be extended to include such excavation. The pay lines for subdrainage material, if used, will be adjusted accordingly.

Materials used or work performed by the Contractor beyond the Agency's requirements for stabilization of the subgrade, so that it will withstand the loads which may be placed upon it by the Contractor's equipment, shall be at the Contractor's expense.

300 -7.4 Fill and Backfill. Unless otherwise specified, the material obtained from the project excavations will be suitable for use as fill or backfill, provided that all organic material, rubbish, debris, and other objectionable material contained therein is first removed. However, rocks, boulders, broken portland cement concrete, and bituminous type pavement obtained from the project excavations will be permitted in the backfill or fill with the following limitations:

1) The maximum dimension of any piece used shall be 150 mm (6 inches).
2) Pieces larger than 100 mm (4 inches) shall not be placed within 300 mm (12 inches) of any structure.
3) Pieces larger than 75 mm (3 inches) shall not be placed within 300 mm (12 inches) of the subgrade for paving.
4) "Nesting" of pieces will not be permitted.

Unless otherwise specified, the relative compaction of all fill and backfill shall be 90 percent.

300 -7.5 Grading. Grading of unlined channels, levees, and access roads shall conform to the following tolerances:

A vertical tolerance of zero above and 75 mm (3 inches) below the specified grade will be allowed for:

1) The channel bottom.
2) The channel sideslopes in both cut and fill.
3) The levee and access road sideslopes in cut.

A vertical tolerance of zero below and 75 mm (3 inches) above the specified grade will be allowed on:

1) The top surface of levees and access roads in both cut and fill.
2) The levee and access road sideslopes in fill.

Regardless of the construction tolerances specified, the excavation and grading shall be performed so that the finished surfaces are in uniform planes with no abrupt breaks in the surface. The construction tolerances specified herein for grading are solely for purposes of field control.

300 - 7.6 Measurement and Payment. Clearing, stripping, and excavation shall be measured and paid for on a cubic meter (cubic yard) basis or as specified.

Compacted fill shall be measured and paid for as provided in 300 - 4.9.

All costs involved in backfilling and grading shall be included in the prices bid for the applicable items of earthwork.

300 -8.0 GEOTEXTILES FOR DRAINAGE

300 - 8.1 Trench Drains. Geotextiles for trench drains shall be placed in accordance with the following provisions:

300 - 8.1.1 Placement. Fabric shall be placed in the trench in accordance with the Plans. The fabric shall be placed loosely and seated firmly into the corners. If heat-bonded fabric is used, the bonded side shall be placed to the inside of the trench and the fuzzy side shall face the outside of the trench, against the native soil. Overlapping, if necessary, shall be a minimum of 300 mm (12 inches). Damaged fabric shall be repaired at Contractor's expense by placing new fabric that meets overlap requirements over the damaged area. Fabric shall be covered as soon as possible after being placed, but not later than 7 calendar days after placement. Fabrics left uncovered for more than 7 calendar days shall be removed and rejected.

Trench sides and bottom shall be excavated to provide a smooth surface, free of obstructions and debris. After placement of granular fill, the two edges of the geotextile protruding at the top of the trench shall be overlapped 300 mm (12 inches) on top of the granular fill, and then soil or other materials required by the Plans shall be compacted in the trench to the required grade.

300 - 8.1.2 Measurement and Payment. Geotextiles shall be measured for payment by the square meter (square yard) of fabric placed, not including any fabric for overlaps or splices.

300 - 9.0 GEOTEXTILES FOR EROSION CONTROL

300 - 9.1 Bank and Shore Protection. Geotextiles for bank and shore protection shall be placed in accordance with the following provisions:

300 - 9.1.1 Placement. Prior to placement of fabric, the Contractor shall construct a subgrade in accordance with the Plans and Specifications. The fabric shall be placed loosely (not in a stretched condition), aligned, and placed in a manner to minimize wrinkling. Adjacent borders and ends of fabric shall be overlapped a minimum of 460 mm (18 inches) or stitched when using nonwoven fabrics with a grab tensile strength of 400 N (90 pounds) or woven fabrics with a grab tensile strength of 890 N (200 pounds) or less. Borders and ends shall be overlapped 900 mm (36 inches) or stitched for nonwoven fabrics with a grab tensile strength greater than 400 N (90 pounds) or woven fabrics with a grab tensile strength greater than 890 N (200 pounds).

If the fabric is overlapped, the upstream or higher panel shall overlap the downstream or lower panel. When stitched, the seam shall have seam breaking strength of not less than 80 percent of the minimum required fabric strength. The size and composition of the stitching material and stitching pattern shall be approved by the Engineer. The stitching yarn shall be of a contrasting color.

Anchoring of the fabric at terminal ends and top and bottom of the slope shall be accomplished through the use of key trenches or aprons as shown on the Plans. If the geotextile is placed in a vertical direction on the slope, there shall be no end joints between rolls. If heat bonded fabric is used, the fuzzy side shall be placed against the soil with the heat bonded side up.

The fabric shall be secured with pins placed on 1.8 m (6 foot) centers at the midpoint of the overlaps unless a key trench is used. Pins at 1.8 m (6 foot) centers shall be placed along the top edge of the slope. Spacing of pins shall be reduced to eliminate tearing of the fabric. Pins shall be 300 mm (12 inches) long or of sufficient length to prevent pin movement.

The outer stone cover shall be thick enough to completely prevent penetration of sunlight, unless a bedding layer of aggregate particles greater in size than the openings in the outer stone cover is installed first.

Fabric shall be covered as soon as possible after being placed, but not later than 7 calendar days after placement. Fabric left uncovered for more than 7 calendar days shall be removed and rejected.

Equipment or vehicles shall not be operated on the fabric. Damaged fabric shall be repaired, at the Contractor's expense, by placing new fabric over the damaged area in a manner that meets the overlap requirements for horizontal placement. Vertically placed fabric shall be replaced in its entirety.

300 - 9.1.2 Measurement and Payment. Measurement and payment shall conform to 300-8.1.2.

300 - 10.0 GEOTEXTILES FOR SEPARATION

300 - 10.1 Subgrade Enhancement. Geotextiles for subgrade enhancement shall be placed in accordance with the following provisions:

300 - 10.1.1 Placement. During grading operations, care shall be taken not to disturb or scarify the subgrade. This may require use of lightweight dozers, etc., for low-strength soils such as saturated, cohesionless, or low cohesion soils.

Once the subgrade along a particular segment of road alignment has been prepared, the geotextile shall be unrolled in line with the placement of the new aggregate. The fabric shall not be dragged across the subgrade, and the entire fabric shall be placed and rolled out as smoothly as possible. If heat bonded fabric is used, the fuzzy side shall be placed against the soil, with the bonded side up.

Parallel rolls or ends of fabric shall be overlapped 600 mm (24 inches) or sewn if required by the Plans or Specifications. When indicated on the Plans or Specifications that soils have a CBR less than 5 or an R-value less than 20, a 900 mm (36 inch) overlap shall be used.

The fabric shall be secured with pins placed on 1.8 m (6 foot) centers at the midpoint of all overlaps and at the edges to maintain them during construction activities. Spacing of pins shall be reduced if necessary to eliminate tearing and movement of fabric.

For roadways, fabric widths shall be selected such that overlaps of parallel rolls occur at lane lines. Overlaps shall not be placed along anticipated main wheel path locations.

Overlaps at the end of rolls shall be in the direction of the aggregate placement with the previous roll on top.

When fabric intersects an existing pavement area, the fabric shall extend to the edge of the old system, and the fabric shall be anchored.

The base aggregate shall be placed on the fabric in such a manner and thickness that wheel rutting of aggregate over the fabric is limited to 13 mm (1/2 inch). Unless otherwise indicated, the minimum thickness shall be 300 mm (12 inches). Lightweight dozers shall be used if necessary. Equipment shall not be allowed directly on the fabric.

Before covering, the conditions of the fabric will be observed by the Project Managerto determine that no holes or rips exist in the fabric. All such occurrences shall be repaired by placing a new layer of fabric extending beyond the defect in all directions a distance equal to the minimum overlap required for adjacent rolls.

300 - 10.1.2 Measurement and Payment. Measurement and payment shall conform to the requirements of 300 - 8.1.2.

300 - 11.0 STONEWORK FOR EROSION CONTROL

300 - 11.1 General. Stone for erosion control shall be in conformance with *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 200-1.6 and the following provisions. When shown on the Plans, stonework shall be shall be concreted as specified herein.

300 - 11.2 Placing Stone. Stone for erosion control shall be placed in accordance with the following method:

A footing trench shall be excavated along the toe of the slope, as shown on the Plans. The larger stones shall be placed in the footing trench. Stones shall be placed with their longitudinal axis normal to the embankment face, and arranged so that each stone above the foundation course has a 3-point bearing on the underlying stones. The foundation course is the course placed on the slope in contact with the ground surface.

Bearing on smaller stones which may be used for chinking voids will not be acceptable. Nesting of the smaller stones used for chinking voids will not be permitted. Placing of stones by dumping will not be permitted.

Local surface irregularities of the slope protection shall not vary from the planned slope by more than 0.3 m (1 foot) measured at right angles to the slope.

300 - 11.3 Concrete Stone Slope Protection. Stone for concreted stone slope protection shall be placed in accordance with 300 - 11.2.

300 - 11.3.1 Concrete. Concrete for concreted stone slope protection shall be 310-C-17P (520-C-2500P) and conform to the requirements of *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 201-1, except that the slump of the concrete shall be adjusted to provide the penetration shown in Table 300 - 11.3.1.

TABLE 300 - 11.3.1

Class	225 Kg (500#)	170 Kg (375#)	90 Kg Light	35 Kg Facing
Minimum Penetration in mm (in)	355 (14)	305 (12)	255 (10)	205 (8)

300 - 11.3.2 Placing Concrete. The surfaces of the stone to be concreted shall be cleaned of adhering dirt and clay and then moistened. The concrete shall be placed in a continuous operation for any day's run at one location. Concrete shall be brought to the place of final deposit by buckets or pump. Other placement methods shall be approved by the Project Manager prior to use.

In no case shall concrete be permitted to flow on the slope protection a distance greater than 3 m (10 feet).

Immediately after depositing, the concrete shall be spaded and rodded into place with suitable tools until the minimum penetration is that shown in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Table 300 - 11.3.1.

After the concrete has been placed, the stones shall be thoroughly brushed so that their top surfaces are exposed. The outer stones shall project 1/3 to 1/4 their diameter above the concrete surface. After completion of any 3 m (10 foot) strip, no person or load shall be permitted on the surface for a period of at least 24 hours, or longer if so ordered by the Engineer.

Concreted stone slope protection shall be cured as provided in *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* 303-1.10.

300 - 11.4 Measurement and Payment. Stone and stonework for riprap and erosion control will be measured and paid for per tonne (ton) of stone in place.

Concrete and concrete placement will be measured and paid for per cubic meter (cubic yard) in place.

END OF SECTION

SECTION 31 41 00
SHORING

SPECIAL PROVISIONS
FOR
EL ENCANTO SPECIAL USE AREA

SECTION SH-SHORING

The following Special Provisions amend the latest edition and supplements of the "Standard Specifications for Public Works Construction" (Green Book) adopted by the City of Azusa. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Green Book.

Pre-bid inquiries regarding the work covered in this Section should be directed to Vik Bapna at California Watershed Engineering (714) 385-2600

Reviewed:

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Date

SPECIAL PROVISIONS
FOR
EL ENCANTO SPECIAL USE AREA

SECTION SH-SHORING

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1.1 PART ONE - GENERAL

2.0 SH-1.1 SUMMARY

A. **Work Included**: Provide shoring at open excavations and elsewhere where greater than 5-feet in depth. Shoring shall be furnished, placed, maintained and when applicable removed by the Contractor, as needed to protect workers, materials, other properties and the public. All wood sections or components of the shoring system shall be pressure treated.

B. **Related Work**:

1. Documents affecting work of this Section include, but are not necessarily limited to the latest edition and supplements of the "Standard Specifications for Public Works Construction" (Green Book) adopted by the City of Azusa.

2. As established in the GENERAL CONDITIONS of the Contract, the Contractor is solely responsible for means and methods of construction and for the sequences and procedures to be used.

3. Excavation and Backfilling as applicable, but not limited to the following:

   a. Section 03 00 00 – Concrete Construction.
   b. Section 04 00 00– Masonry Construction.
   c. Section 31 00 00 – Earthwork.

2.1 SH-1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Employ a qualified Engineer having a previously established reputation for at least five (5) years to design the shoring system and to inspect and report on the quality of its construction.

C. Comply with pertinent requirements of governmental agencies having jurisdiction.

D. Coordinate the shoring design and construction with:

1. Soil Investigation Report prepared for this Work;

2. Structural system established for the Work, including location of storm drain facilities, precast and cast in place subsurface facilities, and other features.

3. Utilities established in the site.

E. Regulatory Requirements:

1. Comply with applicable requirements, but not necessarily limited to, shown on the contract Drawings; the most recently adopted City of Azusa Building Code, State of California, Code of Regulations, Title 8 – INDUSTRIAL RELATIONS, Division 1-DEPARTMENT OF INDUSTRIAL RELATIONS, Chapter 4 – DIVISION OF INDUSTRIAL SAFETY, Subchapter 4 – CONSTRUCTION SAFETY ORDERS, Section 1539, 1540 and 1541.

2.2 SH-1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 2-5.3 Submittals.

B. **Design and Calculations**: The Contractor shall design and prepare shoring drawings and make calculations of materials used structurally in excavations, footings and foundation in accordance with the code requirements.

C. **Shop Drawings**: After submitting drawings for shoring to the Consultant or Engineer for review, the Contractor shall incorporate all comments or corrections in the drawings, and submit to WCA for approval, at least three (3) weeks prior to commencement of work. After the approval is obtained, the Contractor shall submit seven (7) duplicated copies of the approved drawings to the Engineer. No excavations shall be started until all the reviews and approval of the shoring design which includes the following minimum items have been obtained from the authorized agencies, and the Engineer:

1. Design assumptions, analysis calculations, and information on Contractor's proposed method of installation and removal of all shoring.

2. The maximum design load to be carried by the various members of the support system.

3. Detailed excavation support drawings, showing all pertinent dimensions, spacings, and relationships among the components of the shoring, as well as construction sequence and scheduling.

4. The method of bracing and preloading, if any.

5. Detailed utility and structure support drawings, where necessary.

6. The full excavation depth and depth(s) below the main excavation to which the support system will be installed.

7. Detailed sequence of construction and loads for various stages of bracing removal.

8. Detailed drawings and descriptions of the method to be used by the Contractor to monitor shoring movements.

9. Types of construction equipments intended to be used in this Project.

10. Method of removing the soil from the trench or shoring.

11. Backfill Materials and Method of Backfill and Compaction.

12. Dewatering Plans, if applicable.

D. Quality Control Submittals:

1. Design Data: All the design and calculations and shop drawings shall be sealed and signed by a professional engineer licensed in the State of California and experienced in the design of earth retaining structures. The professional engineer shall be obtained and paid for by the Contractor.

E. Permits:

1. Submit in accordance with provisions in Section 00 72 00 General Conditions, Section 01 33 00 Submittals, and other Sections of the Project Manual.

2. The Contractor shall submit shoring drawings and calculations to the City of Azusa Building and Safety and obtain and pay for the required permit.

3. Obtain permit(s) as required by Title 8, Division 1-DEPT. OF INDUSTRIAL RELATIONS, Chapter 4 –DIVISION OF INDUSTRIAL SAFETY of the California Code Of Regulation, and pursuant to Subsection 7-10.4.1 - SAFETY ORDERS of SSPWC, prior to excavating to the depth of 5-feet or greater. A duplicate copy of the permit shall be submitted to the Engineer for review prior to a start of excavation.

F. Certification Form: As required by the latest edition and supplements of the "Standard Specifications for Public Works Construction" (Green Book) adopted by the City of Azusa, the Inspector will provide a competent person trench/excavation certification form to the Contractor. It shall be completely filled out before any worker is allowed access to any trench or excavation, and returned to the Inspector before the end of the first working day. The Contractor shall certify by this form the name of the competent person administering the Work, the soil classification, and the type of excavation protective system provided and/or installed.

2.3 SH-1.4 REFERENCES

A. Reference Standards: Comply with the following, but not necessarily limited to:

1. State of California, Division of Occupational Safety and Health Administration (CAL/OSHA).

2. The latest edition and supplements of the "Standard Specifications for Public Works Construction" (Green Book) adopted by the City of Azusa.

   a. Section 306-1.1.6 - BRACING EXCAVATIONS.

2.4 SH-1.5 PROTECTIONS

A. Protect adjacent existing improvements against damage by Contractor's operations. Protect all excavation so that the soil of adjoining property will not cave in or settle. Repair or replace damaged items to the full satisfaction of the City at no extra cost to the City and Owner.

B. Shore, crib or lag excavations and earth banks as necessary to prevent caving in, erosion or gullying of sides.

C. Divert or pump water out of all excavations and trenches until all installation work and backfilling are completed and inspected. Dewatering, if required, shall comply with City of Azusa requirements.

2.5 SH-1.6 INSPECTIONS

A. Excavation of existing fills, reworking of natural soils and compaction of all required fills will be inspected and tested by Owner and the Soils Engineer.

B. Place all such backfill under the full supervision of the Soils Engineer.

2.6 SH-1.7 SYSTEM DESCRIPTION

A. **Design Requirements**:

1. Shoring: Design shoring in accordance with all applicable codes, and in compliance with the approved Soil Investigation Report. All wood components of the shoring system shall be constructed of pressure treated wood in conformance with the code requirement.

2. Loading: Design and construct shoring to withstand all soil and hydrostatic loading that might occur during the various stages of construction and for any surcharging loading caused by equipment loads, loads from material or soil stockpiles, and earthquake-induced loads.

   a. Determine the soil, surcharge, and hydrostatic loading, but in no case shall the loading be less than the earth and minimum equipment surcharge pressures.

   b. Determine the proper load distributions caused by such activities, and assure that those conditions are not exceeded in the field during construction.

c. Design the shoring for lateral earth and water pressures and surcharge loads that could result from construction methods and dewatering activities.

d. Consider sequence of excavation and placement as well as their removal of the lateral support elements in design of shoring.

3. Existing pipes or structures shall not be used to support any portion of the open excavation unless approved by the Engineer in writing.

4. The design of shoring shall conform to accepted engineering practice in this field. Approval of the Contractor's plans and methods of construction by the Consultant, the Engineer or the authorized agencies does not relieve the Contractor of his responsibility for the adequacy of this support.

B. Performance Criteria

1. The Contractor shall be solely responsible for and bear the sole burden of cost for any and all damages resulting from improper shoring or failure to shore.

2. The safety of workmen, the protection of adjacent structures, property and utilities, and the installation of adequate supports for all excavations shall be the sole responsibility of the Contractor.

3. The design, planning, installation, and removal of all shoring shall be accomplished in such a manner as to maintain stability of the required excavation or trench section and to prevent any movement of soil that may cause damage to adjacent structures and utilities, damage or delay the work, or endanger life and health.

1.2 PART TWO - EXECUTION

2.0 SH-2.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until detrimental conditions are corrected.

B. **Existing Utilities:** Contract Drawings show major utilities, but all utilities may not be shown. The Contractor will obtain all as-built records of existing utilities from local government authorities or Utility Companies and field check locations of utilities with representatives of the Utility Company. Protect and provide utility trench support to any sewer, water, gas, electric or other pipelines or conduits uncovered during work from damage.

1. Excavate by hand or other excavation methods acceptable to the utility owner.

2. If existing utilities interfere with Contractor's proposed method of support, any required modification or relocation shall be performed at no additional cost to the City.

3. Contact Underground Service Alert, 811, and obtain underground service alert inquiry I.D. Number 48 hours prior to digging.

C. Provisions for Contingencies:

1. Provide a contingency plan or alternative procedures to be implemented if unfavorable performance is evidenced from the monitoring program.

a. Keep on hand the necessary materials and equipment to implement the contingency plan.

2. If support elements project beyond the vertical projection of the right-of-way shown on the Contract Drawings onto adjoining property, the Contractor shall obtain permission of the adjoining property owner in writing. The Contractor shall bear cost required to obtain such permission.

3. Subsurface Conditions: Evaluate subsurface conditions as excavation occurs.

4. Differing Conditions: Notify the Engineer of differing conditions that could affect the shoring design assumptions.

5. Acceptance: Proceeding with work means acceptance of existing conditions.

6. Notifications: The Contractor shall make all the necessary notifications to the adjacent properties, as described herein before.

2.1 SH-2.2 PREPARATION

A. Protection:

1. Protect or repair utilities damaged by operations of this Section.

2. Protect adjacent structures and property from damage and disfiguration.

B. Dewatering:

1. Where applicable, no excavation shall commence until the Contractor has demonstrated to the satisfaction of the Consultant or Engineer that the groundwater level has been lowered. Dewatering and that the soils inside the excavation are in the dewatered condition that was assumed in the Contractor's shoring design and submittal.

2.2 SH-2.3 INSTALLATION

A. All trench and excavation openings shall be lighted and fenced or barricaded during nights, weekends, and other times as necessary and meet CAL/OSHA safety requirements.

B. All shoring shall be installed to the lines and elevations shown on the Contractor's review working drawings. No component of the shoring shall infringe on the minimum dimensions of any permanent structure shown in the Contract Drawings.

C. The excavation shall be staged as shown in the Construction Drawings or on required work documents and in such a manner as to provide a stable system of support at all times.

D. Should the shoring system utilize steel H-beams, piles, or other similar vertical supports, driving of said vertical supports will not be permitted in proximity of existing structures except for the last 4-feet. The vertical supports shall be placed in holes drilled to a depth of 4-feet above the proposed bottom of pile, except where this procedure is impracticable. The vertical support may then be driven to the required depth, not to exceed 4-feet. During the drilling and driving operations, the Contractor shall take care to avoid damage to utilities.

At locations where the drilling of such holes is impracticable because of the existence of obstructions or rocks, running sand, or other adverse condition, and provided said impracticability is demonstrated to the satisfaction of the Engineer by actual drilling operations by the Contractor, the Engineer may, upon request of the Contractor, approve the use of means other than drilling for the purpose of placing the vertical support. Such other means, however, must be of a nature which will accomplish, as nearly as possible, the purpose of the drilling, namely, the prevention of damage to existing surface or subsurface improvements, both public and private.

2.3 SH-2.4 MONITORING

A. **Inspection:** Comply with Section 00 72 00 – General Conditions.

1. Monitor and record daily readings on the shoring to detect any vertical or horizontal movement. Submit a copy of all the daily readings to the Engineer at the end of each week. Notify the Inspector, Owner, or the Engineer immediately for any excessive movements or deflection.

    a. Measurements shall be referenced from an initial position of the shoring, as jointly established and agreed upon by the Contractor and the Engineer.

b. Horizontal and lateral deflections into the excavation at any location on the shoring shall be limited to a maximum of 1-inch. If at any time this deflection exceeds 1-inch, immediate corrective measures shall be taken by the Contractor to prevent any further deflections.

c. The Contractor shall stop the excavation work until corrective measures have been taken and the deflections have been reduced to acceptable limits as specified.

2. Monitor adjacent ground and structures on both sides of excavations to verify that no settlement is occurring or has occurred as a result of the Contractor's construction activities.

2.4 SH-2.5 REMOVAL OF SHORING

A. Shoring shall be designed to be gradually removed as necessary to allow backfill to be placed and compacted. All voids existing behind the shoring which remains in place shall be backfilled as specified in Section 300 - EARTHWORK.

B. Shoring shall be removed as backfilling progresses. Removal shall be conducted in such a manner so as to avoid any damage to adjacent facilities, or to other members of the shoring system. Impact loading or in members of the shoring system will not be allowed. All wood forms, loose or casual wood and debris shall be removed. Areas that cannot be accessed or achieve adequate compaction shall be backfilled with structural backfill without additional cost to Owner.

C. During backfilling, temporary support elements shall not be removed until alternative support is available, such as substituted struts, backfill, or ability of the support system to act as a cantilever without detrimental deflection.

D. Portions of shoring used to support excavations for installation of sanitary sewer and storm drain facilities shall be removed, with permission of the Engineer or the pipe bedding and side support shall be recompacted to the satisfaction of the Consultant or Engineer.

END OF SECTION

SECTION 31 41 00.5
DRAINAGE

SPECIAL PROVISIONS
FOR
EL ENCANTO SPECIAL USE AREA

SECTION D - DRAINAGE

The following Special Provisions amend the latest edition and supplements of the "Standard Specifications for Public Works Construction" (Green Book) adopted by the City of Azusa. As a reference convenience, these Special Provisions have been arranged into a format which parallels the Green Book.

Pre-bid inquiries regarding the work covered in this Section should be directed to Vik Bapna at California Watershed Engineering (714) 385-2600.

Reviewed:

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_____
Date

SECTION D - DRAINAGE

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1.1 PART 3 – CONSTRUCTION METHODS

2.0 SECTION 300 - EARTHWORK

3.0 300-1 CLEARING AND GRUBBING.

A. 300-1.3 Removal and Disposal of Materials.

Add the following subsection:

1. 300-1.3.3 Construction and Demolition Debris Recycling.

(a) General. Consistent with the Agency's efforts to comply with the California Integrated Waste Management Act of 1989 (AB 939), the Contractor shall reduce, reuse, and/or recycle to the maximum extent feasible, the construction and demolition debris (debris) generated by this Contract thereby diverting the debris from disposal facilities, saving landfill space, and conserving virgin materials and natural resources.

(b) Definitions.

1."**Construction and Demolition Debris (Debris)**" means materials resulting from building, construction or demolition-related activities such as excavation, grading, land clearing, renovation, repair, road work and site cleanup which are considered solid waste pursuant to Section 40191 of the California Public Resources Code. The materials include, but are not limited to, asphalt, brick, cardboard, carpet, cinder block, concrete, concrete with reinforcement bars, drywall, excavated materials, fixtures and fittings, glass, gravel, green waste, metal, mixed rubble, packaging materials, paper, plastics, porcelain, road work materials, roofing materials, rock, sand, site clearance materials, soil, trees, tree stumps and other vegetative matter, stones, and wood waste. Please note the top soil should be retained for re-use on site as directed by Agency.

2."**Deconstruction**" means the process of carefully dismantling a structure, piece by piece prior to or instead of conventional demolition, to maximize the recovery of building materials for reuse and/or recycling.

3."**Delivery Site**" means a recycling facility as defined in Subsection E.14 and recycling or reuse site as defined in Subsection E.15 or any place, including a transfer station as defined in Subsection E.20 where the debris is delivered for the sole purpose of reuse and/or recycling in a manner acceptable to the Director/Designee.

4."**Disposal**" means the process of disposing of debris at a Disposal Facility.

5."**Disposal Facility**" means a Landfill or any location where the debris is taken for Transformation as defined.

6."**Generation**" means the quantity of debris produced by the Work before the debris is reused and/or recycled.

7."**Green Waste**" means all vegetative cuttings, shrubs, stumps, logs, brush, tree trimmings, grass, and related materials which have been separated from other solid waste.

8."**Landfill**" means a solid waste disposal facility that accepts solid waste for land disposal and is operating under a current Solid Waste Facility Permit issued by a local enforcement agency as defined in Section 40130 of the California Public Resources Code and concurred upon by the California Integrated Waste Management Board.

9."**Recyclable**" means material that still has useful physical or chemical properties after serving its original purpose and that can be reused or re-manufactured into additional products.

10. "**Recycle or Recycling**" means the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste and returning them to the economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace, and in a manner acceptable to the Agency. "Recycle" or "Recycling" does not include Transformation.

11. "**Recycling Facility**" means any facility (except a transformation facility) whose principal function is to receive, store, convert, separate, or transfer recyclable materials for processing.

12. "**Recycling or Reuse Site**" means any place other than a recycling facility acceptable to the Agency for recycling and/or reuse of debris.

13. "**Reduce**" means any action which causes a net reduction in the generation and/or disposal of solid waste.

14. "**Reuse**" means the use, in the form as it was produced, and in a manner acceptable to the Agency of material which might otherwise be discarded into a Disposal Facility.

15. "**Site Clearance Material**" means materials such as trees, brush, earth, mixed concrete, rubble, sand, steel, extraneous paper, plastics, and other waste materials generated from site clearance.

16. "**Source Separation**" means the segregation, by the generator, of materials designated for separate collection for materials recovery or special handling.

17. "**Transfer Station**" means a facility utilized to receive solid wastes and to temporarily store, separate, convert, or otherwise process the materials in the solid wastes, and/or to transfer the solid wastes directly from smaller to larger vehicles or railroad trains for transport.

18. "**Transformation**" means incineration, pyrolysis, distillation, gasification, or biological conversion other than composting.

19. "**Wood Waste**" means solid waste consisting of wood pieces or particles which are generated from the manufacturing or production of wood products, harvesting, processing or storage of raw wood materials, or construction or demolition activities.

(c) Recycling Summary. The Contractor shall prepare and submit a Recycling Summary report using the form included as Attachment 1 summarizing the disposal, reuse, and/or recycling activities which occurred throughout the Contract duration. This report shall be submitted to Agency within 30 calendar days after field acceptance of the Work.

Failure of the Contractor to submit the Recycling Summary within the time specified will result in damages being sustained by Agency. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For failure to submit the Recycling Summary within the time specified, the Contractor shall pay to Agency, or have withheld from monies due it, the sum of $10,000.

Execution of the Contract shall constitute agreement by Agency and Contractor that $10,000 is the minimum value of the costs and actual damage caused by the failure of the Contractor to submit the Recycling Summary within the time specified. Such sum is liquidated damages and shall not be construed as a penalty, and may be deducted from payments due the Contractor.

(d) Payment. The cost of construction and demolition debris recycling shall be considered as included in the Contract Unit Price for the various Bid items. As part of the Recycling Summary report, the Contractor shall fill in the blank after the "Construction Demolition and Debris Recycling Requirements Cost:". This cost shall be the incremental cost of complying with the aforementioned requirements. This cost will be used for information gathering purposes only and not for purposes of payment to the Contractor.

2.1 SECTION 306 - UNDERGROUND CONDUIT CONSTRUCTION

3.0 306-1 OPEN TRENCH OPERATIONS.

A. 306-1-1 Trench Excavation.

1. 306-1.1.6 Bracing Excavations

(Additions and Amendments)

(a) General. Add the following after the fourth paragraph:

The design of temporary shoring of excavations shall be in accordance with the approved soils report for this project.

Submittals shall be in accordance with subsection 2-5.3 of Section G.

Working Drawings:
The Contractor shall design and prepare shoring drawings and make calculations of materials used structurally in excavations, footings and foundations in accordance with the code and permit requirements and shall as a minimum provide the following:

1) Each sheet of the shoring working drawings must show the Project title, sheet number, total number of sheets, wet stamp and signature of a California Registered Civil or Structural Engineer experienced in the design of earth retaining structures responsible for the shoring design. The professional engineer shall also inspect and report on the quality of the shoring construction. The professional engineer shall be paid for by the Contractor.

2) Limits of application for the shoring design, with beginning station and end station.

3) Working drawings (plans, sections, elevations, and details), material specifications, notes, construction and removal procedures, etc. necessary for the construction and inspection of the shoring system.

4) Supporting calculations prepared by the responsible Registered Civil or Structural Engineer, who will wet stamp and sign the first sheet of these calculations. The calculations shall show and justify the design loads on the shoring. The calculations shall also show the capacity of the shoring system is adequate to withstand the imposed loads.

5) Shoring design criteria shall be in accordance with City of Azusa requirements.

6) Notes as needed to comply with City of Azusa requirements.

7) A statement confirming the Contractor has reviewed the proposed shoring plans and found them compatible with the site conditions and his proposed construction methods.

8) If shields are proposed, the shoring plans shall clearly indicate the locations and limits proposed. The shoring designer shall verify the field condition and state on the plans that the design conforms with City of Azusa requirements.

The submittal package shall also include:

1) Manufacturer's specifications/data necessary for the review of the proposed shoring as applicable.

2) Traffic Control Plan if it affects the live load surcharge adjacent to any public right of ways or easements on the shoring system.

(b) Vertical Shores for Supporting Trench Excavations.

Add the following before the last paragraph:

Minimum penetration for vertical shores, if required, shall be determined in accordance with City of Azusa requirements. If the ground water level is found to be above the bottom of the excavation, the City of Azusa shall be notified for possible additional or revised shoring requirements.

B. 306-1.3 Backfill and Densification.

1. 306-1.3.1 General.

Add the following:

If excavation materials with excessive moisture content are considered for use as backfill, the Contractor may find it necessary to do one of the following to attain the required relative compaction:

(a) Suitably dry the wet material.

(b) Blend the wet material with dry material, such dry material being from the Project excavation or imported material with a minimum sand equivalent of 20 from sources outside the Project limits.

(c) Waste the wet material and use suitable excavation or imported material with a minimum sand equivalent of 20.

2. 306-1.3.2 Mechanically Compacted Backfill.

Add the following after the second paragraph of this subsection, as amended:

Mechanical compaction methods of placement shall not include a sheepsfoot wheel mounted on a backhoe below 3 feet or 1/2 of the internal diameter, whichever is greater, over the top of the pipe.

3. 306-1.3.7 Imported Backfill.

Replace the first three paragraphs with the following:

Imported soil from a source outside the Project limits for use as backfill shall be clean, free from organic material, trash, debris, rubbish, broken Portland cement concrete, bituminous materials, or other objectionable substances and must have a minimum Sand Equivalency of not less than 20.

The Contractor shall inform the Engineer of the actual street address or location from which the intended backfill material will be furnished not less than 15 days prior to its use. The Engineer will determine the suitability of the material, the compaction of the material shall conform to the requirement of Section 306-1.3.2.

Should the imported material substantially differ from the Agency approved sample, it shall not be used for backfill and shall be removed from the Work site at the Contractor's expense.

ATTACHMENT 1

CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING SUMMARY
EL ENCANTO SPECIAL USE AREA PROJECT

Project Name:_____

Project ID No.:_____

Project Address/Location:_____

Thomas Guide Page/Grid No(s).:_____

Resident Engineer/Inspector:_____

Contractor Information

Company Name:_____

Company Address:_____

Report Prepared by _____ Phone Number:_____

Project Duration: From: _____To:_____

Construction and Demolition Debris Recycling Cost: $_____

Type(s) of Debris Generated	Estimated Quantity Generated (tons, c.y. or units)	Reuse/Recycling		Disposal	
		Estimated Quantity (tons, c.y. or units)	Name of Reuse/Recycling Facility/Site	Estimated Quantity (tons, c.y. or units)	Name of Disposal Facility
Asphalt					
Brick					
Concrete					
Green Waste					
Metal (ferrous)					
Metal (non-ferrous)					
Mixed Debris					
Rock					
Soil					
Trash					
Wood Waste					
Other:					

Other:					
Total					

Notes:

(1) Other debris types may include, but not limited to Ash, Cardboard, Carpeting, Glass, Gravel, Land Clearing Debris, Non-friable Asbestos, Paper, Plastic, Porcelain, Roofing Material, Sand, and Tires. Attach additional sheets if necessary.

(2) If the debris is taken to a transfer station solely for the purpose of reuse/recycling, then list the transfer station as the reuse/recycling facility.

(3) If the debris is taken to a transfer station solely for the purpose to transfer to a disposal facility, then list the transfer station as the disposal facility.

END OF SECTION

SECTION 32 13 13.13
ROUGH WASHED / EXPOSED AGGREGATE FINISH CONCRETE PAVING & STAIRS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes:

C. Related Sections:

Concrete: Section 03 00 00
Earthwork: Section 31 00 00

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new concrete slab and stairs are to be constructed.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Mock-up Panels: Prepare one mock-up panel at the project site to demonstrate proficiency of the workmen, and define the degree of aggregate exposure. Mock-up panels shall be a minimum of 8'-0" x 12'-0". Contractor shall use the methods and materials proposed for use on the final installation. Uniformity in appearance of each panel shall be the responsibility of the Contractor. The approved mock-up shall serve as a standard of appearance for the final work. Landscape Architect to approve finish before continuing the work. See image below for desired finish.

1.5 QUALITY ASSURANCE

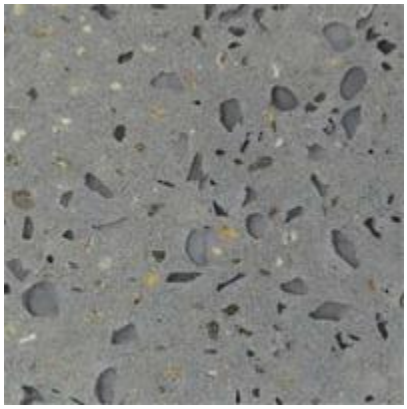
A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

PART 2 – PRODUCTS

2.1 CONCRETE

A. Natural grey concrete.

B. Aggregates to be specified by Landscape Architect.



PART 3 – EXECUTION

3.01 CONCRETE FINISHING

A. General: Do not use tools such as jitterbugs that force the aggregate away from surface.

1. After screeding and consolidating concrete slabs, do not work surface until ready for floating.

2. As soon as concrete will support the mason on knee-boards, float the surface to bring grout to the surface, completely surrounding the aggregate and filling all surface voids. Float to a uniform appearance.

B. Exposing Aggregate: Proceed as soon as the surface grout can be removed by simultaneous brushing and flushing with water without overexposing or dislodging the aggregate. Avoid traffic on the concrete during this operation. High pressure water may be used if desired finish is more easily achieved without harm to the concrete. Use same method of exposure, either with or without retarder, throughout the job.

C. Liquid Chemical Hardener Finish: Apply chemical hardener finish after complete curing and drying of the concrete surface.

1. Dilute liquid hardener with water, and apply in three (3) coats; first coat, 1/3 strength; second coat, 1/2 strength; third coat, 2/3 strength. Evenly apply each coat, and allow 24 hours for drying between coats.

2. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

3. After final coat of chemical hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.1 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 15 40.5
CRUSHED STONE SURFACING

PART 1 – GENERAL

Application and construction procedures shall conform to requirements of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Clearing, excavation, installation of base material and crushed stone for pedestrian path as indicated on Drawings.

C. Related Sections:
   Earthwork: Section 31 00 00

1.2 SYSTEM DESCRIPTION

A. Crushed stone trails are built with 3/8" minus crushed stone (also called crusher fines, cinder or rock dust). They are all-season surfaces accessible to strollers, wheelchairs and road bikes.

B. If built properly and with rolling grade dips for drainage, crushed stone trails can meet Americans with Disabilities Act (ADA) Accessibility Guidelines.

C. Unless otherwise indicated on the Drawings, sub-grade soils shall be graded 8" below final finish grades indicated on the Drawings. A 4" layer of aggregate base and 4" layer of crushed stone shall be installed, moistened and rolled to a uniform finish grade.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a five pound sample and sieve analysis per ASTM C 136 for crushed stone.

1.5 MOCK-UP

A. Install 25 square feet minimum of crushed stone surfacing, including base course and edging, at location approved by Landscape Architect.

B. Landscape Architect to view mock-up before proceeding with rest of crushed stone surfacing.

C. Approved mock-up may remain as part of completed Work.

1.6 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.7 DELIVERY, STORAGE AND HANDLING

A. Protect crushed stone mix from contamination. Store under cover.

B. Do not install crushed stone during any rainy conditions.

PART 2 – PRODUCTS

2.1 MATERIAL CRUSHED STONE

A. Crushed stone (also called crusher fines, cinder or rock dust) shall be screened to include stone particles of 3/8" minus.

A sieve analysis for trails, using 3/8" minus crushed stone, typically describes the material with the following specifications:

- 3/8 inch sieve - 100% passing
- 1/4 inch sieve - 65% passing
- 3/16 inch sieve - 50% passing
- 1/8 inch sieve - 35% passing
- 1/16 inch sieve - 25% passing

B. The crushed stone shall exhibit the 3 critical characteristics for trails construction. Without these, the material shall be deemed inadequate.

- The rock source is crushed into irregular angular particles that interlock and bind into a firm matrix.
- The material has particles ranging from dust to a specified maximum particles size in order to mechanically bind the matrix.
- The material must retain all of its original binders in order to be re-compacted to a firm surface after shaping, wetting and vibratory compaction.

C. The parent rock shall be of significant hardness and contain adequate amounts of fines, so that the crushed rock binders are strong.

D. Particles shall be angular (such as andesite, dolomite, certain types of granite) to easily wet and compact to meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Fines with too many rounded particles (some decomposed granites) are not acceptable; they will not interlock and will yield a loose surface.

E. Proper compaction is required, and will be the result of:

- Proper wetting and compaction during installation
- Particle angularity
- Trail grades less than 6% unless specified
- Adequate amounts of natural soil cements or fines in the parent material that act as binders

F. Crushed stone shall be supplied by

Sunburst Decorative Rock
282 Live Oak Avenue
Irwindale, CA 91706
626.446.4994

and shall be decorative crushed granite.

Landscape Architect to approve material.

2.2 BASE COURSE MATERIAL

A. Comply with Greenbook Section 200-2 – "Untreated Base Materials" for crushed aggregate base See Engineer's spec for base course.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.

3.2 PREPARATION

A. Excavation: Excavate to depth required so edges of crushed stone path surfacing will match adjacent grades and have a maximum cross slope of 1 percent.

B. Subgrade Preparation: Comply with Greenbook Section 301-1 – "Subgrade Preparation."

C. Base Course Installation: Comply with Greenbook Section 301-2 – "Untreated Base."

3.3 INSTALLATION

A. Prior to installation, thoroughly presoak surface on which stabilized decomposed granite surfacing is to be placed.

3.4 PREPARATION OF SUBGRADE

A. The sub-grade shall be graded to an elevation 8" lower than the finish grades indicated on the Drawings. After the paths are graded to the required elevations, they shall be compacted and/or rolled as required by Section 31 00 00. Sub-grade shall have a uniform surface, free from any irregularities.

B. All roots and rocks shall be removed.

3.5 INSTALLATION OF AGGREGATE BASE

A. 3/4 inch Aggregate Base, Class 2.

B. 4" finish layer, wetted and compacted in 1" lifts.

3.6 INSTALLATION OF CRUSHED STONE

A. A 4" finish layer of crushed stone shall then be spread over the entire area in 1" lifts. Spread the material over area of concern, grade and smooth as desired. Thoroughly water entire area so that the entire depth of the material is moist. Crushed stone must be wetted to saturation and compacted with a vibratory roller or plate compactor. Surface shall be filled as required and again rolled to a uniform grade with proper drainage and sloped.

B. Proper installation and compaction shall produce a solid, compacted surface that resists significant deformation from hiking boots and mountain bike tires.

3.7 PROTECTION

A. Protect the Work of this section until Completion.

3.8 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.9 SITE REHABILITATION

A. After cleanup the trail and surrounding impacted area shall be made to look as natural as possible.

3.10 MAINTENANCE/"REFRESHING"

A. Some "refreshing" of trail surfacing material is required on a routine basis. If the surface of a crushed stone trail becomes loose and uncompacted over time it can often be wetted, reshaped and recompacted provided the fines have not sifted to the bottom and the larger particles floated to the top.

END OF SECTION

SECTION 32 15 40
DECOMPOSED GRANITE SURFACING

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes:
   1. Furnish and install decomposed granite with stabilizer.

C. Related Sections:
   Landscape Edging 32 94 13

1.2 SYSTEM DESCRIPTION

A. Unless otherwise indicated on the Drawings, sub-grade soils shall be graded 4" below final finish grades indicated on the Drawings. A 4" layer of decomposed granite with soil stabilizer shall be installed, moistened and rolled to a uniform finish grade.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Product Data: Submit manufacturer's material safety data, product literature, mixing, and application procedures for soil stabilizer.

C. Submit a five pound sample and sieve analysis per ASTM C 136 for decomposed granite.

1.5 MOCK-UP

A. Install 25 square feet minimum of crushed stone surfacing, including base course and edging, at location approved by Landscape Architect.

B. Landscape Architect to view mock-up before proceeding with rest of crushed stone surfacing. Approved mock-up may remain as part of completed Work.

1.6 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.7 DELIVERY, STORAGE AND HANDLING

A. Do not install stabilized decomposed granite during any rainy conditions.

PART 2 – PRODUCTS

2.1 MATERIAL DECOMPOSED GRANITE WITH SOIL STABILIZER

A. Decomposed granite shall be a derived from the crushing and screening of naturally friable granite material conforming to Subsection 400-2.3 of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and shall comply with the following gradations: The granite is to be screened to include stone particles of ½"minus. The particles that pass the 200 screen mesh as determined by ASTM methodology shall not exceed 18 percent. The sand equivalent shall be a minimum of 30 and the R-value shall be a minimum of 70. The optimal moisture content shall be 2% min. in order to achieve proper compaction.

B. Soil stabilizer shall be a non-toxic, colorless, odorless, organic powder that binds decomposed granite screenings. The stabilizer shall be manufactured by Gail Materials, or equal. Stabilizer shall be blended at the rate of 12 pounds per ton of material. Blending of the stabilizer and decomposed granite shall be provided by supplier off-site prior to installation. Stabilizing organic binder as distributed by Gail Materials shall have a minimum swell volume of 32 ml/gm. The binder shall be incorporated with the granite fines by the use of a pug mill that includes a weight belt feeder that insures the proper ratio of binder to granite fines. Blending with the use of a bucket loader or similar is not acceptable. For pathways the binder shall be blended at the rate of 12 lbs. per ton of granite fines. For parking lots or roadways the binder shall be incorporated at the rate of 14 lbs. per ton.

C. Decomposed Granite shall be Pyrite Gold and shall be supplied by Gail Materials,1256 Magnolia Avenue Corona, CA 92879 (951) 279-1095.

PART 3 – EXECUTION

3.1 PREPARATION OF SUBGRADE

A. The sub-grade shall be graded to an elevation 4" lower than the finish grades indicated on the Drawings. After the paths are graded to the required elevations, they shall be compacted and/or rolled as required by Section 31 00 00. Sub-grade shall have a uniform surface, free from any irregularities.

3.2 INSTALLATION OF DECOMPOSED GRANITE WITH STABILIZER

A. 4" finish layer of decomposed granite with stabilizer shall then be spread over the entire area in 2" lifts to received material finish grades. For each 2" lift evenly spread the material over area of concern, grade and smooth as desired. Thoroughly water entire area so that the entire depth of the material is moist. After a period of +/- 6 hours, while the stabilized decomposed granite is still moist, compact the final lift with a 1000-3000lb drum roller to provide at least 95% relative compaction. Surface shall be filled as required and again rolled to a uniform grade with proper drainage and sloped. Compaction with a wacker or vibratory roller is not permitted. Allow for a sufficient curing period of +/- 4 days prior to use.

3.3 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.4 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 34 00
FABRICATED BRIDGES

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. *Additional specifications to be provided by Hughes Brothers, Inc..*

B. Provisions of Division 01 apply to this section.

C. Section includes construction of wood deck bridge.

D. Related Sections:

Section 03 00 00	Concrete
Section 03 11 16	Architectural Cast in Place Concrete
And Sheet C-1.08	Structural Notes

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, a new Glu-Laminated Pedestrian Trail bridge will be constructed atop concrete walls.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all materials.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, anchorages, and jointing methods.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for preceding 10 years, in manufacture laminated wood bridges.

B. Installer's Qualifications: Installer regularly engaged, for preceding 10 years, in installation of similar construction.

1.6 DELIVERY, STORAGE AND HANDLING

A. Lift using wide-belt type slings. Do not use wire rope or ropes containing tar or other substances which may cause staining. Do not use pinch or damage wood.

B. Store and handle wood to prevent damage due to moisture, contaminants, breakage, chipping or other causes.

C. Store wood on wood skids or pallets, covered with non-staining, waterproof membrane.

D. Protect stored wood from weather with waterproof, non-staining covers or enclosures.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install under environmental conditions outside manufacturer's limits

B. During temporary storage on site, cover wood exposed to weather with non-staining waterproof coverings, securely anchored.

PART 2 – PRODUCTS

2.1 GLU-LAMINATED WOOD TRAIL BRIDGE

A. Glu-Lam Panel Bridge C4996-B1 Glu-Laminated Trail Bridge with complete timber bridge superstructures made of douglas-fir laminates. Bridge can be supplied in kits or completely pre-assembled where possible.

2.2 BRIDGE SUPPLIER

HUGHES BROTHERS, INC.
210 N. 13th Seward, NE 68434
Phone (402) 643-2991 fax (402) 643-2149

or approved equal

PART 3 – EXECUTION

3.0 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify stone assembly pattern and start point.

C. Verify that items built-in under other sections are properly located and sized.

3.1 PREPARATION

A. Protection: Protect all parts from exposure to rain, ice, and staining from mortar droppings, sealant and other substances or sources that may cause staining.

B. Establish lines, levels and coursing. Protect from disturbance.

C. Clean wood prior to erection. Do not use wire brushes or implements which will mark or damage exposed surfaces.

3.2 INSTALLATION

A. Install per project Civil Engineering plans and specifications.

B. Install per manufacturers plans and specifications.

C. Finishes for wood and metal fasteners to be selected by Landscape Architect.

D. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

E. Do not impair appearance or strength of wood bridge by cutting, scratching, marring or otherwise damaging.

3.3 CLEANUP

A. As a general rule, wood should be cleaned only with water or with light detergent.

B. Keep wood work as clean as possible as work progresses. Upon completion clean stone thoroughly with water or detergent and water and fiber brushes. Thoroughly rinse when complete with clean water. Do not use acids or wire brushes.

C. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SPECIFICATIONS

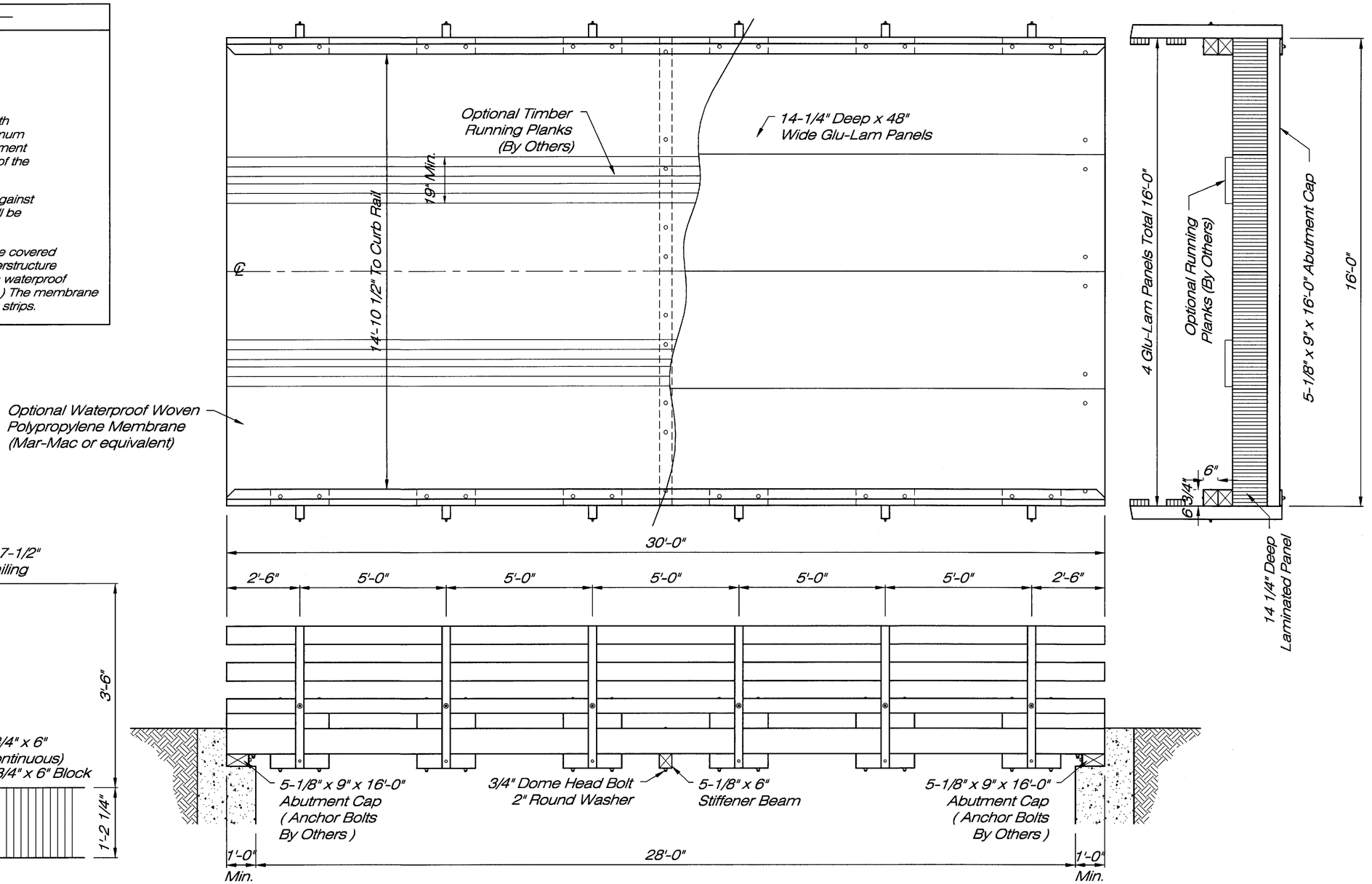
DESIGN: These drawings meet H20 design loads. Live load deflection limit of span divided by 400.

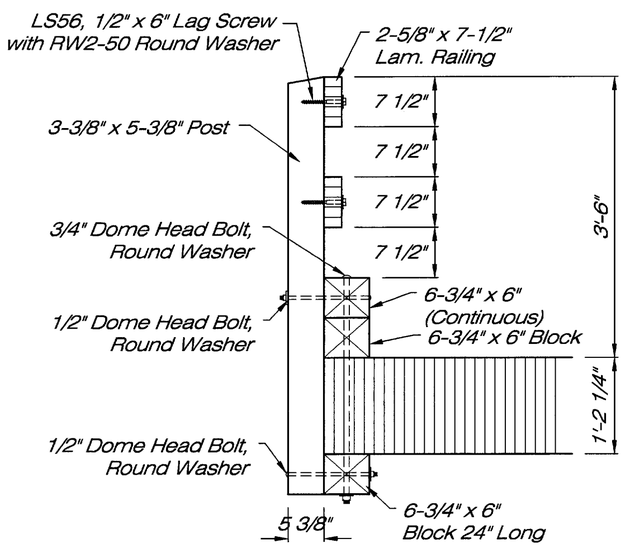
LUMBER: All lumber called for by these drawings shall be Douglas Fir-Laminate

TREATMENT: All lumber shall be pressure treated with Pentachlorophenol using A type "A" solvent, To a minimum retention level of 0.6 pounds per cubic foot. This treatment shall be done after all fabricating, cutting, drilling, etc. of the timber members.

HARDWARE: Malleable iron washers shall be used against wood, unless otherwise noted. All other hardware shall be galvanized A36 or A307 steel.

OPTIONAL SURFACING: The bridge deck shall not be covered until after the initial rod stressing takes place. The superstructure shall be cleaned of dirt and debris then covered with a waterproof woven polypropylene membrane (Mar-Mac or equal) The membrane shall be self-adhering or fastened securely with furring strips.





Curb & Rail Detail

Bridge Drawn For:
Vista Developers, Hendersonville, NC

C4996-B1
Glu-Lam Panel Bridge

CONFIDENTIAL
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Revision

Hughes Brothers
TIMBER BRIDGES FIBERGLASS REBAR

Drawn RP/LV

Date © 5-4-2006 HBI

Date Printed

C4996-B1

Consumer Information Sheet

PENTACHLOROPHENOL PRESSURE-TREATED WOOD

CONSUMER INFORMATION

This wood has been preserved by pressure-treatment with an EPA registered pesticide containing pentachlorophenol to protect it from insect attack and decay. Wood treated with pentachlorophenol should be used only where such protection is important.

Pentachlorophenol penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to pentachlorophenol may present certain hazards. Therefore, the following precautions should be taken both when handling the treated wood and in determining where to use and dispose of the treated wood.

USE SITE PRECAUTIONS

Logs treated with pentachlorophenol should not be used for log homes.

Wood treated with pentachlorophenol should not be used where it will be in frequent or prolonged contact with bare skin (for example, chairs and other outdoor furniture), unless an effective sealer has been applied.

Pentachlorophenol-treated wood should not be used in residential, industrial, or commercial interiors except for laminated beams or building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Wood treated with pentachlorophenol should not be used in the interiors of farm buildings where there may be direct contact with livestock which may crib (bite) or lick the wood.

In interiors of farm buildings where domestic animals or livestock are unlikely to crib (bite) or lick the wood, pentachlorophenol-treated wood may be used for building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Do not use pentachlorophenol-treated wood for farrowing or brooding facilities.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such sites would be structures or containers for storing silage or food.

Do not use treated wood for cutting-boards or counter-tops.

Only treated wood that is visibly clean and free of surface residue should be used for patios, decks and walk-ways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Pentachlorophenol-treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

Do not use Pentachlorophenol-treated wood where it may come into direct or indirect contact with drinking water for domestic animals or livestock, except for uses involving incidental contact such as docks and bridges.

HANDLING PRECAUTIONS

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g. construction sites) may be burned only in commercial or industrial incinerators or boilers rated at 20 million BTU/hour or greater heat input or its equivalent in accordance with state and Federal regulations.

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

Avoid frequent or prolonged skin contact with pentachlorophenol-treated wood; when handling the treated wood, wear long-sleeved shirts and long pants and use gloves impervious to the chemicals (for example, gloves that are vinyl-coated).

When power-sawing and machining, wear goggles to protect eyes from flying particles.

After working with the wood, and before eating, drinking, and use of tobacco products, wash exposed areas thoroughly.

If oily preservatives or sawdust accumulated on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Urethane, shellac latex epoxy enamel and varnish are acceptable sealers for pentachlorophenol-treated wood.

SECTION 32 80 00
LANDSCAPE IRRIGATION

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "*Greenbook" Standard Specifications for Public Works Construction, Latest Editio*n, and any supplements.

The contractor shall be responsible for obtaining all necessary permits.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section Includes:
   1. Irrigation system.
   2. Line voltage connection of irrigation controller.

C. Related Sections:
   1. Section 32 90 01 – Landscape Planting for Native Plants.
   2. Section 32 91 00 – Planting Preparation.

1.2 SUBMITTALS

A. Materials List: Provide manufacturer's name and description of items to be furnished.

B. Product Data: Provide catalog cuts, technical data, and manufacturer's specifications.

C. Shop Drawings: Provide Shop Drawings indicating proposed system layout, locations of controllers, valves, (existing) backflow devices, (existing) flow sensors, (existing) master valves, heads and all points of connections. Include details for sleeves, yard boxes, backflow devices, and controller installations.

D. Provide proof of purchase for all energy saving devices to the Owner. Owner will receive rebates as part of energy savings program.

E. RECORD DOCUMENTS
   1. Before Contract Completion, provide project record documents as follows:
      a. Control Diagrams: Submit three controller charts, with one copy laminated in plastic, for each controller.
      b. Controller chart shall be a reduced drawing of the section of the record drawings that pertain to each individual controller and shall fit inside the controller housing with a maximum size for readability.
      c. Controller chart shall be a C.A.D. print with differentiating pastel or transparent colors applied to indicate area of coverage for each numbered station.
      d. Indicate the location of each numbered sprinkler controlled valves and quick coupling valves with legible dimensions from two permanent points of reference such as building corners or sidewalks.
      e. The controller charts shall indicate all remote control valves, quick couplers, controllers, flow sensors and master valves, backflow devices, point of connections, and sprinkler head manufacturer and type of sprinklers for each zone. Each zone shall be colored differently.
   2. Closeout Submittals-As Built:
      a. Submit three (3) copies of as built including complete list of materials, manufacturer’s name, and product installation literature.
      b. Record drawings: Submit dimensioned drawings and details, before Contract Completion.
      c. Record Drawings shall contain the following:
         1) As-Built shall be computer generated (C.A.D.)

2) Print shall show the locations of the numbered remote control valves, manual control valves, locations and size of all supply and lateral lines, location and type of all sprinkler heads, quick coupling valves, gate valves, backflow devices, point of connections, controllers and all other related equipment.
3) Dimensions shall be legible from two permanent points of reference such as buildings and sidewalks.
4) Drawings shall be 24 inches x 36 inches minimum size.

3. Operation and Maintenance Manuals:
   a. Provide complete operating and maintenance instruction manuals for all equipment.

1.3 REFERENCES

A. American Society for Testing and Materials International (ASTM):
   1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
   3. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   4. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

B. American Society of Mechanical Engineers International (ASME):
   1. B36.10M - Welded and Seamless Wrought Steel Pipe.

C. American National Standards Institute (ANSI):
   1. ANSI B125.1 **-** Welded And Seamless Steel Pipe.
   2. ANSI B125.2 **-** Black/Hot-Dipped Zinc Coated Welded/Seamless Pipe.

D. Federal Specifications:
   1. FS WW-P-460 - Pipe Fittings: Brass Or Bronze.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with local, municipal and state laws, rules, and regulations governing or relating to this Work. Wiring shall conform to National Electrical Code and local codes.

B. Best Management Practices: Conform to “Handbook Five: A Guide for Implementing Large Scale Irrigation Projects” as required by California's Updated Model Water Efficient Landscape Ordinance (Assembly Bill 1881).
   1. AB 1881 California Calculation of Estimated Applied Water Use (EAWU).
   2. AB 1881 California Calculation of Maximum Applied Water Allowance (MAWA).

C. Conform to California Code of Regulations, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.

D. Manufacturers Instructions: The manufacturer's instructions and detailed drawings shall be followed in all cases where the manufacturers of products and/or materials furnish installation details not indicated in the Drawings and Specifications.

E. Qualifications: Work shall be performed by skilled workers with a minimum of 5 years experience in work of similar scope and complexity.

1.5 PRODUCT HANDLING

A. Do not damage materials during handling, loading, unloading, and storage of pipe and fittings. Store materials under cover, protect from direct sunlight. Transport materials in a manner to avoid undue stress on piping and other materials.

B. Do not install damaged materials or products into the Work.

1.6 PROJECT CONDITIONS

A. Before excavation, contact the "Underground Service Alert of Southern California" (USASC) for information on buried utilities and pipelines.

1.7 TESTING AND INSPECTION

A. Notify the Inspector 24 hours in advance of the pressure side piping inspection.
   1. Pressure Side Piping: After all welded joints have cured for at least 24 hours, all lines flushed and outlets are capped, the system shall be tested under normal street water pressure for a minimum of 4 hours. All joints shall remain exposed for inspection during the pressure test. Center loading of piping with small loads of sand backfill to prevent arching or slipping under pressure is permitted.
      Correct all defective Work and repeat tests until the entire system is tested watertight.

B. Submit a request for a final inspection 48 hours in advance. Perform a coverage test to determine if the coverage of water to planting areas is complete and adequate as required.

C. Final Inspection: The following items shall be considered part of the final inspection:
   1. All specified products and materials.
   2. Irrigation coverage test, providing 100% head to head coverage for overhead sprays, and complete rootball irrigation for all bubbler systems.
   3. Soils compacted in trenches and around sprinkler heads, level with existing grades.
   4. Controller and cabinet installation.
   5. Sprinkler control valves and boxes.
   6. Backflow devices, pressure regulators, pumps.
   7. Automatic sensors.
   8. Final site review shall include operating each system in its entirety in the presence of the Landscape Architect or Inspector.
   9. Provide any required adjustments and correct defective Work as required.

1.8 MAINTENANCE

A. Extra Materials, Tools and Accessories:
   1. Spare Sprinkler Heads: Furnish six spare sprinkler heads, with inserts for each type, size and series installed.
   2. Keys and Wrenches:
      a. Keys: Furnish two tagged pin tumbler type keys.
      b. Wrenches: Furnish two sets for each type of sprinkler head or nozzle.

B. Training:
   1. Before substantial completion provide at least 4 hours of training, by an authorized representative of the controller manufacturer, for each type of irrigation controller installed.
   2. Instruct designated Owner personnel on operation and programming of the irrigation controller and hand held controller, demonstrating all program features.
   3. Review “As-Built” plans with Owner's personnel and explain the following features: rain sensors, and locations of critical valves.
   4. Provide an attendance sheet to the Owner listing all personnel trained.

1.9 WARRANTY

A. Provide a 5 year manufacturer's warranty for controller units.

B. Provide a 1 year warranty for workmanship, including restoration of planted or paved areas due to settlement of trenches.

PART 2 – PRODUCTS

2.1 IRRIGATION SYSTEM

A. All systems shall be automatic with electrically operated control valves.

B. Provide 100% head to head triangulated coverage or other required 100% configuration.

C. Point of connection (POC) for all irrigation systems:
   1. Provide a single POC on a designated irrigation meter, with flow monitoring, unless otherwise indicated on the Drawings.

D. No PVC piping of any kind will be permitted for above grade pressure lines.

E. Full meter protection is required for all irrigation systems by installing reduced pressure principle backflow prevention devices unless otherwise noted on drawings.

F. Install isolation valves in order to avoid a total system shutdown for maintenance and repairs. Include valves to isolate loop system and major branch lines.

G. Irrigation System shall incorporate the following requirements:
   1. The flow velocity shall not exceed five (5) feet per second for pressure/lateral lines based on industry standard friction pressure loss values.
   2. Pressure line pipe size shall be sufficient to support a minimum of two control valves operating at the same time, one valve opening while another is closing.
   3. G.P.M. demand and sprinkler head coverage shall follow the manufacturer's requirements.

2.2 MATERIALS

A. Provide only new materials, of brands and types noted on Drawings and in the Specifications.

B. Plastic Pipe and Fittings:
   1. Plastic Pipe: Schedule 40, extruded from 100 percent Virgin Polyvinyl Chloride (PVC) Compound, meeting requirements of Class 12454-B of ASTM D1784.
      a. Plastic pipe shall be continuously and permanently marked with the following information: Manufacturer's name, nominal pipe size, Schedule or Class, SDR (Standard Dimension Ratio, or pressure rating in psi) National Sanitation Foundation (NSF).
   2. Plastic fittings: Schedule 40 molded from PVC Type I Compound, conforming to the requirements of specification ASTM D2466.
      a. Plastic Nipples: PVC schedule 80 conforming to ASTM D2467.
      b. PVC male threaded fittings are not allowed.
   3. PVC primer and solvent for chemical weld of pipe and fittings shall be as recommended by pipe manufacturer. Containers for solvent and primer shall be clearly marked with manufacturer's data. Solvent and primer shall not be more than one year old. Blue or red hot glue is not permitted.

C. Valves:
   1. Gate valves shall be: Watts FBV – Line Size.
   2. Quick coupler valves shall be all brass, 1 inch, with lock top and rubber cap: 33 DNP.
      a. Quills shall be the same manufacturer as quick coupler valve, cast bronze, machine shank, stainless steel or bronze lugs.
   3. Coupler keys (quills) shall be from the same manufacturer as quick coupler valve; cast bronze with stainless steel or bronze lugs.
   4. Master valve shall be: Superior 3100.
   5. Remote Control Valve shall be: Rainbird EFB-PRS-D

D. Controller:
   1. Calsense ET-2000-24-LR-RR w/ TP1, TP110 and LR-DOME: 24-station controller with stainless steel pedestal cabinet, Strong Box model SB-24SS/120V
      a. Install inside restroom chase.

E. Tipping bucket rain gauge
   1. Rainmaster EV-SEN-RN
      a. Mount on restroom

F. Flow Sensor
   1. Calsense FM-2

G. Rotors
   1. Hunter rotors – MP 2000 series – See Irrigation Plan, L-2.01

H. Spray Nozzles
   1. Toro Precision series spray nozzles – 570 Z-PRX series – See Irrigation Plan, L-2.01

I. Tree Bubblers
   1. Toro 570Z-PRX-O-T-4X18SST

PART 3 - EXECUTION

3.1 CONNECTIONS TO SUPPLY

A. Source(s) of water supply shall be as indicated on the Drawings.

B. Connection to piping shall be provided with proper fittings:
   1. When connecting to point of connection (POC) above grade all pipes shall be brass or copper with required fittings unless otherwise indicated.
      POC from above to below grade transition shall be brass or copper pipe to a depth of 18 inches from top of pipe.
   2. No steel pipe or fitting shall be installed below grade.
   3. When connecting plastic pipe to copper, brass, or steel material, provide a schedule 80 PVC nipple.
   4. All exposed copper or brass material above grade shall be painted green in color.
   5. Connect steel and copper pipe or tube with a 6-inch brass nipple.
   6. A 1” conduit from a submaster zone controller to nearest building (maintenance room) shall be installed and located on the as-built drawings to provide for future control system. This conduit shall be labeled for its use.

3.2 PIPE INSTALLATION

A. Excavate trenches deep enough to provide earth coverage of 12 inches for non-pressure lines and 18 inches for pressure lines, from finished grades to top of pipe. Bottom of trenches shall be free of rocks, clods and other sharp-edged objects. Below grade piping shall be installed on a firm sand bed for its entire length.

B. Plastic pipe and fittings shall be solvent welded. PVC pipe ends shall be cut ninety (90) degrees and cleaned of all cutting burrs prior to cementing. Use approved reaming tool. Pipe ends shall be wiped clean with a rag and lightly wetted with PVC primer. Cement shall be applied with a light coat on the inside of the fitting and a heavier coat on the outside of the pipe. Pipe shall be inserted into the fitting and given a quarter turn to seat the cement. Excess cement shall be wiped from the outside of the pipe. The pipe will be tested as indicated in article 1.07.

C. Cure welded joints at least 15 minutes before moving or handling, and at least 24 hours before applying pressure to system, unless otherwise recommended by joint solvent manufacturer.

D. Pressure piping installed under a driveway or sidewalk shall be sleeved. The sleeves shall be two pipe sizes larger than the pressure piping.

E. Piping through cement and asphalt pavement shall be L type copper with ¼ inch of foam wrap or other required material around the pipe to allow for expansion.

F. All holes cored through walls shall be two pipe sizes larger to allow for foam wrap around pipe.

G. PVC pipes shall not be installed above grade unless reviewed by the Architect.

H. Lettering shall be face up on all below grade PVC piping. Pipe serving tree areas shall be located not less than 30 inch from center of tree area.

3.3 IRRIGATION HEAD INSTALLATION

A. Install all sprinkler heads with 100% triangulated head to head coverage or other required 100 % head to head coverage method where indicated.

B. To insure proper coverage spray heads and rotary heads shall be installed on separate control valves.

C. Install heads and or change heads, nozzles, or orifices as may be required to provide coverage.

D. Branch lines, swing joints or sprinkler risers shall not be sized smaller than the sprinkler heads inlet they serve.

E. Rotary Heads:
   1. Prior to installing heads, thoroughly flush main and lateral lines with full line pressure. Repeat whenever system is opened up for repairs or replacements. Start flushing operation at highest point of delivery and proceed to lowest.
   2. Risers to rotary heads shall be installed plumb and secured in position with thoroughly compacted sand.
   3. In new hydroseed areas, rotary heads shall be temporarily set 3 inch minimum above grade and then lowered into permanent position as required.
   4. Part circle rotor heads shall be adjusted to completely avoid the overspray water onto adjacent track or paving surfaces, per AB1881.
   5. Adjust spray nozzles to avoid overspray and so entire system will be evenly balanced as required.
   6. Install rotary heads on factory assembled triple-swing joints or triple-swing joints assembled with PVC Schedule 80 nipples and Marlex 90 degree elbows.

F. Pop-up Head Installation:
   1. Pop-up head shall be installed flush with finished grade and 12 inches from edge of walks, and 12 inches from buildings to parking areas, or whenever sprays are located adjacent to impervious surfaces.
   2. Install pop-up heads on factory assembled triple-swing joints or triple-swing joints assembled with PVC Schedule 80 nipples and Marlex 90 degree elbows.

3.4 VALVE BOX INSTALLATION

A. Automatic control valves shall be enclosed in valve boxes of HDPE or pololefin fibrous material, with locking lids.

B. Valve boxes shall be of sufficient size to provide no less than 1-1/2 inch of clearance on all sides of equipment installed within. The bottom section shall be slotted so as to extend below the pipe. Extensions shall be added as required to meet grade requirements.

C. Valve boxes installed in concrete or asphalt shall be set one inch below pipe and extensions shall be added as required to meet grade requirements. A homogeneous finished material shall surround valve boxes 4 inches below finished grade and match existing grade conditions.

D. All valve boxes shall be installed level to finish grade except in ground cover areas which shall extend 2 inches above finish grade.

E. Bottom of valve boxes shall be set level on 4 full size corner bricks on 2 inches of gravel bed.

F. Pea gravel shall be filled up to the bottom of the manual and remote valve and at least 4 inches of gravel inside of the valve box.

3.5 QUICK COUPLER VALVES AND ASSEMBLIES

A. Quick couplers shall be one inch all brass with one or two piece bodies and locking brass tops with rubber cover.
   1. In all applications other than Baseball infield, football fields or athletic fields, install next to walkways.
   2. Top of quick coupler assembly shall be installed within 2 inches from bottom of cover.

3.6 VALVES

A. Isolation and Shut-off Valves:
   1. Pressure piping system shall be furnished with valves at all points indicated on Drawings or specified.
   2. Valves shall be installed with the best of workmanship, neat appearance, and groupings, so all parts are easily accessible. Valves near walks, curbs etc., shall be set in 12 inches and parallel to the adjacent surface. Remote control valves shall be installed in ground cover or shrub areas wherever possible.
   3. Valves shall be full size of line in which they are installed unless otherwise indicated.

B. Remote Control Valves:
   1. Remote control valves shall be low wattage (24 volts,) and shall be capable of operating properly on no larger than #14 gauge UF wire.
   2. All remote control valves shall be adjustable to control flow of water through valve adjustments and shall be accessible through valve boxes installed above each valve. Valves shall be highest quality of manufacturer.
   3. Remote control valves shall be installed and adjusted so that sprinkler heads operate at pressure recommended by head manufacturer. Remote control valves shall be adjusted so that sprinkler heads to planting areas from each individual valve system applies a uniform distribution of water.
   4. All remote control valves on any line shall be installed 3 inch minimum, 8 inch maximum below finish grade to top of flow control stem.
   5. All remote control valves shall be installed with schedule 80 PVC nipples on each side of the valve.
   6. Valves for lawn and shrub areas shall be installed within the perimeter of the area it serves. The location shall be accessible within 12 inches from curb or sidewalk and installed in a location to avoid wetting the person operating the valve manually.
   7. Remote control valves for all athletic fields shall be installed in one of the following specified locations:
      a. All control valves shall be installed in groups of three or more. They shall be installed on the perimeter of the athletic field in valve boxes.
      b. All control valves above ground shall be grouped together and installed on the perimeter outside of the athletic field, on a copper manifold and enclosed in a secure fenced enclosure.

3.7 CONTROLLER CLOCK AND ENCLOSURE

A. Program the controller for all its functions and record settings on the sheet provided by the manufacturer.

B. To install wall mount clock including the enclosure follow the guidelines listed below:
   1. Assemblies shall be installed with the best of workmanship, neat appearance, and be easily accessible.
   2. The complete assembly shall not cause a safety hazard of any kind.
   3. Follow the manufacturer's recommendations regarding the electrical connections and mounting procedures.
   4. The assemblies shall be set level, secure, and in alignment with adjacent surfaces.
   5. Ground the assembly according to the manufacturer's recommendations.
   6. All outside controllers shall be equipped with a G.F.C.I. 110-volt power source.

C. The controller enclosure shall be mounted to a concrete pad with four 3/8 “J bolts” with a minimum of 6 inches penetration into the pad. The concrete pad shall be a minimum of 9 inches deep in ground, 3 inches above ground level and with a 6-inch overhang around complete enclosure base. Install a recognized electrical elbow for passing control wire through the concrete pad into the enclosure.

3.8 BACKFLOW DEVICE ASSEMBLY

A. Backflow device is not required.

3.9 CONTROL WIRE

A. Mainline control wires shall be taped together at five (5) foot intervals with black electrical tape, then laid parallel to pressure line with 18 inches minimum cover to finish grade.

B. Control wiring located under paved areas shall be encased in Schedule 40 PVC pipe and shall extend a minimum of 12 inches beyond pavement.

C. Wires shall be color coded, white for common ground wire, red or black for valve control wires.

D. Wire splicing shall only be performed in controller cabinet and at remote control valve boxes. Splices shall be made with a mechanical connector equal to "Scotch-lok" and encased in epoxy resin to provide a permanent watertight connection.

E. Stubbed out control wires shall terminate in concrete yard boxes.

F. Wire passing under future or existing paving or structures shall be encased in Schedule 40 PVC pipe extending at least 12 inch beyond edges of the paving or structure.

3.10 TRACER WIRES

A. Tracer wire #14 or greater shall be installed on bottom of trench, adjacent to vertical pipe projections, carefully installed to avoid stress from backfilling, and shall be continuous throughout length of pipe with spliced joints soldered and covered with insulation type tape.

B. Tracer wire shall follow main line pipe and branch lines and terminate in yard box with gate valve controlling these main irrigation lines. Provide sufficient length of wire to reach finish grade, bend back end of wire to make a loop and attach a Dymo-Tape type plastic label with designation "Tracer Wire."

C. Record locations of tracer wires and their terminations on project record documents.

3.11 COVERAGE TEST

A. When irrigation system has been completed, perform a coverage test to determine if coverage of water to turf and planting areas is complete and adequate.

B. Make adjustments, add heads, change heads, nozzles or orifices as may be required to provide complete coverage and provide layout indicated on Drawings.

3.12 PRESSURE TEST

A. After welded joints have cured at least 24 hours and before sprinkler heads are installed, flush out lines and cap all outlets. Test system under normal street water pressure, in presence of the Landscape Architect.

B. Joints shall remain exposed for examination during pressure test. Center load pipe with small amount of sand to prevent arching or slipping under pressure. Use normal street water pressure for test. Maintain pressure on plastic pipe for not less than four hours.

C. Replace or repair system, including joints that fail during pressure test. Repeat pressure testing until entire system passes the test period without leaks.

3.13 PROTECTION

A. Protect the Work of this section until Substantial Completion.

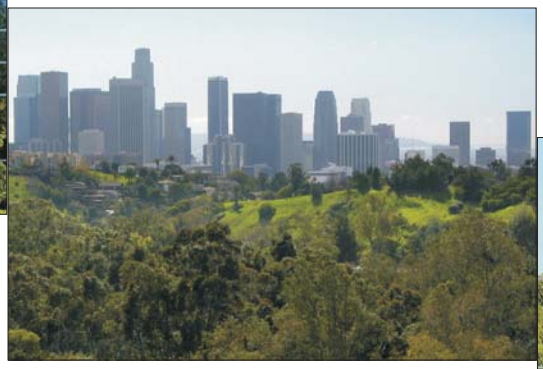
3.14 CLEANUP

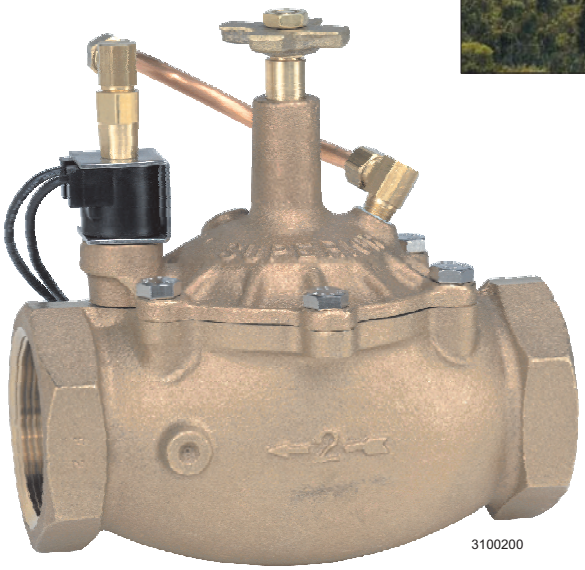
A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site. All hard surfaces shall be washed clean. Daily clean up shall be required on all areas used for circulation, parking, or other use.

END OF SECTION

SUPERIOR

Normally Open Master Valves



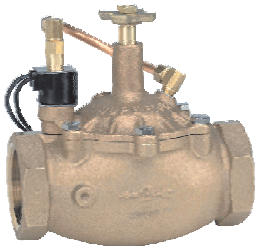


3100200

Truly the SUPERIOR™ master valves.

- Two-Piece Upper Diaphragm and Lower Seat Assembly maximizes flow through valve and ensures long-term durability and performance under the toughest conditions
- Low-Flow model option ensures valve will close completely with flow rate as low as 1 gallon per hour, allowing master valve use on systems with low-flow drip zones
- Normally Open design allows for constant system pressurization and on-demand access to manual irrigation and quick coupler use
- Dirty Water protection is afforded by the removable filter and metering rod assembly plus the added benefit of non-continuous flow through the solenoid
- All EPDM rubber parts outlast commonly used Buna-N parts when exposed to dirty water

3100



- Normally open design allows constant system pressurization and manual operation (quick couplers) during non-irrigation times

How To Specify / Order

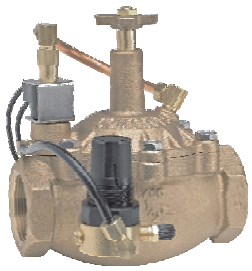
3100 100 RW

Model	Size	Type	Option
3100	100 = 1"	-	RW = Purple Handle

3100

Model No.	Descriptions
3100075	3/4" NPT Normally Open Master Valve
3100100	1" NPT Normally Open Master Valve
3100125	1-1/4" NPT Normally Open Master Valve
3100150	1-1/2" NPT Normally Open Master Valve
3100200	2" NPT Normally Open Master Valve
3100250	2-1/2" NPT Normally Open Master Valve
3100300	3" NPT Normally Open Master Valve
OPTION	Add "RW" for Optional Purple Handle

3100PRS



- Incorporates all the features of the 3100 valve

***Adds* Pressure Regulation:**
PRS feature allows a constant outlet pressure to be set anywhere between 10 and 125 psi

How To Specify / Order

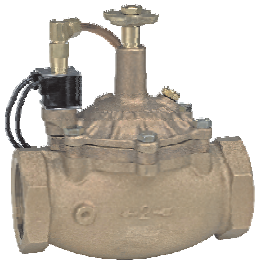
3100 100 PRS RW

Model	Size	Type	Option
3100	100 = 1"	PRS	RW = Purple Handle

3100 Pressure Regulating System

Model No.	Descriptions
3100075PRS	3/4" NPT Normally Open Master Valve
3100100PRS	1" NPT Normally Open Master Valve
3100125PRS	1-1/4" NPT Normally Open Master Valve
3100150PRS	1-1/2" NPT Normally Open Master Valve
3100200PRS	2" NPT Normally Open Master Valve
3100250PRS	2-1/2" NPT Normally Open Master Valve
3100300PRS	3" NPT Normally Open Master Valve
OPTION	Add "RW" for Optional Purple Handle

3300



- Normally open design allows constant system pressurization and manual operation (quick couplers) during non-irrigation times

***Adds* "Low Flow" feature:**
Ensures reliable opening and closing with flow as low as 1 gallon per hour

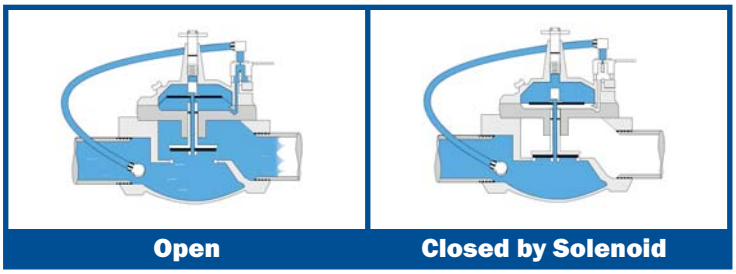
How To Specify / Order

3300 200 RW

Model	Size	Type	Option
3300	200 = 2"	-	RW = Purple Handle

3300

Model No.	Descriptions
3300150	1-1/2" NPT Normally Open Master Valve, No Min. Flow Requirement
3300200	2" NPT Normally Open Master Valve, No Min. Flow Requirement
3300250	2-1/2" NPT Normally Open Master Valve, No Min. Flow Requirement
3300300	3" NPT Normally Open Master Valve, No Min. Flow Requirement
OPTION	Add "RW" for Optional Purple Handle



Open | Closed by Solenoid

Solenoid Specifications

Standard 24 VAC
In-rush current: .45 A (10.8 VA)
Holding current: .30 A (7.2 VA)

Optional 110 VAC
In-rush current: 95 mA (10.5 VA)
Holding current: .65 mA (7.2 VA)

Operating Ranges

Flow: 0 - 360 gpm
Pressure: 0 - 200 psi

OPTIONAL CROSS HANDLE
Available with purple cross handle for reclaimed water identification. Add RW to model number.

Pressure Loss in PSI

GPM	5	10	15	20	30	40	50	60	70	80	90	100	120	140	160	200	240	260	320	360
3/4"	0.45	1.75	4	7																
1"	0.16	0.75	1.5	2.6	5.7	10														
1-1/4"			0.48	0.85	1.9	3.5	5.3	7.6	10.1											
1-1/2"				0.45	1	1.7	2.65	3.8	5.1	6.6	8.3	10.9								
2"						0.53	0.82	1.2	1.6	2.05	2.6	3.2	4.6	6.3	8	13.9				
2-1/2"												2.38	2.45	2.5	2.9	4	6	8.2	10.7	13.2
3"												2.38	2.45	2.5	2.9	4	6	8.2	10.7	13.2

SUPERIOR™
Storm Manufacturing Group
23201 Normandie Ave.
Torrance, CA 90501
Tel: 800.210.2525
Fax: 800.997.0500
www.superiorcontrolsco.com

SECTION 32 90 01
LANDSCAPE PLANTING FOR NATIVE PLANTS

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* and any supplements.

The contractor shall be responsible for obtaining all necessary permits.

1.1 SECTION INCLUDES

A. Furnish materials, equipment and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the contract, including but not limited to these major items:
   1. Site preparation
   2. Finish grading (fine)
   3. Watering
   4. Planting native shrubs and planting and staking native trees
   5. Plant establishment period (90 days/Shrubs, 1 year/Trees)
   6. Landscape maintenance period (180 days following plant establishment period)

1.2 RELATED WORK

1. Section 32 80 00 – Irrigation
2. Section 32 91 00 – Planting Preparation

1.3 APPROVALS

A. All site preparation, weed abatement, and planting layouts shall be inspected and approved by Landscape Architect and the City of Azusa, prior to start of installation of plant materials.

1.4 SOIL TEST

A. An Agricultural Soil Suitability Report shall be prepared by Wallace Labs or approved equal laboratory.

B. Planting pits are to be amended with Gro-Power plant tablets.

C. Plants are to be inoculated with native mychorrizae, at nursery or at time of planting. See Myco Apply All Purpose Soluble.

D. An organic top dressing will be applied.

1.5 PRODUCT HANDLING AND STORAGE

A. Deliver materials to the job site in original unopened containers bearing manufacturers/suppliers name and product designation.

1.6 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.7 PRODUCT SUBMITTALS

A. Per requirements of "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, 2 – 5.3 and Submittals Section 01 33 00.

B. Submit material list of all materials of this Section proposed for use.

C. Submit manufacturers' and laboratory's written recommendations, proportion mixes, and installation instructions for factory prepared finish materials.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All materials shall conform to the requirements of Section 212 of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition*, except as modified herein.

B. All plant material shall meet requirements of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* Section 212.

C. All planting shall conform to plants shown on the Landscape Plan in quantity and type. Plant material shall be grown in nurseries inspected by the State Department of Agriculture. All plants shall be held till delivered to the project site. No plants will be delivered to the site without approval of the Landscape Architect prior to delivery.

D. Nursery shall tag one of each variety of plant. Final determination of species or variety will be made by the Landscape Architect.

E. All native seed mixtures shall be as indicated on plans.

F. All planting areas with less than a 4:1 slope, excluding hydroseed and sodded locations, shall receive 3" of organic mulch after installation of plant material. Mulch shall be clean, weed and seed free. Landscape architect to approve sample of mulch prior to delivery at site.

2.2 LANDSCAPE FINISH GRADING

A. On site top soil.

2.3 SOIL AMENDMENTS

A. Apply recommended soil amendments per the Wallace Labs (or equal) report on soil amendments.

B. Apply MycoApply All Purpose Soluble per manufacturer's recommendations. See following sheet.

C. An organic top-dressing of Cal-Blend Organic Fine Mulch or equal will be used after planting.

2.4 BACKFILL MIX

A. Backfill mix to be 1/3 composted or nitrolized forest humus and 2/3 native soil, blending them outside of the hole.

B. Dig planting pits to the depth of the rootball and twice as wide as the rootball. Fill pit with 1/3 composted or nitrolized forest humus and 2/3 native soil to the depth of the rootball and irrigate thoroughly. Be sure entire rootball area is covered when planting. **DRAINAGE is CRITICAL**.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work.

B. Plant installation shall conform to the requirements of Section 308 of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition,* except as modified herein.

3.2 WEED REMOVAL

A. Existing trees to remain will be avoided during all herbicide applications.

B. Prior to the start of weed removal, all trash and deleterious materials on the surface of the grounds shall be removed and legally disposed of.

C. All weed growth shall be removed within the areas to receive planting by a repeated grow and kill operation. Initial herbicide application should be applied in the early spring after nonnative grasses have germinated, but before their seeds have matured and been dispersed.

D. Herbicide application should be repeated in mid- to late spring.

E. In late summer mow down all remaining weeds to a three or four-inch stubble and pick up all clippings.

F. In the fall, following the first wetting rain (inch or more) allow remaining seeds to germinate and apply a final herbicide application.

3.3 SOIL PREPARATION

A. See Wallace Labs report for soil amendments.

3.4 FINISH GRADING

A. All flow lines shall be maintained to allow for free flow of surface water. Displaced material which would interfere with drainage shall be removed and placed as directed. Low spots and pockets shall be graded to drain properly. Tolerance for finish grade is plus or minus 1/10th of one foot.

B. All areas to receive planting shall be finish graded per Section 308-2 of the *"Greenbook" Standard Specifications for Public Works Construction, Latest Edition*. Finish grades shall be so graded that required tolerances are met after settlement at the completion of the project maintenance period.

3.5 PLANTING

A. Plants shall be planted where shown on the plans and/or as directed by the Landscape Architect.

B. Plant pits for container plants shall have vertical sides and shall be the size noted on the planting plan.

C. Before plants are transported to the planting area, they shall be properly pruned or cut back to reduce damage by wind and to force lateral growth.

D. Plant sizes for I gallon shall be 12" - 15"; 5 gallon plants shall be 15"-18"; tree sizes shall meet at least the minimum industry standards, whether 15 gallon, 24" box, 36" box, or 48" box.

E. No plants shall be transported to the planting area that are not thoroughly wet throughout the ball of earth surrounding the roots. Plants should not be allowed to dry out, nor shall any roots be exposed to the air except during the act of placement.

F. Any plants that in the opinion of the Landscape Architect are dry, root bound, or in a wilted condition when delivered or thereafter, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.

G. Backfill materials shall be thoroughly mixed to the bottom of the pit so they are evenly distributed and without clods or lumps. Backfill shall be so placed in the pits so the plant will be at its natural growing height and backfill material will be level 1 inch below surrounding soil after settlement.

H. After completion of installation, regrade planted areas to restore smooth finish grade and to insure proper surface drainage. A 3" layer of mulch material as specified, shall be spread over the entire planter area after grade is established. Watering shall begin immediately after mulching.

I. Immediately after planting, apply water to each shrub by means of a hose. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.

J. Apply water in sufficient quantities and as often as seasonal conditions require keeping the planted area moist, but not wet, at all times. Do not allow plants to wilt.

K. All ground cover planting shall be immediately sprinkled to avoid drying out until the entire planted area is thoroughly watered and the soil soaked to the full depth of each plant hole.

3.6 HYDRO-SEEDING

A. Seed shall be uniformly spread over the areas at the rates and mixtures specified on the plans.

B. Hydroseeding: Stabilizing emulsion shall be miscible with all available water at the time of mixing and application. Stabilizing emulsion shall not be applied during rainy weather or when soil temperatures are below 40°. Pedestrians or equipment shall not enter hydroseeded areas, after the materials have been applied, until time approved by City. The materials shall be mixed and applied in approximately the following proportions:

Material Per Acre:	
Stabilizing Emulsion	100 lbs.
Fiber	2,000 lbs.
Seed	500 lbs. min.

C. Seed bed shall be finally prepared by floating areas smooth to a neat uniform appearance free from humps and depressions. Contractor shall request inspection prior to seeding.

D. Quantities of materials added to each tank lead shall be verified by the City's representative to insure compliance with the above proportions. Mixing shall be performed in a tank with a built-in continuous agitation and recirculation system of sufficient operating capacity to produce a homogenous slurry of fiber. Apply the slurry to the planted area at a continuous and uniform rate. The tank shall have a minimum capacity of 1,000 gallons. A dispersing agent may be added provided that the Contractor furnishes evidence that the additive is not harmful to the mixture. Any material considered to be harmful, as determined shall not be used. Materials shall not be applied more than four hours after mixing. If material in place begins to dry, the City representative may require spray application of water to said material. The nozzles used for watering shall produce a spray that does not concentrate or wash the material. Areas that do not properly germinate shall be reseeded at ten-day intervals until an acceptable stand of native plant material is obtained.

E. Protect hydro-seeded areas against damage, including erosion and trespass and provide proper safeguards as may be needed. Replant damaged areas promptly. Special care shall be taken to prevent erosion from surface drainage from other areas. Any damages from same shall be the Contractor's responsibility.

3.7 PLANT ESTABLISHMENT PERIOD

A. During the plant establishment period, all plants and planted areas shall be kept well watered and weed free at all times. Weed and debris shall be removed and legally disposed of.

B. In order to carry out the plant establishment work, the Contractor shall maintain a sufficient number of workers and adequate equipment to perform the work specified from the time any planting is performed until final acceptance.

C. The plant establishment period shall extend at least 180 consecutive calendar days from the date of the last planting (I year/trees, 180 days/shrubs). The date of last planting may be the replacement planting of significant areas that failed to grow at the Landscape Architect's discretion. Contractor shall bear all costs for extension of the plant establishment period.

3.8 REPLACEMENT OF PLANTS

A. All plants that show signs of failure to grow at any time during the life of the contract, or those plants so injured or damaged as to render them unsuitable for the purposes intended, shall be immediately replaced in kind at the expense of the Contractor.

3.9 LANDSCAPE MAINTENANCE PERIOD

A. Landscape maintenance work shall consist of watering, weeding, caring for plants, and replacement of dead plant material.

B. This project shall be satisfactorily maintained for a minimum period of 180 days from the date of final inspection and written approval. The maintenance period will begin at the end of the plant establishment period.

C. At completion of the landscape maintenance period, all areas included in the Contract shall be substantially clean and free of debris and weeds.
   1. All plant materials shall be alive, healthy, and free of infestations. The Contractor shall obtain written release before ending maintenance obligations.
   2. If at any time it is deemed that proper maintenance is not being performed, the count down for the 180 day maintenance period shall be stopped and not resumed until the project is brought up to the specifications and proper maintenance is resumed.

3.10 CERTIFICATION

A. Written certifications required which are to be submitted to the Landscape Architect upon delivery to the job site include:
   1. Quantity and type of plant material

END OF SECTION

Mycorrhizal Applications, Inc.®

Application Instructions by Product

MycoApply® All Purpose Soluble

MycoApply® All Purpose Soluble is a soil drench for porous soil and contains 9 carefully selected Endo and Ecto mycorrhizal fungi, high quality organic fertilizer and kelp well-suited to a variety of soils, climates and plants. MycoApply® All Purpose Soluble contains 9 specially selected top performing mycorrhizal fungi that colonize plant roots and extend the root system into the surrounding soil greatly enhancing the absorptive surface area of root systems, forming an essential link between plant and soil and producing seedlings of the highest quality. The plant enjoys improved nutrient and water uptake and superior field performance.

The MycoApply® Difference

Reduces

- Drought stress
- Water inputs
- Transplant shock
- Nutrient loss

Increases

- Yields
- Fruiting & flowering
- Survivability

Promotes

- Rooting
- Nutrient uptake
- Self sufficient plants

Directions

Industry	Rates: The goal is to create physical contact between the innoculant and seed/root
Existing landscape trees and shrubs	Mix 1 lb. bag in 200 gallons of water or use spray pattern for deep root feeding. Inject 1/2 gallon per hole 2-5 times a year. Plant performance improves with every application. Since water is the carrier more concentrated solutions can be made for stressed plants.
B&B plantings	Mix 1 lb. bag in 200 gallons of water. Spray or pour on the root balls until saturated just before backfilling.
Turf and Nursery	Mix 1 lb. bag in 200 gallons of water. Use as soil drench in porous media. Each pound treats 2000 square ft. of turf. Each pound treats 2000 square ft. nursery area for small plants or 4000 square feet of nursery area for plants 1 gallon size or larger. Use 2-5 times a year. May be mixed with spray equipment that allows passage of No. 70 screen (212 microns) or larger particles.

Ingredients

Ingredient	Amount
Endo's	Glomus intraradices, G. mosseae, G. aggregatum, G. etunicatum: 10,000 prop./lb. each
Ecto's	Rhizopogon villosullus, R. luteolus, R. amylopogon, R. fulvigleba (2.5 million prop./lb. each), Pisolithus tinctorius (200 million prop./lb.)
Other	High Quality Slow Release Organic Fertilizer 4-0-6 and Kelp

Contact Mycorrhizal Applications, Inc.

➡ 239 565 9741 ➡ plantsuccess@comcast.net

Disclaimer: Statement of Claims: MA, Inc. certifies that this product contains the indicated mycorrhizal fungi and propagule rates stated on the label. The mycorrhizal symbiosis is sensitive to environmental conditions and MA, Inc. is unable to make guarantees beyond the above statements. Rev: 11-12-2011

SECTION 32 91 00
PLANTING PREPARATION

PART 1 – GENERAL

1.1 SUMMARY

A. Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements, as well as any regulatory agency requirements.

B. Provisions of Division 01 apply to this section.

C. Related Sections:
Section 01 56 39: Temporary Tree and Plant Protection
Section 32 90 01: Planting Natives

1.2 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit copies of the manufacturer's and/or source data for all materials specified, including soils

C. Plant Photographs: Submit color photographs of representative specimens of each type or tree and shrub on the plant list. Photos shall be min. 3 in. x 5 in., taken from angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph. For species where more than 20 plants are required, include a minimum of three photos that show the average plant, the best quality plant, and the worst quality plant to be provided. Label each photograph with the plant name, plant size, and name of the growing nursery.

D. Nursery Sources: Submit a list of all nurseries that will supply plants, along with a list of the plants they will provide and the location of the nursery.

E. Soil Test: Submit soil test analyses report for each sample of topsoil and planting mix from a soil testing laboratory approved by the landscape architect.

1. Provide a particle size analysis, including the following gradient of mineral content:

USDA Designation	Size in mm
Gravel	+ 2 mm
Very coarse sand	1 -2 mm
Coarse sand	0.5 -1 mm
Medium sand	0.25 – 0.5 mm
Fine sand	0.1 – 0.25 mm
Very fine sand	0.05 – 0.1 mm
Silt	0.002 – 0.05 mm
Clay	smaller than 0.002 mm

2. Provide a chemical analysis, including the following:

a. pH and buffer pH
b. Percentage of organic content by oven-dried weight.
c. Nutrient levels by parts per million, including phosphorus, potassium magnesium, manganese, iron, zinc, and calcium.
d. Soluble salt by electrical conductivity of a 1:2, soil: water, sample measured in millimho per cm.
e. Cation exchange capacity (CEC).

3. Material testing: Submit the manufacturer's particle size analysis, and the pH analysis and provide a description and source location for the content material of all organic materials.

1.3 REGULATORY STANDARDS

A. Certificates of inspection shall accompany the invoice for each shipment of plants as may be required by law for transportation. File certificates with the landscape architect prior to acceptance of the material. Inspection by federal or state authorities at place of growth does not preclude rejection of the plants at the site.

1.4 QUALITY ASSURANCE

A. Comply with the following standards:

American National Standards for Tree Care Operations, ANSI A300. American National Standards Institute.

American Standard for Nursery Stock, ANSI Z60.1 American Nursery and Landscape Association

All standards shall include the latest additions and amendments as of the date of advertisement for bids.

1.5 UTILITY VERIFICATION

A. The contractor shall contact Digalert for verification of the location of all underground utility lines in the area of the work. The contractor shall be responsible for all damage resulting from neglect or failure to comply with this requirement.

PART 2 – PRODUCTS

2.1 PLANTING MATERIALS

A. As indicated on the Drawings and as follows:

B. Mulches

C. Topsoil (Imported and Existing)

D. Soil Conditioners

E. Plants

F. Tree stakes and cinch ties

G. Mulch

H. Mycorrhizae

I. Fertilizer

2.2 MULCHES

A. Free from noxious weeds, mold, or other deleterious materials.

B. Wood locally chipped or ground bark shall be treated to retard the growth of mold and fungi. Gradation: A maximum 50 mm 2 inch wide by 100 mm 4 inch long.

C. Fine Blend Mulch as supplied by Cal Blend Soils 1270 E. Arrow hwy. #A, Irwindale, CA 91706, phone: 800 425-3631.

D. Sample of Mulch to be approved by Landscape Architect.

2.3 IMPORTED SOIL REQUIREMENTS

A. Imported fill materials shall be free from contamination as demonstrated by testing. Design-Builder shall perform the tests by utilizing a state approved laboratory to test for the following substances according to the indicated method:
   1. Total Petroleum Hydrocarbons, utilizing EPA Methods8015M, for gasoline and diesel
   2. Solvents and other volatile compounds, utilizing EPA Method 8260B
   3. Polychlorinated biphenyls, utilizing EPA Method 8080
   4. Semivolatile Compounds, utilizing EPA Method 8270C
   5. Organochlorine pesticides, utilizing EPA Method 8081
   6. Organophosphosphorous pesticides, utilizing EPA Method 8141
   7. Chlorinated herbicides, utilizing EPA Method 8151
   8. California Code of Regulations Title 22 Metals, utilizing EPA Method 6010AI7470A

B. Initial sampling and testing shall be performed before importing materials to the Project site. Provide test results of the proposed materials to the Owner's Project Manager. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site.

C. The Contractor shall perform additional sampling and testing during import operations. One sample shall be obtained and tested for each 100 cubic yard of imported material. Bills of lading or equivalent documentation will be submitted to the Owner's Project Manager on a daily basis. Upon completion of import operations, provide the owner's Project Manager a certification statement attesting that all imported material has been obtained from the identified source site. Soil contaminant levels shall be demonstrated to be below the preliminary remedial for residential use as issued by the California Environmental Protection Agency.

2.4 TOPSOIL

A. Topsoil: Evaluate soil for use as topsoil in accordance with ASTM D 5268.

2.5 WATER

A. Irrigation Systems:
   1. Provide high efficiency irrigation systems with water-efficient technology including ET based systems such as a mini weather station and soil moisture sensors.

2.6 PESTICIDES AND HERBICIDES

A. Pesticides: Not permitted.

B. Herbicides: Not permitted.

C. Biological Pest Controls: Integrated Pest Management to be approved by OWNER.

2.7 SOIL CONDITIONERS

A. Soil Conditioners: Nontoxic. Use singly or in combinations required, meeting requirements for topsoil.

B. Peat: Peat humus derived from a freshwater site and conforming to ASTM D5539 and as follows.
   1. Biobased Content: Minimum 100 percent.

C. Sand: Clean and free of materials harmful to plants.

D. Compost

1. Compost shall be a well decomposed, stable, weed free organic matter source. It shall be derived from: agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; source-separated or mixed solid waste. The product shall contain no substances toxic to plants and shall be reasonably free (< 1% by dry weight) of man-made foreign matter. The compost will possess no objectionable odors and shall not resemble the raw material from which it was derived. For acid loving plants, only use a compost that has not received the addition of liming agents or ash by-products.

2. Method of Measurement: Compost will be measured by the cubic yard or the ton at the point of loading.
3. Landscape architects and project (field) engineers may modify the allowable compost specification ranges based on specific field conditions and plant requirements.
4. Product Parameters: Provide compost products with the following product parameters; certified in accordance with the U.S. Composting Council (USCC) Seal of Testing Assurance (STA) Program:
   a. Compost product parameters for turf establishment, planting bed establishment and as backfill mix component

Parameters[1,6]	**Reported as (units of measure)**	**General Range**
pH[2]	pH units	6.0 - 8.5
Soluble Salt Concentration[2] (electrical conductivity)	dS/m (mmhos/cm)	Maximum 10
Moisture Content	%, wet weight basis	30 – 60
Organic Matter Content	%, dry weight basis	30 – 65
Particle Size	% passing a selected mesh size, dry weight basis	98% pass through 3/4" screen or smaller
Stability[3] Carbon Dioxide Evolution Rate	mg CO_2-C per g OM per day	< 8
Maturity[3] (Bioassay) Seed Emergence and Seedling Vigor	%, relative to positive control %, relative to positive control	Minimum 80% Minimum 80%
Physical Contaminants (inerts)	%, dry weight basis	< 1
Chemical Contaminants[4]	mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants[5] Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

   b. Compost product parameters for use as a Landscape Mulch

Parameters[1,5]	**Reported as (units of measure)**	**General Range**
pH[2]	pH units	5.5 – 9.0
Soluble Salt Concentration[2] (electrical conductivity)	dS/m (mmhos/cm)	Maximum 10
Moisture Content	%, wet weight basis	25 – 60
Organic Matter Content	%, dry weight basis	> 30

Particle Size	% passing a selected mesh size, dry weight basis	99% pass through 3" screen, >25% passing 3/8" screen
Physical Contaminants (inerts)	%, dry weight basis	< 0.1
Chemical Contaminants[3]	mg/kg (ppm)	Meet or exceed US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels
Biological Contaminants[4] Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR § 503.32(a) levels

5. Soil Analysis: Before any soil preparation procedures ensue, a soil analysis shall be completed by a reputable laboratory to determine any nutritional requirements, pH and organic matter adjustments necessary. Once determined, the soil shall be appropriately amended to a range suitable for the plant species to be established.
6. The landscape architect/designer shall specify the compost inclusion rate depending upon soil conditions and quality, plant tolerances, and manufacturer's recommendations.
7. The use of stable, nutrient rich composts will reduce initial fertilizer requirements by the amount of available nutrients in the compost. Composts containing available nutrients, primarily nitrogen, are preferred.
8. The use of unstable or immature compost is not approved.
9. When using compost for mulching, specific products may be considered more physically or visually acceptable for a given planting area. A representative sample of compost must be submitted to the Landscape Architect/Designer prior to field use since aesthetic preferences are subjective.

E. Biobased Content: Minimum 100 percent.

2.8 PLANTS

A. Plants shall be true to species and variety specified and nursery-grown in accordance with good horticultural practices under climatic conditions similar to those in the locality of the project for at least two years. They shall have been freshly dug (during the most recent favorable harvest season).

1. All plant names and descriptions shall be as defined in *Hortus Third.*
2. All plants shall be grown and harvested in accordance with the *American Standard for Nursery Stock*.
3. Unless approved by the landscape architect, plants shall have been grown at latitude not more than 325 km (200 miles) north or south of the latitude of the project unless the provenance of the plant can be documented to be compatible with the latitude and cold hardiness zone of the planting location.

B. Unless specifically noted, all plants shall be of specimen quality, exceptionally heavy, symmetrical, and so trained or favored in development and appearance as to be unquestionably and outstandingly superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf; free of disease and insects, eggs, or larvae; and shall have healthy, well-developed root systems. They shall be free from physical damage or other conditions that would prevent vigorous growth.

1. Trees with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leader, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over 20 mm (3/4") in diameter that are not completely closed will be rejected.

C. Plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the landscape architect. Use of larger plants shall not increase the contract price. If larger plants are approved, the root ball shall be increased in proportion to the size of the plant.

1. Caliper measurements shall be taken on the trunk 150 mm (6 in.) above the natural ground line for trees up to and including 100 mm (4 in.) in caliper, and 300 mm (12 in.) above the natural ground line for trees over 100 mm (4 in.) in caliper. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Plants shall be measured when branches are in their normal position. If a range of sizes is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified. Measurements specified are minimum sizes acceptable after pruning, where pruning is required. Plants that meet measurements but do not possess a standard relationship between height and spread, according to the American Standards for Nursery Stock, shall be rejected.

2.9 FERTILIZER

A. Fertilizer for trees, plants, shrubs: Shall be Humus-based/Soil Conditioner. GRO-POWER PLUS: Designed for difficult soil conditions such as clay, adobe soils or areas with high salt, sodium, boron or pH problems. 5-3-1, 70% Humus, Nitrogen 5%, Phosphate 3%, Potash 1%, 15% Humic Acids, with Soil Enhancers added. 1% Soil Penetrant added. Application rates per manufactures recommendations:

B. No synthetic chemical fertilizers.

2.10 ACCESSORIES

A. Tree stakes are to be 8’ x 2” lodge pole

PART 3 – EXECUTION

3.1 AGRONOMIC SOIL REPORT

A. Existing Site Soil. If existing site soil is used for the Project, Contractor shall submit an agronomical soil and growth (herbicide) test(s) report for the existing soil after the completion of the grading operations and prior to soil preparation.

B. Imported Topsoil. Prior to the delivery of the soil on site, Contractor shall obtain an agronomical soil report(s) and growth (herbicide) test(s) for imported topsoil and submit it for the Owners approval. If import topsoil is obtained from more than one source/site, Contractor shall submit a soils test report for each soil sample from each site. Note that the growth (herbicide) test usually takes approx. 1 month from the time the sample is submitted to the lab.

C. Contractor shall, at his expense, obtain soils test report(s) from an approved professional agronomic soils testing laboratory. Contractor shall submit the name, address and phone number of the consulting soil testing laboratory for approval prior to obtaining services.

D. The approved soil testing laboratory report shall indicate soil analysis for plant growth suitability, including permeability rate, and recommendations for soil preparation in all planting areas and soil mix for backfill of planting container material.

E. The recommendations of the agronomic soil report(s) shall take precedence over the quantities of soil amendments and material mix specified in the backfill mix; and only when those specifications exceed the minimum requirements specified herein.

F. Contractor shall submit the agronomic soil's report(s) to the OWNER, and shall not begin any landscape planting work until the report has been evaluated and approved by the OWNER.

3.2 PREPARATION

A. Soil Conditioners:
   a. Compost
      1) Construction Requirements:
         (a) Contractor to provide agricultural suitability soil report and shall amend soil as recommended by Landscape Architect.
            (i) Pre-plant fertilizer and pH adjusting agents (e.g., lime and sulfur) may be applied before incorporation, as necessary.
            (ii) Rake soil surface smooth prior to seeding, sprigging, sodding, or hydroseeding.
            (iii) The soil surface shall be reasonably free of large clods, roots, stones greater than 2 inches, and other material which will interfere with planting and subsequent site maintenance.
            (iv) Water thoroughly after seeding, or sprigging.
            (v) Where necessary, topdress newly seeded and sprigged areas with a 1/4 inch layer of fine compost (3/8 inch screen, minus), then water to protect against hot, dry weather or drying winds.
            (vi) The landscape architect/designer shall specify the compost inclusion rate depending upon soil conditions and quality, plant tolerances, and manufacturer's recommendations. The use of stable, nutrient rich composts will reduce initial fertilizer requirements by the amount of available nutrients in the compost.
         (b) Compost as a Landscape Backfill Mix Component
            (i) Description: This work shall consist of excavating a planting hole and blending compost with the excavated soil to improve soil quality and plant growth. This specification applies to all types of bare root, containerized, and balled and burlapped plant material.
            (ii) Construction Requirements:
            (iii) Excavate a planting hole slightly shallower and 2 to 3 times the width of the root ball or container.
            (iv) Set the root ball on firm soil so that the top of the root ball will sit slightly higher than the final grade.
            (v) Uniformly blend compost and excavated soil at a 1 compost : 2 soil ratio.
            (vi) Backfill and firm the soil blend around the root ball within the planting hole.
            (vii) Water thoroughly during and after planting.
         (c) Compost as an Oak Leaf Mulch
            (i) Description: This work shall consist of applying compost to the soil surface after planting to help inhibit weed growth, conserve soil moisture, and reduce soil erosion.
            (ii) Construction Requirements:
            (iii) Compost mulch shall be uniformly applied over the entire area at an average depth of 2 to 3 inches as soon as possible after weed removal and planting.
            (iv) Avoid placing mulch against the trunk or stem of any plant material.
            (v) Water thoroughly before and after mulching to saturate the root zone and entire mulch layer.
            (vi) All stones, roots, or other debris shall be removed from the surface of the mulched area.

(vii) The Landscape Architect shall specify the compost inclusion rate depending upon soil conditions and quality, plant tolerances, and manufacturer's recommendations. The use of stable, nutrient rich composts will reduce initial fertilizer requirements by the amount of available nutrients in the compost.

(viii) Generally, biosolids composts should not be applied at a depth greater than 2 inches, while most yard trimmings composts can be applied to a depth of 3 inches. Salt sensitive species typically prefer lower application rates.

(d) Before delivery of the compost, supplier must provide a copy of the lab analysis, performed by a certified lab, verifying that the compost meets the product parameters listed above. The lab analysis should not be more than 90 days old.

(e) Verify that all materials do not include invasive species, including seeds.

3.3 WEED SUPPESSION

A. Weed suppression, shall apply to all planting areas. The suppression operation shall be commenced only after removals, grading, hardscape construction, installation of irrigation system, soil preparation, and fine grading of planting areas have been completed. Contractor shall thoroughly water all planting areas for a period of two weeks minimum prior to commencing removal. Contractor shall clear site of all dead vegetation and living weeds by hand or mechanical means. All removed vegetation shall be composted on site for reuse or properly disposed of off site at a green waste facility.

END OF SECTION

SECTION 32 92 19
SEEDING

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes: Erosion control (Hydroseed)

C. Related Sections: Section 32 91 00 – Planting Preparation

1.2 SYSTEM DESCRIPTION

A. This work includes removing and disposing of weeds and applying erosion control materials including seed, fiber, commercial fertilizer, organic fertilizer, straw, and tackifier to erosion control (Hydroseed) areas shown on the plans.

B. The Landscape Architect will designate the ground location of all erosion control (Hydroseed) areas in increments of one acre or smaller by directing the placing of stakes or other suitable markers. Contractor to furnish all tools and materials required to adequately indicate the various erosion control (Hydroseed) locations.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit all product and seed to Landscape Architect for approval.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

B. Seed not required to be labeled under the California Food and Agricultrual Code must be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Measure and mix individual seed species in the presence of the Engineer.

C. Seed must contain at most 1.0 percent total weed seed by weight. Seed must be free of the following specific weed species: Cynodon dactylon (Bermuda grass), Ricinus communis (Castor Bean) and Solanum nigrum (Black Nightshade).

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Landscape Architect shall take a sample of approximately one ounce of seed for each seed lot greater than 2 pounds.

PART 2 – PRODUCTS

2.1 SEED MIX

A. Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Landscape Architect shall take a sample of approximately one ounce or 0.25 cup of seed for each seed lot greater than 2 pounds. Seed to be supplied by S + S Seeds, Inc. P.O. Box 1275, Carpenteria, CA 93014-1275. www.ssseeds.com, phone: 805.684.0436.

B. At the time of seed sampling, provide the Landscape Architect a glassine lined bag and custody seal tag for each seed lot sample.

C. Bills of lading or equivalent documentation will be submitted to the Owner's Project Manager.

Erosion Control Hydroseed Mix #1 – approx. 7000 s.f.

Botanical Name[1] (Common Name)	**Percent Germination (Minimum)***	**Pounds Pure Live Seed Per Acre (Slope Measurement)***
Artemisia californica (California sagebrush)	30	.20
Encelia californica (California sunflower)	30	1.00
Eriogonum fasciculatum (California buckwheat)	10	1.00
Lotus scoparius (Deer weed)	40	4.00
Penstemon heterophyllus (foothill penstemon)	40	0.50
Phacelia	40	2.00
Salvia apiana (white sage)	15	2.50
Zauschneria canum (California fuschia)	TBD	TBD

*Final seed mix to be approved by Landscape Architect.

[1]Seed source from Los Angeles, Ventura, and/or Orange County only.

Exhibit H - Plan Specifications for the Special Use Area

Riparian Understory Seed Mix- to be hand broadcast – approx. 4200 s.f.

Botanical Name[1] (Common Name)	**Percent Germination (Minimum)***	**Pounds Pure Live Seed Per Acre (Slope Measurement)***
Achillea millefolium (yarrow)	40	1.00
Agrostis exarata (bentgrass)	40	5.00
Artemisia douglasiana (mugwort)	25	.10
Carex alma (sturdy sedge)	TBD	TBD
Carex praegracilis (slender sedge)	40	1.00
Clematis lasiantha (chaparral virgin's bower)	2	.10
Eleocharis montevidensis (spike-rush)	10	.20
Eriophyllum confertiflorum (golden yarrow)	30	1
Juncus ensifolia (sword rush)	TBD	TBD
Oenothera elata ssp. Hookeri (Hooker's evening primrose)	35	.50
Potentilla glandulosa ssp. Glandulosa (sticky cinquefoil)	TBD	TBD
Ribes aureum var. gracillimum (golden currant)	10	.10
Ribes californicum var. hesperium (hillside gooseberry)	25	.10
Venegasia carpesioides (canyon sunflower)	TBD	1.5
Verbena lasiostachys (verbena)	25	2.00

*Final seed mix to be approved by Landscape Architect.

[1]Seed source from Los Angeles, Ventura, and/or Orange County only.

Hydroseed Mix #2 Eastern Drainage – approx. 800 s.f.

Botanical Name[1] (Common Name)	Percent Germination (Minimum)*	**Pounds Pure Live Seed Per Acre (Slope Measurement)***
Achillea millefolium (yarrow)	40	1
Artemisia californica (California sagebrush)	30	.20
Artemisia douglasiana (mugwort)	25	.20
Baccharis salicifola (Mulefat)	20	.10
Brickellia california (California bricklebush)	10	.10
Cercocarpus betuloides (mountain mahogany)	35	2

Clematis lasiantha (chaparral virgin's bower)	2	.10
Delphinum cardinale (scarlet larkspur)	TBD	TBD
Ericameria pinifolia pine-bush)	5	.10
Eriodictyon crassifolium (thickleaf yerba santa)	20	2
Eriogonum fasciculatum var. foliolosum (California buckwheat)	10	1
Heteromeles arbutifolia var. arbutifolia (toyon)	25	2
Lonicera subspicata var. denudata (honeysuckle)	TBD	TBD
Lotus scoparius (Deerweed)	40	4
Melica imperfect (coast melic grass)	30	2
Nassella (Stipa) cernua (nodding needlegrass)	35	4
Phacelia cicutaria (caterpillar phacelia)	40	1
Salvia apiana (white sage)	15	2
Venegasia carpesiodes (canyon sunflower)	TBD	TBD
Yucca whipplei (chaparral yucca)	30	1.50

*Final seed mix to be approved by Landscape Architect.

[1]Seed source from Los Angeles, Ventura, and/or Orange County only.

D. Mycorrhizal Inoculum – quantity as recommended by the supplier.

E. Tackifier and fiber – included in Flexterra HP-FGM

F. Mulch – Flexterra High Performance - Flexible Growth Medium (HP-FGM)

G. Slope interruption devices or water diversion techniques—wattles.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section

B. Verify limits of seeding

C. Verify that items installed under other sections are properly located and sized.

3.2 PREPARATION

A. Immediately prior to applying seed to erosion control (hydroseed) areas, trash and debris and weeds must be removed. Removed weeds must be disposed of in conformance with the provisions in Section 00 72 00 General Conditions, Section 31 00 00 Earthwork and Section 32 91 00 Planting Preparation.

3.3 INSTALLATION

A. Apply hydroseed materials in separate applications in the following sequence:
   1. Apply fertilizer, soil amendments and 50% of seed with a small amount of HP-FGM for visual metering.
   2. Mix balance of seed and apply HP-FGM at a rate of 50 lbs. per 125 gallons of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.

B. The ratio of total water to total tackifier in the mixture must be as recommended by the supplier.

C. Seed may be dry applied at the total rate specified in the preceding table for small areas not accessible by hydroseeding equipment, when approved in writing by the Landscape Architect. Dry applied seed must be incorporated into the soil a maximum depth of ¼ inch by raking or dragging.

D. Hydraulic application of Hydroseed materials for rolled erosion control product areas must be applied by hose, from the ground. Hydroseed materials must be applied onto the slope face such that the materials are well integrated into the rolled erosion control product (Netting) and in contact with ground surface. Application must be perpendicular to the slope face such that rolled erosion control product (Netting) materials are not damaged or displaced. Once straw work is started in an area, complete tackifier applications in that area on the same working day.

E. The Landscape Architect may change the rates of Hydroseed materials to meet field conditions.

F. For any area where Hydroseed materials are to be applied, the application of all Hydroseed materials to be applied to that area must be completed within 72 hours from when the first materials were applied.

G. Hydroseed will be measured by the square foot or by the acre, whichever is designated in the Landscape Architect's Estimate. The area will be calculated on the basis of actual or computed slope measurements.

H. The contract price paid per square foot or acre for Hydroseed includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in Hydroseed complete in place, as shown on the plans, as specified in the Specifications and these special provisions, and as directed by the Landscape Architect.

3.4 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

Exhibit H - Plan Specifications for the Special Use Area

Profile
Your Trusted Partner In Soil Solutions

Flexterra® HP-FGM™

High Performance Flexible Growth Medium

GREEN DESIGN ENGINEERING™

Description

Flexterra® HP-FGM™ is a fully biodegradable, High Performance-Flexible Growth Medium (HP-FGM) composed of 100% recycled and Thermally Refined™ wood fibers, crimped interlocking man-made biodegradable fibers, micro-pore granules, naturally derived cross-linked biopolymers and water absorbents. The HP-FGM is phyto-sanitized, free from plastic netting, requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

Recommended Applications

- Erosion control for slopes ranging from mild to severe (≤0.25H:1V)
- Rough graded slopes
- Superior performance over rolled erosion control blankets with plastic nettings
- Enhancement of vegetation establishment
- Ideal infill material to create the GreenArmor™ System

Technical Data

Physical Properties*	Test Method	Units	Minimum Value
Mass/Unit Area	ASTM D6566[1]	g/m^2 (oz/yd^2)	407 (12)
Thickness	ASTM D6525[1]	mm (in)	5.6 (0.22)
Wet Bond Strength	ASTM D6818[1]	N/m (lb/ft)	131 (9)
Ground Cover	ASTM D6567[1]	%	99
Water Holding Capacity	ASTM D7367	%	1700
Material Color	Observed	n/a	Green
Performance Properties*	**Test Method**	**Units**	**Value**
Cover Factor[2]	Large Scale[4]	n/a	< 0.01
Percent Effectiveness[3]	Large Scale[4]	%	> 99
Cure Time	Observed	hours	0 - 2
Vegetation Establishment	ASTM D7322[1]	%	800
Environmental Properties*	**Test Method**	**Units**	**Typical Value**
Functional Longevity[5]	ASTM D5338	n/a	Up to 18 months
Ecotoxicity	EPA 2021.0	%	96-hr LC50 > 100%
Effluent Turbidity	Large Scale[4]	NTU	< 100
Biodegradability	ASTM D5338	%	100
Product Composition			**Typical Value**
Thermally Processed Wood Fiber[6] (within a pressurized vessel)			80 % ± 3 %
Crosslinked Biopolymers and Water Absorbents			10 % ± 1%
Crimped, Man-Made Biodegradable Interlocking Fibers			5 % ± 1 %
Micro-Pore Granules			5 % ± 1 %

* When uniformly applied at a rate of 3500 pounds per acre (3900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Profile technical service representative at 866-325-6262. 5. Functional Longevity is the estimated time period, based upon field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors. 6. Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined™/Processed and to achieve phyto-sanitization.

Packaging Data

Properties	Test Method	Units	Nominal Value
Bag Weight	Scale	kg (lb)	22.7 (50)
Bags per Pallet	Observed	#	40

UV and weather-resistant plastic bags. Pallets are weather-proof stretch wrapped with UV resistant pallet cover.

PO Box 1275
Carpinteria, CA 93014-1275
Ph: 805/684-0436
Fax: 805/684-2798
Email: info@ssseeds.com
Web: www.ssseeds.com

S&S SEEDS

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SECTION 32 94 13
LANDSCAPE EDGING

PART 1 – GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 SUMMARY

A. Provisions of Division 01 apply to this section.

B. Section includes:

Installation of landscape edging to serve as a border for planting areas and walkways, or wherever necessary to separate differing materials.

C. Related Sections:

Section 32 15 40 – Decomposed Granite Surface

1.2 SYSTEM DESCRIPTION

A. Where indicated on plan, new landscape edging to be installed along walk and planting borders.

1.3 REGULATORY REQUIREMENTS

A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.

B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.

C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

A. Submit in accordance with General Conditions.

B. Submit a 3" sample piece of specified edging to Landscape Architect for approval.

C. Indicate location of edging with garden hose or other similar material for Landscape Architect's approval prior to installation.

1.5 QUALITY ASSURANCE

A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.

1.6 DELIVERY, STORAGE AND HANDLING

PART 2 – PRODUCTS

2.0 LANDSCAPE EDGING

A. As provided by Sure-loc Corporation of Holland, MI.

B. Edging to be manufactured from steel with interlocking system and stake punch outs fabricated in each strip. Edging to be ¼" thick x 5" wide x 16 ' long with powder coated baked on enamel finish. Color: brown.

C. Sections to lock together without offset or double thickness at the joints and secured with two 12" stakes at every joint.

D. All stakes manufactured of steel, a minimum of 15" long.

PART 3 – EXECUTION

3.1 INSTALLATION OF LANDSCAPE EDGING

A. Check to ensure that all underground lines, irrigation hoses, and other cables are installed below the maximum depth of edging to be used.

B. Edge all landscape beds, maintenance strips, walks, and/or where edging is to be used using string, garden hose, or paint. Using a spade or mechanical trencher, cut a trench along area to be defined to depth so that top of edging will not exceed 1/2" above finish grade.

C. Install edging with stakes on inside of bed. A minimum of 5 stakes are to be used with each section of edging.

D. Backfill on both sides of edging during installation, leaving no more than two sections unsupported at one time. Compact backfill along edging, ensuring that top of edge is no more than ½" above finish grade.

3.2 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION