B

Type

X

Plans

BLD05-5623

Permit Number

31313

Street Number

Seaview Rd

Street Name

TIM

Community Code

109-530-004

APN

Special Inspection and Testing Acknowledgment

CNI-011

I have read and agree to comply with the terms and conditions of this agreement.

Owner — Date

Contractor — Date

License Number

Special Inspection Agency — Date

Staff Engineer's License Number — Date

Fabricator

I.C.B.O. Approval Number

Geotechnical Engineer — Date 9/26/05

DAN CALDWELL

License Number

GEO. ENG. # 2006

Architect or Engineer of Record — Date 9/26/05

ROBERT OST

License Number

CE 28151

Accepted for Permit and Resource Management Department
Construction-Building Inspection Section

By — Date

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA ❖ 95403-2829 ❖ (707) 565-1900 ❖ Fax (707) 565-2210

Special Inspection and Testing Requirements

CNI-012

ALLEN/ELY — **Project Name** | 3131 SEAVIEW RD, GUERNEVILLE — **Project Address** | **Permit No.**

Reinforced Concrete, Gunite, Grout and Mortar: CBC 1701.5.1

Concrete	Gunite	Grout	Mortar	
☐	☐	☐	☐	Aggregate Tests
☐	☐	☐	☐	Reinforcing Tests
☐	☐	☐	☐	Mix Designs
☐	☐	☐	☐	Reinforcing Placement
☐	☐	☐	☐	Batch Plant Inspection
☐	☐	☐	☐	Inspect Placing
☐	☐	☐	☐	Cast Samples
☐	☐	☐	☐	Pick-up Samples
☐	☐	☐	☐	Compression Tests

CBC 1701.5.1 and .4

Piers	Grade Beams	Pretens	Precast	
☐	☐	☐	☐	Aggregate Tests
☐	☐	☐	☐	Reinforcing Tests
☐	☐	☐	☐	Tendon Tests
☐	☐	☐	☐	Mix Designs
☐	☐	☐	☐	Reinforcing Placement
☐	☐	☐	☐	Insert Placement
☐	☐	☐	☐	Concrete Batching
☐	☐	☐	☐	Installation Inspection
☐	☐	☐	☐	Cast Samples
☐	☐	☐	☐	Pick-up Samples
☐	☐	☐	☐	Compression Tests

Structural Observation by Architect or Engineer: CBC 1702

- ☐ Foundation Observation
- ☐ Framing Observation
- ☐ Final Observation
- ☐ General Conformance Letters

Masonry: CBC 1701.5.7

- ☐ Special Inspection Stresses Used
- ☐ Prelim. Acceptance Test (Masonry Units, Wall Prisms)
- ☐ Subsequent Tests (Mortar, Grout, Field Wall Prisms)
- ☐ Placement Inspection of Units

Plans Examiner — Date

ROBERT OST — 9/26/05

Requirements specified by (Architect/Engineer of record) — Date

Contractor — Date

Owner — Date

Embedded Bolts or Inserts: CBC 1701.5.2 and .15

- ☐ Bolt/Insert Placement Inspection ____ %
- ☐ Bolt/Insert Tension Test ____ %
- ☐ Bolt/Insert Shear Test ____ %
- ☐ Epoxy Mix and Placement Observation ____ %

Structural Steel / Welding: CBC 1701.5.5 and .6

- ☐ Sample and Test (list specific members below)
- ☐ Shop Material Identification
- ☐ Welding Inspection ☐ Shop ☐ Field
- ☐ Ultra Sonic Inspection ☐ Shop ☐ Field
- ☐ High-Stress Bolting Inspection
  - ☐ A325 ☐ Shop ☐ Field
  - ☐ A490 ☐ N ☐ X ☐ F
- ☐ Metal Deck Welding Inspection
- ☐ Reinforcing Steel Welding Inspection
- ☐ Metal Stud Welding Inspection
- ☐ Concrete Insert Welding Inspection

Structural Wood: CBC 1701.5.15

- ☐ Horizontal Diaphragms
- ☐ Shear Wall Nailing Inspection
- ☐ Inspection of Glulam Fabrication
- ☐ Inspection of Truss Joint Fabrication
- ☐ Sample and Test Components

Geotechnical/Foundation: CBC 1701.5.11 and .13

- ☒ Soils Engineer Plan Review Acceptance Letter
- ☒ Foundation Excavation
- ☐ Pier Holes
- ☐ Site Drainage
- ☐ Fill Material
  - ☐ Placement Inspection
  - ☐ Field Density
  - ☐ Acceptance Letter
- ☐ Acceptance Letter

Fireproofing: CBC 1701.5.10

- ☐ Placement Inspection
- ☐ Density Tests
- ☐ Thickness Tests
- ☐ Inspect Batching

Insulating Concrete: CBC 1701.5.9

- ☐ Sample and Test
- ☐ Placement Inspection
- ☐ Unit Weights

Additional Instructions/Other Tests & Inspections:

PROJECT GEOTECHNICAL ENGINEER IS MICHELUCCI AND ASSOCIATES TO INSPECT. FOOTING EXCAVATION

Sonoma County Permit and Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA ❖ 95403-2829 ❖ (707) 565-1900 ❖ Fax (707) 565-2210

Project Title..... Ely Residence Date..09/22/05 14:27:27
Project Address..... 31313 Seaview Road *******
Cazadero, CA 95421 *v6.01*
Documentation Author... Jennifer A. Somoff *******
Accurate Energy
3713 Laguna Way
Sacramento, CA 95864
916-483-7313
Climate Zone..... 01
Compliance Method..... MICROPAS6 v6.01 for 2001 Standards by Enercomp, Inc.

Building Permit #
Plan Check / Date
Field Check/ Date

MICROPAS6 v6.01 File-25487 Wth-CTZ01S92 Program-FORM CF-1R
User#-MP2093 User-Accurate Energy Run-Compliance Documentation

GENERAL INFORMATION

Conditioned Floor Area.....	2879 sf
Building Type.....	Single Family Detached
Construction Type	New
Building Front Orientation.	Front Facing 58.5 deg (NE)
Number of Dwelling Units...	1
Number of Stories.....	3
Floor Construction Type....	Slab On Grade
Glazing Percentage.....	25.8 % of floor area
Average Glazing U-factor...	0.39 Btu/hr-sf-F
Average Glazing SHGC.....	0.41
Average Ceiling Height.....	10.2 ft

BUILDING SHELL INSULATION

Component Type	Frame Type	Cavity R-value	Sheathing R-value	Total R-value	Assembly U-factor	Location/Comments
Wall	None	R-0	R-0	R-0	0.752	Concrete Wall
Wall	Wood	R-21	R-0	R-21	0.055	Typical 2x6
Wall	Wood	R-21	R-0	R-21	0.070	Attic Wall
Door	n/a	R-n/a	R-n/a	R-0	0.330	Entry Door Exterior Door
SlabEdge	n/a	R-n/a	R-n/a		F2=0.760	Slab to Exter.
Floor	Wood	R-19	R-0	R-19	0.037	Flr. o/Crawl
FloorExt	Wood	R-19	R-0	R-19	0.046	Flr. o/Exter.
Roof	Wood	R-38	R-0	R-38	0.035	4/12 Vault 6/12 Vault 8/12 Vault
Roof	Wood	R-38	R-0	R-38	0.039	Attic Roof
WallBaseA	n/a	R-n/a	R-n/a	R-0	0.388	Shallow Bsmt
WallBaseB	n/a	R-n/a	R-n/a	R-0	0.388	Medium Bsmt

FENESTRATION

Orientation		Area (sf)	U-Factor	SHGC	Interior Shading	Exterior Shading	Over-hang/ Fins
Window	Front (NE)	14.6	0.310	0.260	Standard	Standard	None
Window	Front (NE)	14.6	0.310	0.260	Standard	Standard	None
Window	Front (NE)	6.7	0.290	0.360	Standard	Standard	None
Window	Front (NE)	20.0	0.310	0.260	Standard	Standard	None
Window	Front (NE)	6.3	0.310	0.260	Standard	Standard	None
Window	Front (NE)	14.6	0.310	0.260	Standard	Standard	None

MICROPAS6 v6.01 File-25487 Wth-CTZ01S92 Program-FORM CF-1R
User#-MP2093 User-Accurate Energy Run-Compliance Documentation

FENESTRATION

Orientation			Area (sf)	U-Factor	SHGC	Interior Shading	Exterior Shading	Over-hang/ Fins
Window	Front	(NE)	2.0	0.290	0.360	Standard	Standard	None
Window	Front	(NE)	10.0	0.310	0.260	Standard	Standard	None
Window	Front	(NE)	4.9	0.290	0.360	Standard	Standard	None
Window	Front	(NE)	10.0	0.310	0.260	Standard	Standard	None
Window	Front	(NE)	4.9	0.290	0.360	Standard	Standard	None
Window	Left	(SE)	14.6	0.310	0.260	Standard	Standard	None
Window	Left	(SE)	18.7	0.310	0.260	Standard	Standard	None
Window	Left	(SE)	6.3	0.310	0.260	Standard	Standard	None
Window	Back	(SW)	16.8	0.310	0.260	Standard	Standard	None
Door	Back	(SW)	40.0	0.550	0.650	Standard	Standard	None
Window	Back	(SW)	16.8	0.310	0.260	Standard	Standard	None
Window	Back	(SW)	18.0	0.290	0.360	Standard	Standard	None
Door	Back	(SW)	40.0	0.550	0.650	Standard	Standard	None
Window	Back	(SW)	21.0	0.290	0.360	Standard	Standard	None
Window	Back	(SW)	30.0	0.290	0.360	Standard	Standard	None
Window	Back	(SW)	20.0	0.310	0.260	Standard	Standard	None
Window	Back	(SW)	20.0	0.310	0.260	Standard	Standard	None
Window	Back	(SW)	13.9	0.310	0.260	Standard	Standard	None
Door	Back	(SW)	40.0	0.550	0.650	Standard	Standard	None
Door	Back	(SW)	40.0	0.550	0.650	Standard	Standard	None
Window	Back	(SW)	13.9	0.310	0.260	Standard	Standard	None
Door	Back	(SW)	17.8	0.550	0.650	Standard	Standard	None
Window	Back	(W)	33.5	0.310	0.260	Standard	Standard	None
Window	Back	(W)	16.8	0.310	0.260	Standard	Standard	None
Door	Back	(W)	40.0	0.550	0.650	Standard	Standard	None
Window	Back	(W)	21.0	0.290	0.360	Standard	Standard	None
Window	Back	(W)	30.0	0.290	0.360	Standard	Standard	None
Window	Back	(W)	16.8	0.310	0.260	Standard	Standard	None
Window	Back	(W)	18.0	0.290	0.360	Standard	Standard	None
Window	Right	(NW)	13.9	0.310	0.260	Standard	Standard	None
Door	Right	(NW)	36.7	0.550	0.650	Standard	Standard	None
Window	Right	(NW)	14.6	0.310	0.260	Standard	Standard	None
Window	Right	(NW)	6.3	0.310	0.260	Standard	Standard	None

SLAB SURFACES

Slab Type	Area (sf)
Standard Slab	845

THERMAL MASS

Type	Exposed	Area (sf)	Thickness (in)	Location/Comments
ExteriorVert	Yes	111	8.0	Shallow Basement
ExteriorVert	Yes	57	8.0	Medium Basement

MICROPAS6 v6.01 File-25487 Wth-CTZ01S92 Program-FORM CF-1R
User#-MP2093 User-Accurate Energy Run-Compliance Documentation

HVAC SYSTEMS

Equipment Type	Minimum Efficiency	Refrigerant Charge and Airflow	Duct Location	Duct R-value	Tested Duct Leakage	ACCA Manual D	Thermostat Type
Furnace	0.780 AFUE	n/a	Attic	R-4.2	No	No	Setback
NoCooling	10.00 SEER	No	Attic	R-4.2	No	No	Setback

WATER HEATING SYSTEMS

Tank Type	Heater Type	Distribution Type	Number in System	Energy Factor	Tank Size (gal)	External Insulation R-value
Instantaneou	Gas	Standard	1	n/a	n/a	R-n/a

WATER HEATING SYSTEMS DETAIL

System	Recovery Efficiency	Rated Input	Standby Loss Fraction	Internal Tank Insulation R-value	Pilot Light
Instantaneo	0.80	n/a	n/a	R- n/a	n/a

SPECIAL FEATURES AND MODELING ASSUMPTIONS

*** Items in this section should be documented on the plans, ***
*** installed to manufacturer and CEC specifications, and ***
*** verified during plan check and field inspection. ***

This building does not have a cooling system installed.

This building incorporates non-standard Water Heating System

REMARKS

Viceroy Vinyl Low-E2 Windows were used for compliance. These units have the following U-Values & Solar Heat Gain Coefficients. Casement = 0.31/0.26; Projected = 0.31/0.26; Fixed = 0.29/0.36

CEC Dual Non-Metal Default for Hinged and Sliding Patio Doors. These units must have the following U-Values and Solar Heat Gain Coefficients. Door = 0.55/0.65

Project Title..... Ely Residence Date..09/22/05 14:27:27

MICROPAS6 v6.01 File-25487 Wth-CTZ01S92 Program-FORM CF-1R
User#-MP2093 User-Accurate Energy Run-Compliance Documentation

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and performance specifications needed to comply with Title-24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. When this certificate of compliance is submitted for a single building plan to be built in multiple orientations, any shading feature that is varied is indicated in the Special Features Modeling Assumptions section.

DESIGNER or OWNER

Name.... Mr. Richard D. Ely
Company. Homeowner
Address. 27264 Meadowbrook Drive
Davis, CA 95616
Phone... (530) 753-8864
License. _____

Signed.. Richard D. Ely 9/07/05 (date)

DOCUMENTATION AUTHOR

Name.... Jennifer A. Somoff
Company. Accurate Energy
Address. 3713 Laguna Way
Sacramento, CA 95864
Phone... 916-483-7313

Signed.. 9/22/05 (date)

ENFORCEMENT AGENCY

Name.... _____
Title... _____
Agency.. _____
_____
Phone... _____

Signed.. _____ (date)

Project Title..... Ely Residence Date..09/22/05 14:27:27
Project Address..... 31313 Seaview Road *******
Cazadero, CA 95421 *v6.01*
Documentation Author... Jennifer A. Somoff *******
Accurate Energy
3713 Laguna Way
Sacramento, CA 95864
916-483-7313
Climate Zone..... 01
Compliance Method..... MICROPAS6 v6.01 for 2001 Standards by Enercomp, Inc.

Building Permit #

Plan Check / Date

Field Check/ Date

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User#-MP2093 User-Accurate Energy Run-Compliance Documentation

Note: Lowrise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. Items marked with an asterisk (*) may be superseded by more stringent compliance requirements listed on the Certificate of Compliance. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

BUILDING ENVELOPE MEASURES

	Designer	Enforcement
*150(a): Minimum R-19 ceiling insulation.	_____	_____
150(b): Loose fill insulation manufacturer's labeled R-Value.	_____	_____
*150(c): Minimum R-13 wall insulation in wood framed walls or equivalent U-factor in metal frame walls (does not apply to exterior mass walls).	_____	_____
*150(d): Minimum R-13 raised floor insulation in framed floors.	_____	_____
150(l): Slab edge insulation - water absorption rate no greater than 0.3%, water vapor transmission rate no greater than 2.0 perm/inch.	_____	_____
118: Insulation specified or installed meets insulation quality standards. Indicate type and form.	_____	_____
116-17: Fenestration Products, Exterior Doors and Infiltration/ Exfiltration Controls		
1. Doors and windows between conditioned and unconditioned spaces designed to limit air leakage.		
2. Fenestration products (except field fabricated) have label with certified U-factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration certification.		
3. Exterior doors and windows weatherstripped; all joints and penetrations caulked and sealed.	_____	_____
150(g): Vapor barriers mandatory in Climate Zones 14 and 16 only.	_____	_____
150(f): Special infiltration barrier installed to comply with Sec. 151 meets Commission quality standards.	_____	_____
150(e): Installation of Fireplaces, Decorative Gas Appliances and Gas Logs		
1. Masonry and factory-built fireplaces have:		
a. Closeable metal or glass door		
b. Outside air intake with damper and control		
c. Flue damper and control		
2. No continuous burning gas pilots allowed.	_____	_____

Project Title..... Ely Residence Date..09/22/05 14:27:27

MICROPAS6 v6.01 File-25487 Wth-CTZ01S92 Program-FORM MF-1R
User#-MP2093 User-Accurate Energy Run-Compliance Documentation

SPACE CONDITIONING, WATER HEATING AND PLUMBING SYSTEM MEASURES

	Designer	Enforcement
110-113: HVAC equipment, water heaters, showerheads and faucets certified by the Commission.	_____	_____
150(h): Heating and/or cooling loads calculated in accordance with ASHRAE, SMACNA or ACCA.	_____	_____
150(i): Setback thermostat on all applicable heating and/or cooling systems.	_____	_____
150(j): Pipe and Tank insulation 1. Storage gas water heaters rated with an Energy Factor less than 0.58 must be externally wrapped with insulation having an installed thermal resistance of R-12 or greater. 2. First 5 feet of pipes closest to water heater tank, non-recirculating systems, insulated (R-4 or greater). 3. Back-up tanks for solar system, unfired storage tanks, or other indirect hot water tanks have R-12 external insulation or R-16 combined internal/external insulation. 4. All buried or exposed piping insulated in recirculating sections of hot water system. 5. Cooling system piping below 55 degrees insulated. 6. Piping insulated between heating source and indirect hot water tank.	_____	_____
*150(m): Ducts and Fans 1. All ducts and plenums installed, sealed and insulated, to meet the requirements of the 1998 CMC sectons 601, 603, and 604, and standard 6-3; ducts insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape, aerosol sealant, or other duct-closure system that meets the applicable requirements of UL181, UL181A, or UL181B. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used. Building cavities shall not be used for conveying conditioned air. Joints and seams of duct systems and their components shall not be sealed with cloth back rubber addhesive duct tapes unless such tape is used in combination with mastic and drawbands. 2. Exhaust fan systems have backdraft or automatic dampers. 3. Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.	_____	_____
114: Pool and Spa Heating Systems and Equipment 1. System is certified with 78% thermal efficiency, on-off switch, weatherproof operating instructions, no electric resistance heating and no pilot light. 2. System is installed with: a. At least 36 inches of pipe between filter and heater for future solar heating. b. Cover for outdoor pools or outdoor spas. 3. Pool system has directional inlets and a circulation pump time switch.	_____	_____
115: Gas-fired central furnaces, pool heaters, spa heaters or household cooking appliances have no continuously burning		

pilot light (Exception: Non-electrical cooking appliances with pilot < 150 Btu/hr). _____ _____

LIGHTING MEASURES

	Designer	Enforcement
150(k)1: Luminaires for general lighting in kitchens shall have lamps with an efficacy of 40 lumens/watt or greater for general lighting in kitchens. This general lighting shall be controlled by a switch on a readily accessible lighting control panel at an entrance to the kitchen.	_____	_____
150(k)2: Rooms with a shower or bathtub must have either at least one luminaire with lamps with an efficacy of 40 lumens/watt or greater switched at the entrance to the room or one of the alternatives to this requirement allowed in Sec. 150(k)2.; and recessed ceiling fixtures are IC (insulation cover) approved.	_____	_____

Michelucci & Associates, Inc.
Geotechnical Consultants

Daniel S. Caldwell, G.E.
Joseph Michelucci, G.E.
Richard Quarry

February 13, 2006
Job No. 05-SR613

Richard Ely and Lindsay Allen
27264 Meadow Brook Drive
Davis, California 95616

Re: Update
Geotechnical Engineering Review
Foundation Plan and Foundation Details
Proposed Single Family Residence
31313 Seaview Road
Sonoma County, California

Dear Mr. Ely and Ms. Allen:

At your request, we have conducted a geotechnical engineering review of the foundation plan and foundation details for the proposed single family residence at 31313 Seaview Road near Cazadero in western Sonoma County, California.

Our firm prepared a soil report for the site, dated August 22, 2005, which provided recommendations for grading, foundation and retaining wall design criteria, and surface/subsurface drainage.

Foundation details are shown on plans (Sheets S1.1, S2.1, S5, and S9) prepared by Ost Engineering, Inc., dated August 2005. Architectural plans for the proposed home were prepared by Viceroy Homes. Our firm prepared a letter dated September 26, 2005 documenting our review of the referenced plans. Since our initial review and letter, minor revisions have been made to the plans. We have subsequently reviewed the revised plans, prepared by Ost Engineering, Inc., and stamped/signed on February 10, 2006.

The purpose of our review of the foundation plan/details is to see that the intent of our recommendations, as outlined in the soil report for the project, has been understood and is reflected on the drawings.

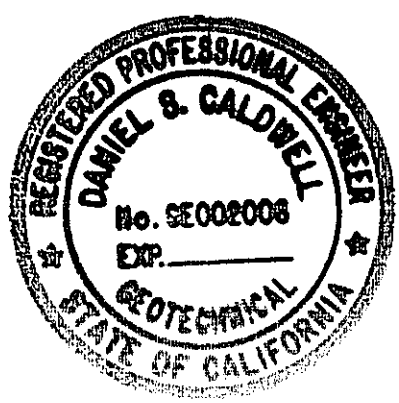
In our opinion, the foundation details shown on the referenced revised plans are in general conformance with the recommendations contained in the soil report, and are suitable for the site soil and rock conditions.

We anticipate that our representative will observe portions of the grading operation to develop the building pad at the subject project, and will conduct testing to verify that any fills are compacted to the minimum recommended degree of compaction.

We anticipate that our representative will observe the footing excavations prior to the placement of steel and concrete. This will allow us to verify that the soil and rock conditions are similar to those anticipated, and to confirm that the footings are extending to the minimum recommended depths and bearing on suitable supporting soil or rock.

Please call us if you have any questions or need further assistance.

Very truly yours,
MICHELUCCI & ASSOCIATES, INC.



Daniel S. Caldwell
Geotechnical Engineer #2006
(expires 9/30/07)

cc: Ost Engineering, Inc.

Michelucci & Associates, Inc.
Geotechnical Consultants

Daniel S. Caldwell, G.E.
Joseph Michelucci, G.E.
Richard Quarry

August 22, 2005
Job No. 05-SR613

Summary
Recommendations for Foundation and Retaining Wall Design Criteria

Proposed Single Family Residence
31313 Seaview Road
Sonoma County, California

The proposed two story, wood frame, single family residence can be supported (for the most part) on a conventional spread footing foundation system. We understand that the lower level will consist of a partial basement, excavated into the slope a full story on the east of uphill side. The east side of the basement, and portions of the north and south sides, will consist of concrete retaining walls. The west, downhill side of the home may be near original grade, and may be located close to a steepening slope down toward the west. Drilled piers may be required along the west side of the home, depending on the proximity of the home to the steeper slope. Deck footings west of the home should be also consist of drilled piers (depending on the proximity to the steeper slope), connected to the main foundation with tie beams.

Spread footings should extend at least 18 inches below the lowest adjacent finished grade or 36 inches below the original site grade, whichever is deeper. Footings adjacent to slopes should be deepened as necessary to maintain 10 feet of horizontal confinement for footings supported in stiff soil or weathered rock. Footings perpendicular to the slope should be benched so that the bottom of the footing is no steeper than 10 horizontal to 1 vertical.

Footings extending to the recommended minimum depths can be designed for a maximum allowable soil bearing pressure of 1,200 psf for dead loads, 1,800 psf for combined dead plus live loads, and 2,400 psf for all loads, including wind or seismic. In any case, the minimum footing widths as given in the latest building code should be maintained.

Retaining walls that will be restrained from rotation (building walls) should be designed for an at-rest earth pressure equivalent to 50 pcf for wall backslope inclinations as steep as 4:1 (65 pcf for backslope inclinations as steep as 2.5:1). For unrestrained walls, an equivalent fluid pressure of 40 pcf can be used for backslope inclinations no steeper than 4:1 (55 pcf for backslope inclinations as steep as 2.5:1). These values assume retaining walls will be fully subdrained.

Resistance to lateral loads can be generated by passive pressure against the front face of the footing or a key that extends below the bottom of the footing and by friction on the base of the footing. The upper 12 inches (relative to finished grade) or 36 inches (relative to original grade) should be discounted in passive support. Below 12 inches, the passive resistance can be assumed to be an equivalent fluid pressure of 350 pcf. A coefficient of friction of 0.40 can be used for design. The above are ultimate values, and a suitable factor of safety should be applied in the design. No passive support should be assumed where there is less than 10 feet of horizontal confinement to an adjacent downslope.

If the west side of the home, and a deck on the west side of the home, will be located near the steep slope down toward the west, and will be at or near original grade, it may be more efficient to support this portion of the structure on drilled, cast-in-place, reinforced concrete pier and grade beam foundations.

The drilled piers should have a minimum diameter of 18 inches and should be designed to gain support for vertical and lateral loads below the upper weak topsoil layer that mantles the site. The top of lateral and vertical support should be assumed to begin at a minimum depth of 36 inches below the lowest adjacent finished grade, or below a point where 10 feet of horizontal confinement is achieved. Resistance to vertical loads can be generated by skin friction acting on that portion

of the peripheral area of the pier that extends below the top of supporting soil (36 inches below original grade or below 10 feet of horizontal confinement). A skin friction value of 500 pounds per square foot can be assumed for design. No end bearing resistance should be used in the design. We recommend that a minimum pier depth of ten feet below the lowest adjacent finished grade should be maintained. The required embedment depth of each pier should be determined based upon the building loads at a given pier location. The required embedment into supporting soil should be shown for each pier location on the plans.

Drilled piers located on or within twenty feet of the steep slope west of the building site should be designed for possible soil creep lateral loading. We recommend that each pier be designed to resist a lateral load equal to an equivalent fluid pressure of 60 pcf acting on the upper three feet of the pier, and assuming that soil arching will extend three pier diameters.

Resistance to lateral loads can be generated on that portion of the pier that extends into supporting soil. The passive resistance can be assumed to be an equivalent fluid pressure of 350 pounds per cubic foot. The passive resistance can be applied to 1.5 times the projected area of the pier.

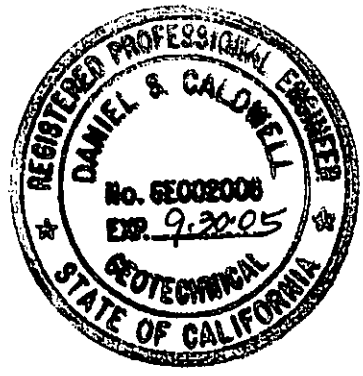
Reinforced concrete grade beams should be designed to span across the tops of the piers and carry the building loads to the piers, without relying on the soil between piers for support.

Seismic design should be in accordance with the applicable building code. The appropriate design parameters are as follows: Seismic source type is A; distance to closest known seismic source is less than 0.5 kilometers; and soil profile type is Sd, stiff soil.

Additional foundation and drainage design recommendations will be included in the final soil report for the project.

Very truly yours,
MICHELUCCI & ASSOCIATES, INC.

Daniel S. Caldwell
Geotechnical Engineer #2006
(expires 9/30/05)



GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed Single Family Residence
31313 Seaview Road
Sonoma County, California

Prepared for:

Richard Ely and Lindsay Allen
27264 Meadow Brook Drive
Davis, California 95616

August 22, 2005
Job No. 05-SR613

Michelucci & Associates, Inc.
Geotechnical Consultants

Daniel S. Caldwell, G.E.
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Richard Quarry

August 22, 2005
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Richard Ely and Lindsay Allen
27264 Meadow Brook Drive
Davis, California 95616

Re: Geotechnical Engineering Investigation
Proposed Single Family Residence
31313 Seaview Road
Sonoma County, California

Dear Mr. Ely and Ms. Allen:

At your request, we have conducted a geotechnical engineering investigation of the site of the proposed single family residential development at 31313 Seaview Road in Sonoma County, California.

The purpose of our investigation was to evaluate the soil and rock conditions beneath the proposed building site in order that we could provide recommendations for soil and foundation related features of the proposed development.

Project Description

The property is a large parcel located on the westerly side of Seaview Road, approximately three quarters of a mile north of the intersection of Seaview Road and Timber Cove Road. The natural ground surface in the vicinity of the proposed building area consists of a slope down toward the west at an average slope inclination of roughly 4 or 5 horizontal to 1 vertical (steeper in some areas). The natural ground surface becomes somewhat steeper just west of the proposed building area. Numerous shrubs and wild grasses and weeds currently grow in and around the proposed building area. The proposed building location is shown on the attached site plan sketch, Figure 1.

We understand that you propose to construct a two story, single family residence. The new structure would be of wood frame construction and would have a concrete slab-on-grade floor in the lower level living space and attached garage. Some grading and retaining walls will be required to develop a proposed lower level of the home, which will be excavated into the natural slope at the east side. No fill is planned within the footprint area of the proposed residence.

The driveway will follow the path to an existing driveway along the northern portion of the site. It is anticipated that cuts and fills up to roughly three to four feet thick will be required along the lower portion of the driveway near the proposed garage.

Field Investigation

Members of our staff conducted a detailed visual reconnaissance of the subject property on July 23, 2005. During the site reconnaissance, the general soil and rock conditions across the lot were observed. Five shallow borings were drilled in the proposed building area using a manual bucket auger drill. The logs of the borings are shown on the attached Figures 2 through 6.

Site and Soil Conditions

Based upon our site reconnaissance and five shallow exploratory borings, the soil/rock conditions in the proposed building area consist of a layer of topsoil composed of medium stiff to stiff red brown to tan sandy silt to clayey silt with rock fragments. In general, the thickness of the topsoil layer in the proposed building area will range from two to four feet. Beneath the topsoil is dense tan brown, orange brown, and red brown weathered and fractured sandy siltstone to silty sandstone.

Based upon an Atterberg Limits test conducted on a sample representative of the surface soil at the site, the soil has low plasticity and low expansion potential. The results of the Atterberg Limits test are included on the attached Figure 7.

Conclusions

In our opinion, the site is suitable for the proposed development. The surface soil in the proposed building area is generally thin and has low expansion potential. Dense weathered and fractured siltstone and sandstone is located at a relatively shallow depth beneath the existing ground surface in the proposed building area. This rock will provide good foundation support. We expect that shallow "perched" groundwater occurs at the site during the rainy winter months. Therefore, careful attention to surface and subsurface drainage measures is an important aspect of the development.

Proper keying and benching will be required along portions of the driveway alignment to remove and recompact any weak soil prior to placing the driveway structural section. Subdrainage will be required in certain areas beneath fill slopes and behind retaining walls.

Specific recommendations are given in the following section.

Recommendations

1. Grading and Site Preparation

All grading and site preparation should be done under the direct observation of our field representative and in accordance with the attached "Guide Specifications for Engineered Fills". It is the contractor's responsibility to complete the grading in accordance with the job specifications. Our representative will observe the grading and take a random number of tests each day in order to provide an opinion to the owner regarding the conformance of the grading to the specifications. When we feel the grading does not meet the specifications, the contractor should rework the area to our satisfaction.

All engineered fill should be placed in thin lifts not exceeding 6 to 8 inches in uncompacted thickness, brought to a moisture content that will permit proper compaction, and each lift should be compacted until a minimum degree of compaction of 90% is achieved, based on ASTM Test Method D1557.

We recommend that all fills placed on the site be placed as compacted, engineered fills, with appropriate quality control testing, including fills for the driveway, terraces, yard areas, and other features of the proposed development.

Prior to placing fill, any vegetation and debris should be stripped so that the site is clean. We estimate that the typical stripping depth will be approximately 3 inches. The stripped material should not be used as engineered fill, but it may be stockpiled for later use as topsoil in nonstructural areas. Any cracked or saturated surface soil should be overexcavated prior to placing fill. After any necessary overexcavation has been completed, the subgrade should be scarified, brought to a moisture content of 1 to 3 percent over optimum, and then it should be compacted to a minimum degree of compaction of 90% (ASTM D1557). Fill can then be placed on the prepared subgrade in lifts not exceeding 6 to 8 inches in uncompacted thickness. Each lift should be brought to a moisture content that will permit proper compaction, and then be compacted to a minimum degree of compaction of 90% (ASTM D1557).

Where fills are being placed on natural slopes exceeding an inclination of 5 horizontal to 1 vertical, a key excavation should be made at the toe of the fill, extending to a depth of at least two feet into dense rock, or as determined by the soil engineer in the field. The key should be at least 12 feet wide, or one and one half times the equipment width. Horizontal benches should be excavated into strong soil or rock as the level of the fill is raised, so that fill is always being placed on a level surface. Subdrains should be installed beneath fills at locations determined by the soil engineer in the field, and in all areas where the fill slope height exceeds four feet. Details of subdrainage are shown on the attached "Guide Specifications for Subsurface Drains".

Cut and fill slopes should be constructed no steeper than 2.5 horizontal to 1 vertical, where competent rock is exposed, as approved by the soil engineer in the field. Where topsoil or weathered rock is exposed in the cut slope, we recommend that the slope inclination be no steeper than 3 horizontal to 1 vertical.

It is recommended that fills be overbuilt by two to three feet, and then be trimmed back to expose stiff, compacted soil at the face of the fill slope, due to the difficulty of compacting to the outside edge of a fill slope. We recommend that fills be constructed in such a way as to provide at least a two foot wide horizontal bench beyond the edge of any adjacent driveway surface, concrete slab-on-grade terrace or walkway, or other improvements, in order to provide lateral support to the various structures.

Fill placed behind retaining walls should also be placed in thin lifts not exceeding 6 to 8 inches in uncompacted thickness, brought to a moisture content that will permit proper compaction, and then be compacted to a minimum degree of compaction of 90% (ASTM D1557). Backfill placed within 10 feet of existing retaining walls should be compacted with light weight (hand operated) compaction equipment to minimize loads on the walls during construction.

It is noted that some of the soils on the site are silty and may be difficult to adequately compact when the moisture content is high, particularly during the winter months. Therefore, it should be anticipated that some spreading and drying will be necessary in order to achieve proper compaction of silty fill. Conversely, moisture may have to be added to the soil, particularly during the summer months, to achieve proper compaction.

2. Building Foundations

The proposed structure can be supported on spread footing foundations bearing on engineered fill, stiff natural soil, or rock. We recommend that spread footings extend to a minimum depth of 18 inches below the lowest adjacent finished grade (excluding topsoil placed around the building for landscaping purposes) or 36 inches below the original site grade, whichever is deeper. However, footings need not extend more than 12 inches into dense rock, as approved by the soil engineer in the field during foundation excavation. Footings near slopes should be deepened as necessary to achieve a minimum 10 feet of horizontal confinement between the edge of the footing and the slope face. Footings perpendicular to the slope should be benched so that the bottom of the footing is inclined no steeper than 10 horizontal to 1 vertical.

At the recommended depths, the footings can be designed for an allowable soil bearing pressure of 1,200 psf for dead loads, 1,800 psf for dead plus live loads, and 2,400 psf for all loads, including wind or seismic. In any case, the minimum footing widths given in the applicable building code should be used.

We recommend that deck footings should be tied back to the main house foundation using tie beams.

Resistance to lateral loads can be generated by passive pressure against the front face of the footing, if the footing is cast neat against undisturbed soil, rock, or compacted fill and by friction between the bottom of the footing and the soil. The top of lateral support should be assumed to begin at a minimum depth of one foot below the lowest adjacent finished grade or 36 inches below the original site grade. Below 12 (or 36) inches, the passive resistance can be assumed to be an equivalent fluid pressure of 350 pcf. No passive support should be assumed where there is less than 10 feet of horizontal confinement to an adjacent downslope. A coefficient of friction of 0.40 may be used for calculating frictional resistance. The above are ultimate design values, and a suitable factor of safety should be incorporated into the design.

Seismic design should be in accordance with the applicable building code. The appropriate design parameters are as follows: Seismic source type is A; distance to closest known seismic source is less than 0.5 kilometers; and soil profile type is Sd, stiff soil.

3. Retaining Walls

Retaining walls which will be restrained from rotation at the top (such as a building wall) should be designed to resist a lateral load equivalent to a fluid pressure of 50 pounds per cubic foot for backslope inclinations no steeper than 4 horizontal to 1 vertical and in cut (65 pcf for backslope inclinations as steep as 2.5:1). Walls that will be unrestrained from rotation at the top, and will support backslopes no steeper than 4 horizontal to 1 vertical and in cut, should be designed to resist a lateral load equivalent to a fluid pressure of 40 pounds per cubic foot (55 pcf for backslope inclinations as steep as 2.5:1). The

active forces can be assumed to act at an angle of 15 degrees to the horizontal to account for wall friction. Any surcharge loads due to automobile traffic or adjacent footing loads should be added to the above lateral loads for design. The above soil pressures assume that walls will be subdrained. Recommended details of subdrainage are included on the attached Figure 8. Specifications for subdrainage are included in the attached "Guide Specifications for Subsurface Drains."

Footings for retaining walls should have a minimum 24 inch embedment below the lowest adjacent finished grade, or deeper, as required, to maintain 10 feet of lateral confinement near slopes. The resistance to lateral loads can be generated by passive pressure against the front face of the footing, if the footing is cast neat against undisturbed soil, rock, or compacted fill and by friction between the bottom of the footing and the soil. The top of lateral support should be assumed to begin at a minimum depth of one foot below the lowest adjacent finished grade (or 36 inches below the original site grade). The passive resistance at a depth of one foot can be assumed to be 200 pounds per square foot, and this can be increased by 350 psf per foot below that. The passive pressure can be computed on the basis of the above pressure acting on the front face of the footing or a key that extends below the bottom of the foundation. A coefficient of 0.40 may be used for calculating frictional resistance. The above are ultimate design values, and a suitable factor of safety should be incorporated into the design.

All retaining walls over 3 feet in height or any building walls that act as retaining walls should be provided with a subdrain behind the wall stem to minimize the build-up of hydrostatic pressure. Subdrains should be constructed in accordance with the appropriate section of the attached "Guide Specifications for Subsurface Drains" and as shown on Figure 8.

It should be pointed out that the recommended subdrainage is not intended to provide water or moisture proofing to the walls, but only to relieve hydrostatic pressure. Therefore, any retaining walls where moisture would be undesirable or that form structural perimeters should be moisture proofed in addition to being subdrained. Moisture proofing details are the responsibility of the architect or another consultant.

4. Slab-on-Grade Construction

The surface soil on the site is generally low in plasticity and expansion potential. We recommend that the subgrade of any living area floor slabs or other slabs where cracking would be undesirable be evaluated during construction for the presence of expansive soil. If expansive soil is present, supplemental recommendations will be given for placement of select fill beneath floor slabs. Select fill is defined in the attached "Guide Specifications for Engineered Fill".

We recommend that concrete slabs-on-grade be designed with a minimum thickness of 4 inches, although 5 inches thick is preferable to minimize the risk of slab cracking. In addition, we recommend that all concrete slabs-on-grade be reinforced with #3 or #4 steel rebar at an appropriate spacing in each direction. Slabs should have control joints at a maximum spacing of roughly 10 feet on center in each direction. The specific design of concrete floor slabs and exterior driveway and walkway slabs should be provided by the project structural engineer.

It is recommended that a moisture retarding treatment be provided beneath interior slab-on-grade floors where moisture would be undesirable. A minimum but commonly used treatment is illustrated on Figure 9. It should be pointed out that other, more expensive but possibly more effective, methods have been used in some cases, and the architect should make the final decision regarding moisture prevention based on the needs of the project. Our contribution in this matter is only to point out that moisture will be available at the base of slabs from the subgrade soil due to groundwater conditions and capillary rise.

It should be pointed out that where the gravel moisture retarding layer is placed beneath slabs, there is a possibility that water will tend to collect in the gravel layer and become trapped. If this condition occurs, the potential for moisture problems in the slab will be increased. One method of minimizing the potential for this to occur would be to construct a subdrain trench through and just below the gravel layer so that water collected in this area can escape. The subdrain should extend at least 12 inches below the base of the slab and 6 inches below the bottom of the gravel, and would consist of a 4

inch diameter, perforated pipe surrounded by gravel. Details of subsurface drains are given in the attached "Guide Specifications for Subsurface Drains". The subdrain would connect to the recommended moisture retarding treatment under the slab, and the pipe should lead to a storm drain or low area on the site. The choice of installing the subdrain facilities should be based on an evaluation of the detrimental effect, if any, of dampness on the surface of the slab.

5. Surface and Subsurface Drainage

It is important that careful attention be given to surface drainage considerations on all aspects of the project. We recommend that all roof rain gutter downspouts be connected to rigid nonperforated pipes that lead to suitable storm drainage facilities located well away from the residence foundations and away from slopes. Surface gradients should be designed such that there is always a positive slope away from any buildings and away from pavements. Surface runoff from the adjacent higher ground east of the building area should be collected in appropriate drainage facilities upslope of the home.

We have observed on past projects that numerous drainage problems in the form of moisture under buildings and pavement failures have occurred due to the design and construction of landscape and irrigation improvements after the basic grading has been completed. Planting areas that drain toward pavements cause water to collect in the baserock layer, and this directly results in pavement failures, even under light traffic. The same considerations also apply to depressed areas beneath buildings and to gravel layers beneath floor slabs. Any low areas on the site (including the crawl space areas beneath the home) should be provided with catch basins that lead by nonperforated pipes to suitable drainage facilities. In general, water should not be allowed to pond at the tops of slopes or to flow over the faces of slopes.

Details of surface drainage are to be designed by the civil engineer and are beyond the scope of our assignment. The recommendations of this section are intended to provide only general guidelines for drainage control measures.

6. Utility Trench Backfill Construction

If settlement is to be avoided, backfill placed in utility trenches should be compacted to a minimum degree of compaction of 90% (ASTM D1557) from 2 feet above the top of the pipe to the finished grade. In the case that utility trenches are located in paved areas, the upper 6 inches of backfill below the pavement subgrade level should be compacted to a minimum degree of compaction of 95% (ASTM D1557).

Either on-site soil or imported granular fill can be used as trench backfill material. It is noted that if on-site clayey soil is used for trench backfill, jetting would not be expected to achieve the compaction specification of 90%. We would anticipate that the on-site clayey material would have to be placed in relatively thin lifts and compacted with a whacker or other mechanical compaction device to achieve the specified degree of compaction.

As mentioned, imported granular fill material could also be used to backfill utility trench excavations. Granular fill material would be easier to compact in small excavations. If granular fill material is used, the fill should be placed in layers and compacted to a minimum degree of compaction of 90%. It is possible that jetting of granular backfill, such as sand, in the utility trenches would achieve the recommended degree of compaction. Many times, utility contractors choose to place granular fill in one lift, and then jet the backfill to achieve the specified degree of compaction. In this case, test pits would have to be excavated at various levels within the backfill, at some reasonable spacing along the trench line, so that field density tests could be taken in the backfill to sample the degree of compaction that is being achieved.

Preparation of the bedding layer of the utility pipes and the placement of shading and cover over the pipe should be undertaken according to the standard specifications of the various utility districts, and plumbing manufacturers that would have jurisdiction over the various utilities.

7. Construction Considerations and Review of Plans

It is recommended that the foundation and grading plans for the proposed development be submitted to our office for review. The purpose of this review would be to determine that the intent of our recommendations has been understood and is reflected on the drawings. At that time, any specific details of the project that may not have been covered by the recommendations given in this report should be brought to our attention so that appropriate supplemental recommendations can be made.

It is also recommended that the foundation excavations be examined by our representative prior to construction of footings or slabs-on-grade. This would enable us to verify our assumptions regarding the soil conditions and to see that the foundations are bearing on the recommended material. As mentioned, all grading work should be performed under our direct observation. Any fills on the lot should be tested as they are being placed to verify that the minimum recommended degree of compaction is being achieved.

As discussed, it should be anticipated that some of the soil at the site may be too wet to compact, particularly during the winter months. Therefore, some spreading and aeration of the soil may be required before proper compaction can be achieved. Conversely, some of the soil may have to be moisture conditioned by adding water prior to compaction.

Limitations

The conclusions and opinions in this report are based on the scope of work described above. While in our opinion our study has adequately disclosed the soil conditions across the site, the possibility exists that anomalies or changes in the soil conditions which were not discovered by this investigation could occur. Should such items be discovered during construction, our office should be notified immediately so that any necessary supplemental recommendations can be made.

This study was not intended to disclose the locations of any existing utilities, septic tanks, leaching fields, or other buried structures. The

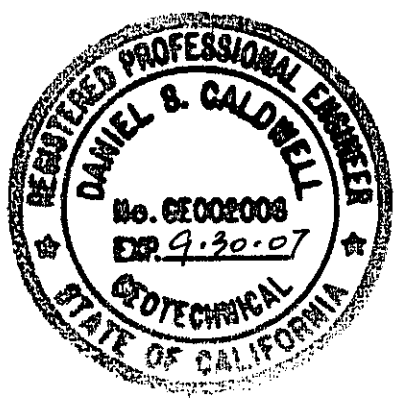
contractor or other people working on the project should locate these items, if any.

This report was prepared to provide engineering opinions and recommendations only. It should not be construed to be any type of guarantee or insurance.

Very truly yours,
MICHELUCCI & ASSOCIATES, INC.

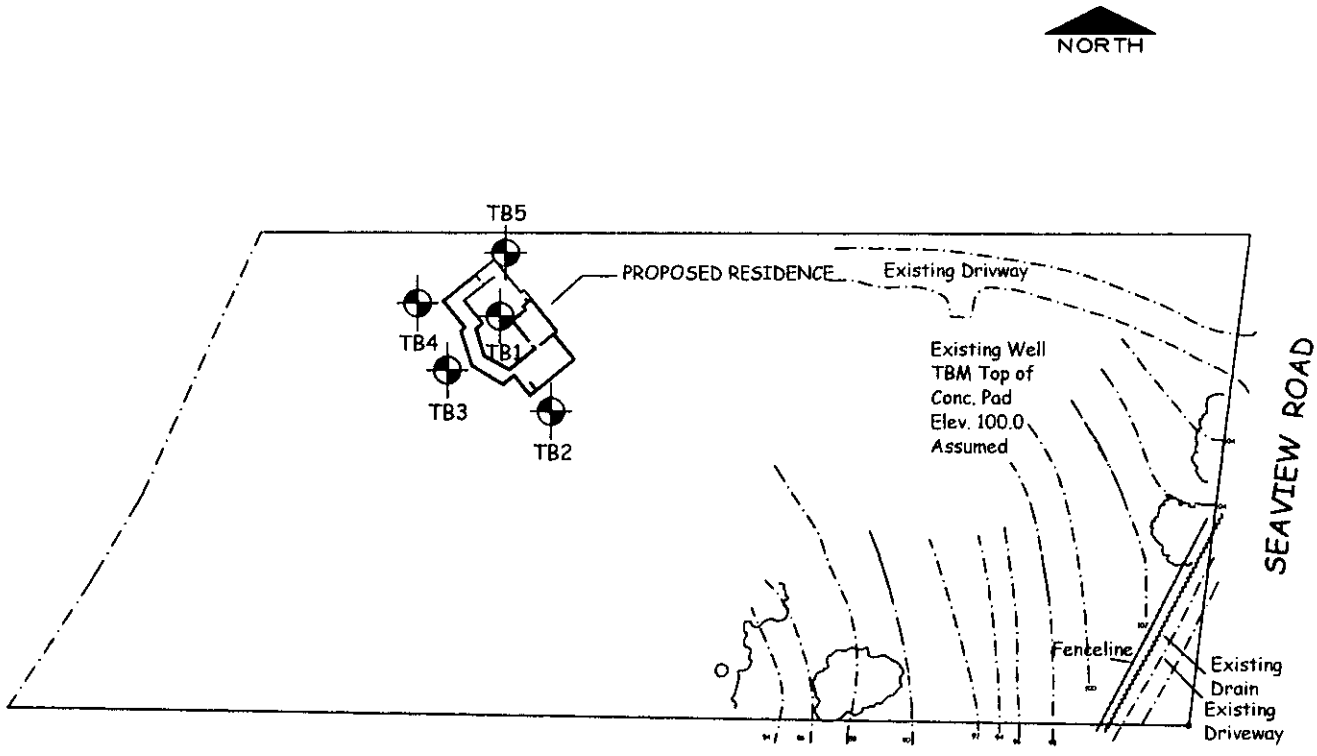
Daniel S. Caldwell

Daniel S. Caldwell
Geotechnical Engineer #2006
(expires 9/30/07)



SITE PLAN

31313 Seaview Road
Sonoma County



Approximate Scale : 1" = 100'

Approximate location of exploratory boring

Job No. 05-SR613	Michelucci & Associates, Inc.	Figure 1

PROJECT	31313 Seaview Road, Sonoma County								BORING NO. 1
BORING SUPERVISOR	DC/BC	TYPE OF BORING 3.25 inch diameter manual bucket auger						DATE OF BORING 7/23/05	
HAMMER WEIGHT	15 pounds, 18 inch drop								
SURFACE ELEVATION	-								
GROUNDWATER DEPTH	Dry / 7/23/05								

DESCRIPTION OF MATERIALS	DEPTH IN FT.	SAMPLE	SAMPLE NUMBER-SAMPLE DIAMETER	DRIVING RESISTANCE BLOWS PER FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT %	UNCONFINED COMPRESSIVE STRENGTH P.S.F.	OTHER TESTS
Medium stiff brown to red brown clayey silt to sandy silt	1							
Stiff mottled tan and light gray clayey silt	2		1) 2"	33/6"	93	14		
	3							
Dense mottled orange brown and light gray weathered and fractured sandy siltstone to clayey siltstone	4							
	5		2)2"	78/6"	99	11		
	6							
Dense orange brown fractured and weathered silty fine sandstone	7							
	8							
Bottom of Boring at 8 feet								

Job No. 05-SR613

Michelucci & Associates, Inc.

Figure 2

PROJECT	31313 Seaview Road, Sonoma County	BORING NO. 2
BORING SUPERVISOR	DC/BC	TYPE OF BORING 3.25 inch diameter manual bucket auger
HAMMER WEIGHT	15 pounds, 18 inch drop	DATE OF BORING 7/30/05
SURFACE ELEVATION	-	
GROUNDWATER DEPTH	Dry 7/30/05	

DESCRIPTION OF MATERIALS	DEPTH IN FT.	SAMPLE	SAMPLE NUMBER-SAMPLE DIAMETER	DRIVING RESISTANCE BLOWS PER FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT %	UNCONFINED COMPRESSIVE STRENGTH P.S.F.	OTHER TESTS
Medium stiff brown to red brown clayey silt to sandy silt	1							
Stiff mottled tan and light gray clayey silt	2		1) 2"	42/6"				
Dense mottled orange brown and light gray weathered and fractured sandy siltstone to silty sandstone	3, 4, 5, 6							
Bottom of Boring at 6 feet	7, 8							

PROJECT	31313 Seaview Road, Sonoma County		BORING NO. 3
BORING SUPERVISOR	DC/BC	TYPE OF BORING 3.25 inch diameter manual bucket auger	DATE OF BORING 7/30/05
HAMMER WEIGHT	15 pounds, 18 inch drop		
SURFACE ELEVATION	-		
GROUNDWATER DEPTH	Dry / 7/30/05		

DESCRIPTION OF MATERIALS	DEPTH IN FT.	SAMPLE	SAMPLE NUMBER-SAMPLE DIAMETER	DRIVING RESISTANCE BLOWS PER FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT %	UNCONFINED COMPRESSIVE STRENGTH P.S.F.	OTHER TESTS
Medium stiff brown to red brown clayey silt to sandy silt	1							
	2							
Stiff mottled tan and light gray clayey silt		■	1) 2"	46/6"				
	3							
Dense mottled orange brown and light gray weathered and fractured sandy siltstone to silty sandstone	4							
	5							
Bottom of Boring at 5 feet	6							
	7							
	8							

Job No. 05-SR613

Michelucci & Associates, Inc.

Figure 4

PROJECT	31313 Seaview Road, Sonoma County	BORING NO. 4
BORING SUPERVISOR	DC/BC	
HAMMER WEIGHT	15 pounds, 18 inch drop	
SURFACE ELEVATION	-	
GROUNDWATER DEPTH	Dry 7/30/05	

TYPE OF BORING: 3.25 inch diameter manual bucket auger

DATE OF BORING: 7/30/05

DESCRIPTION OF MATERIALS	DEPTH IN FT.	SAMPLE	SAMPLE NUMBER-SAMPLE DIAMETER	DRIVING RESISTANCE BLOWS PER FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT %	UNCONFINED COMPRESSIVE STRENGTH P.S.F.	OTHER TESTS
Medium stiff brown to red brown clayey silt to sandy silt	1	■	1) 2"	22/6"				
Dense mottled orange brown and tan weathered and fractured sandy siltstone to silty sandstone	2							
	3							
	4							
	5							
Bottom of Boring at 5 feet	6							
	7							
	8							

PROJECT	31313 Seaview Road, Sonoma County		BORING NO. 5
BORING SUPERVISOR	DC/BC	TYPE OF BORING 3.25 inch diameter manual bucket auger	DATE OF BORING 7/30/05
HAMMER WEIGHT	15 pounds, 18 inch drop		
SURFACE ELEVATION	-		
GROUNDWATER DEPTH	Dry / 7/30/05		

DESCRIPTION OF MATERIALS	DEPTH IN FT.	SAMPLE	SAMPLE NUMBER-SAMPLE DIAMETER	DRIVING RESISTANCE BLOWS PER FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT %	UNCONFINED COMPRESSIVE STRENGTH P.S.F.	OTHER TESTS
Medium stiff brown to red brown clayey silt to sandy silt	1							
Stiff red brown sandy silt	2							
Dense mottled red brown and tan weathered and fractured sandy siltstone to silty sandstone	3							
Bottom of Boring at 4 feet	4							
	5							
	6							
	7							
	8							

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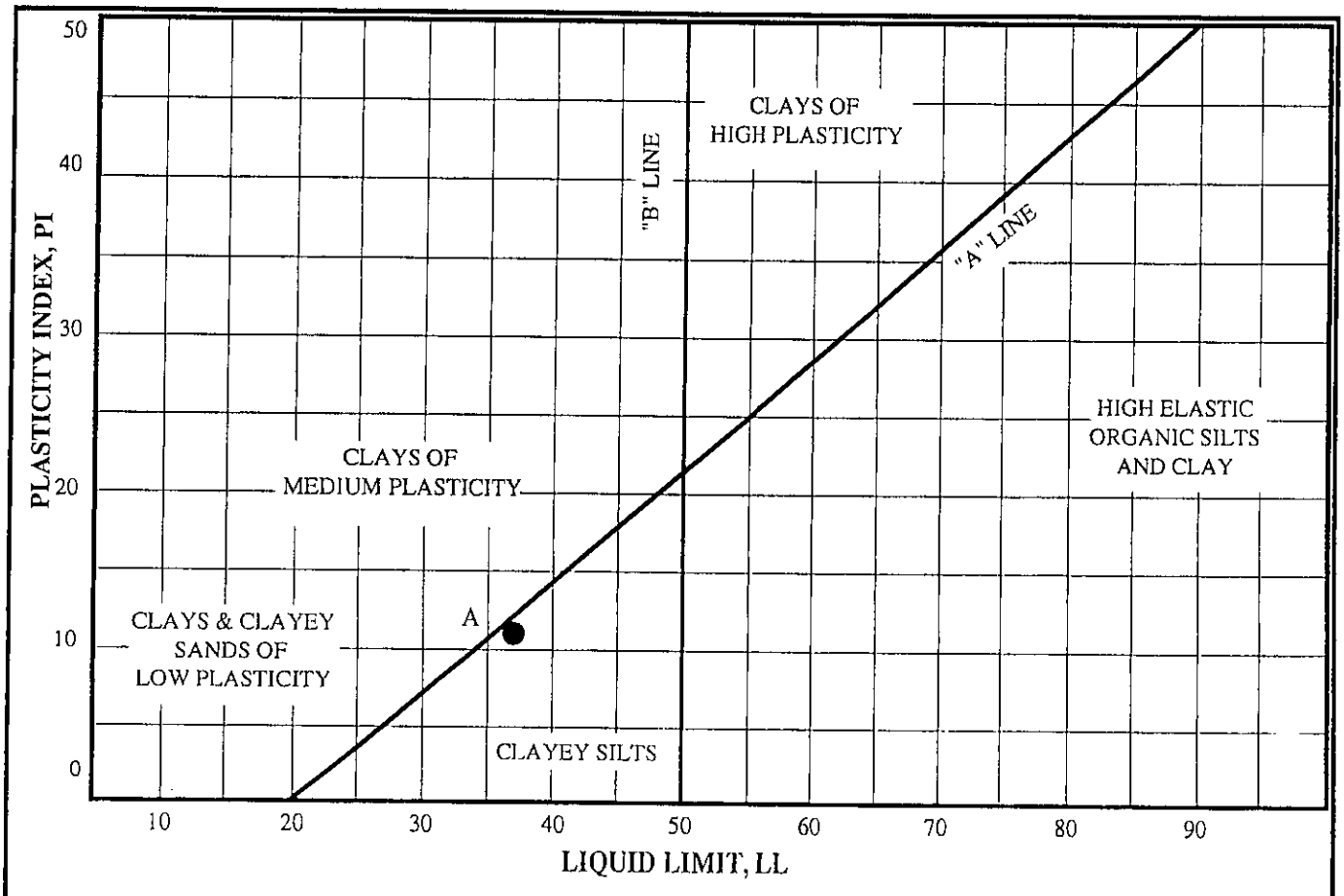
Figure 6



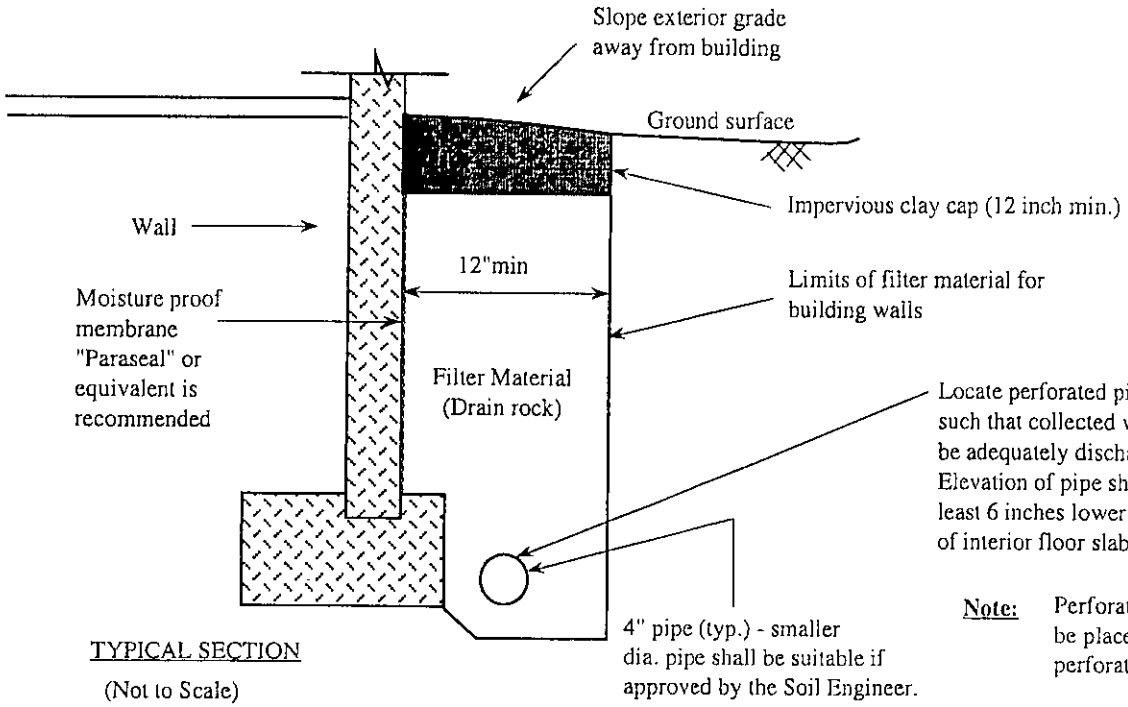
CLASSIFICATION TEST RESULTS

SAMPLE IDENTIFICATION			ATTERBERG LIMITS			GRAIN SIZES % DRY WT.			
SAMPLE	LETTER DESIGNATION	DESCRIPTION	LIQUID LIMIT	PLASTICITY INDEX	SHRINKAGE LIMIT	SAND	SILT	CLAY	COLLOIDAL
Bulk	A	Red brown clayey to sandy silt	37	11		--	--	--	--

PLASTICITY CLASSIFICATION

Job No. 05-SR613	Michelucci & Associates, Inc.	Figure 7

GUIDE SPECIFICATIONS FOR SUBDRAINS BEHIND RETAINING WALLS



TYPICAL SECTION

(Not to Scale)

Subdrain pipe shall be manufactured in accordance with the following requirements:

a. Acrylonitrile-butadiene-styrene (ABS) plastic pipe shall conform to the specifications for ABS plastic pipe given in ASTM Designation D2282 and ASTM Designation D2751. ABS pipe shall have a minimum pipe stiffness of 45 psi at 5% deflection when measured in accordance with ASTM Method D2412.

b. Polyvinyl chloride (PVC) pipe shall conform to AASHTO Designation M278. PVC pipe shall have a minimum pipe stiffness of 50 psi at 5% deflection when measured in accordance with ASTM Method D2412 except that pipe conforming to F758 shall be suitable. Schedule 40 PVC pipe shall be suitable. SDR-35 PVC pipe conforming to ASTM D3034 shall be suitable when the thickness of pipe cover does not exceed 12 feet.

Filter material for use in backfilling trenches around and over subdrain pipes and behind retaining walls shall consist of clean coarse sand and gravel or crushed stone conforming to the following requirements:

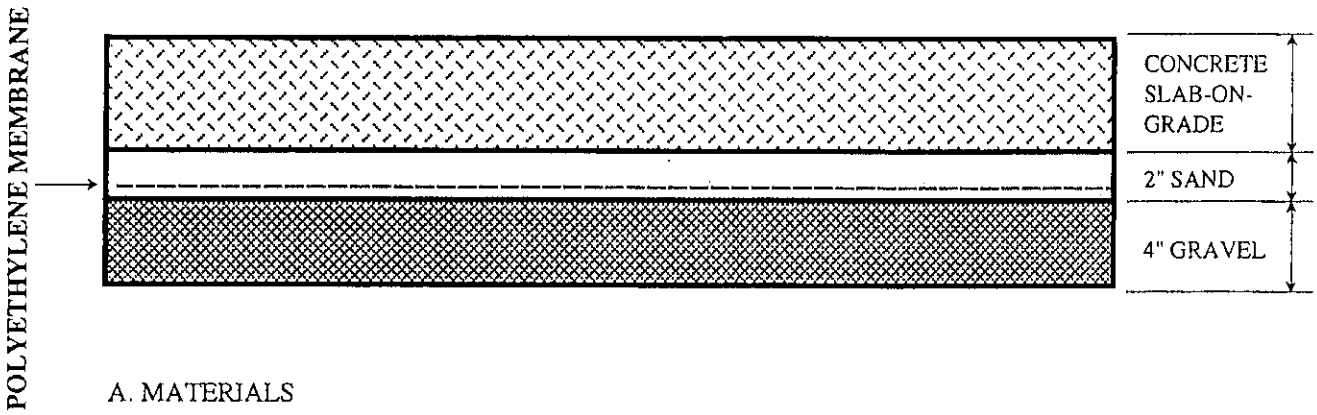
Sieve Size	% Passing Sieve
2"	100
3/4"	70 to 100
3/8"	40 to 100
#4	25 to 50
#8	15 to 45
#30	5 to 25
#50	0 to 20
#200	0 to 3

Class 2 " Permeable Material" conforming to the State of California Department of Transportation Standard Specifications, latest edition, Section 68-1.025 shall be suitable.

Clean, coarse gravel ("drain rock") shall be suitable, provided the subsurface drain is wrapped in an acceptable geotextile ("filter fabric") such as Mirafi 140N.

MOISTURE RETARDANT BENEATH CONCRETE FLOOR SLABS

TYPICAL SECTION



A. MATERIALS

The mineral aggregate for use under floor slabs shall consist of clean rounded gravel and sand. The aggregate shall be free from clay, organic matter, loam, volcanic tuff, and other deleterious substances.

B. GRADATIONAL REQUIREMENTS

The mineral aggregate shall consist of such sizes that the percentage composition by dry weight as determined by laboratory sieve (U.S. Series) will conform to the following gradation:

	Percentage Passing	
Sieve Size	Gravel	Sand
1"	100	
3/4"	90-100	
No. 4	0-5	100
No. 50		0-30

NOTES:

1. The polyethylene membrane should be adequately thick so that it will not be easily damaged during construction. It should be adequately detailed so that there are little or no openings around plumbing at conduit points and near foundations. Pipe penetrations should be taped to minimize vapor transmission. The membrane sheets should be adequately lapped.

2. The sand covering is not a part of the moisture retardant treatment. It is a normally used optional component that gives some protection to the membrane and also aids in curing the concrete. Pea gravel may be used as a substitute for sand.

3. The final moisture retardant detail is to be determined by the project architect.

GUIDE SPECIFICATIONS

FOR ENGINEERED FILL

A. GENERAL

1. Definition of Terms

FILL...is all soil or soil/rock materials placed to raise the grade of the site or to backfill excavations.

ON-SITE MATERIAL...is that which is obtained from the required excavations on the site.

IMPORT MATERIAL...is that hauled in from off-site areas.

SELECT MATERIAL...is a soil material meeting the requirements set forth in "C(2)" below.

ENGINEERED FILL...is a fill upon which the Soil Engineer has made sufficient test and observations to enable him to issue a written statement that in his opinion the fill has been placed and compacted in accordance with the specification requirements.

AASHTO SPECIFICATIONS...are the Standard Specifications of the American Association of State Highway Officials latest revision.

ASTM SPECIFICATIONS...are the Annual Book of ASTM Standards (Part 19), American Society for Testing and Materials, latest revision.

MAXIMUM LABORATORY DENSITY...is the maximum density for a given fill material that can be produced in the laboratory by the Standard procedure ASTM D1557, "Moisture-Density Relations of Soils Using a 10-Pound (4.5 kg) Hammer and an 18-inch (457 mm) Drop" (AASHTO Test T-180, "Moisture-Density Relations of Soils Using 10-Pound Hammer and an 18-Inch Drop").

OPTIMUM MOISTURE CONTENT...is the moisture content at which the maximum laboratory density is achieved using the standard compaction procedure ASTM Test Designation D1557 (AASHTO Test -180).

DEGREE OF COMPACTION...is the ratio, expressed as a percentage, of the dry density of the fill material as compacted in the field to the maximum dry density for the same material.

2. Responsibility of the Soil Engineer

The Soil Engineer shall be the Owner's representative to observe the grading operations, both during preparation of the site and compaction of any engineered fill. He shall make enough visits to the site to familiarize himself generally with the progress and quality of the work. He shall make a sufficient number of field observations and tests to enable him to form an opinion regarding the adequacy of the site preparation, the acceptability of the fill material, and the extent to which the degree of compaction meets the specification requirements. Any fill where the site preparation, type of material, or compaction is not approved by the Soil Engineer shall be removed and/or recompacted until the requirements are satisfied.

3. Soil Conditions

A soil investigation has been performed for the site by Michelucci & Associates and a report has been issued by them dated August 22, 2005 covering that investigation. The contractor shall familiarize himself with the soil conditions on the site, whether covered in that report or not, and shall thoroughly understand all recommendations associated with the grading.

B. SITE PREPARATION

1. Stripping

Prior to any cutting or filling, the site shall be stripped to a sufficient depth to remove all grass, weeds, roots, and other vegetation, including trees and their root systems. The minimum stripping depth shall be 3 inches. The site shall be stripped to such greater depth as the Soil Engineer in the field may consider necessary to remove materials that, in his opinion, are unsatisfactory. The stripped material shall either be removed from the site or stockpiled for reuse later as topsoil, but none of this stripped material may be used for engineered fill.

When trees are removed, the soils loosened by the roots shall be overexcavated at least to the bottom of the disturbed zone and

to the width of the equipment. These excavations should be backfilled with engineered fill.

2. Preparation for Filling

After stripping, the weak soils in areas to be filled or in building footprint areas plus 5 feet beyond building lines shall be overexcavated to the minimum depth called for on the plans or that is required by the Soil Engineer in the field. The overexcavated soils that are clean and free from organic material can be used later as general engineered fill.

After stripping the surface vegetation and overexcavating the weak soils to the required depths, the exposed surface shall be scarified to a minimum depth of 6 inches, watered or aerated as necessary to bring the soil to a moisture content that will permit compaction, and recompacted to the requirements of engineered fill as specified in "D" below. Prior to placing fill, the Contractor shall obtain the Soil Engineer's approval of the site preparation in the area to be filled. The requirements of this section may be omitted only when approved in writing by the Soil Engineer.

C. MATERIAL USED FOR FILL

1. Requirements for General Engineered Fill

All fill material must be approved by the Soil Engineer. The material shall be a soil or soil/rock mixture that is free of organic matter or other deleterious substances. The fill material shall not contain rocks or lumps over 6 inches in greatest dimension, and not more than 15% by dry weight shall be larger than 2 1/2 inches in greatest dimension. The soils from the site, except the surface strippings, shall be suitable for use as fill.

2. Requirements for Select Fill Material Beneath Floor Slabs

In addition to the requirements of "C(1)" above, select material, when called for on the plans and for use under floor slabs or in

buttress fills, must conform to the following minimum requirements:

Maximum Plasticity Index	12

3. Environmental Certification for Imported Fill
All imported fill materials, to be used as a select material or otherwise, shall be free from hazardous contaminants and other refuse. The contractor shall provide to the owner proper certification and other documentation as required by the owner to verify that the imported material is not contaminated with hazardous substances. The acceptable levels of any contaminants discovered in the soil shall be determined by the owner.

D. PLACING AND COMPACTING FILL MATERIAL

All fill material shall be compacted as specified below or by other methods, if approved by the Soil Engineer, so as to produce a minimum degree of compaction of 90% (clayey and silty soil) or 95% (sandy soil). Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness.

Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either aerating the material if it is too wet or spraying the material with water if it is too dry. Each lift shall be thoroughly mixed before compaction to ensure a uniform distribution of water content. Where natural clayey soils are used within 3 feet of the finished ground surface, they shall be placed and compacted at a moisture content that is 1% to 3% above optimum.

E. EXCAVATION

All excavations shall be carefully made true to the grades and elevations shown on the plans. The excavated surfaces shall be

properly graded to provide good drainage during construction and to prevent ponding of water.

F. SUBGRADE PREPARATION UNDER FLOOR SLABS

The floor slab area shall be overexcavated to a sufficient depth to accommodate a 12-inch thickness of select fill, when called for by the soil engineer. After overexcavating, the exposed surface shall be scarified, mixed with water, if necessary, and compacted to a degree of compaction of 90% at a moisture content 1% to 3% above optimum. The select engineered fill shall be placed immediately to prevent drying up of the subgrade. The select fill shall be placed and compacted as in "D" above.

G. TREATMENT AFTER COMPLETION OF GRADING

After grading is completed and the Soil Engineer has finished his observation of the work, no further excavation or filling shall be done except with the approval of and under the observation of the Soil Engineer. It shall be the responsibility of the Grading Contractor to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

GUIDE SPECIFICATIONS

FOR SUBSURFACE DRAINS

A. DESCRIPTION

Subsurface drains are pipes installed beneath the ground surface and which collect and convey subsurface drainage water. Unless otherwise directed by the Soil Engineer in the field, the conduit shall be placed in a trench, and the trench shall be backfilled with pervious material. The conduit and pervious material shall meet the requirements for the materials given in these specifications. The materials for the subsurface drain and the size of the trench shall be as shown on the plans or as determined by the Soil Engineer in the field.

B. MATERIALS

1. Subdrain Pipe

Subdrain pipe shall be manufactured in accordance with the following requirements:

a. Perforated corrugated metal pipe shall conform to the specifications of AASHTO Designation M36. Corrugated steel sheet used in the fabrication of the pipe shall have a protective coating of zinc (galvanizing), aluminum, or aluminum-zinc alloy conforming to ASTM Designation A760.

b. Acrylonitrile-butadiene-styrene (ABS) plastic pipe shall conform to the specifications for ABS plastic pipe given in ASTM Designation D2282 and ASTM Designation D2751. ABS pipe shall have a minimum pipe stiffness of 45 psi at 5% deflection when measured in accordance with ASTM Method D2412.

c. Polyvinyl chloride (PVC) pipe shall conform to ASSHTO Designation M278. PVC pipe shall have a minimum pipe stiffness of 50 psi at 5% deflection when measured in accordance with ASTM Method D2412. Schedule 40 PVC pipe shall be suitable.

2. Pervious Backfill Material

Pervious materials for use in backfilling trenches shall conform to the requirements of Paragraph "C1" of these specifications. Pervious material conforming to the requirements of Paragraph "C2" may be used, provided that the backfill is wrapped in a suitable geotextile ("filter fabric") meeting the requirements given in Section "D".

C. BACKFILL MATERIAL

1. Filter Material

Filter material for use in backfilling trenches around and over subdrain pipes and behind retaining walls shall consist of clean coarse sand and gravel or crushed stone conforming to the following requirements:

Sieve Size	% Passing Sieve
2"	100
3/4"	70 to 100
3/8"	40 to 100
# 4	25 to 50
# 8	15 to 45

#30	0 to 40
#50	0 to 20
#200	0 to 3

Class 2 "permeable material" conforming to the State of California Department of Transportation Standard Specifications, latest edition, Section 68-1.025 shall be suitable.

2. Gravel

Gravel for use in pervious blankets and in backfilling trenches or wrapped in filter fabric meeting the requirements of Section D of these specifications shall consist of clean fresh stone conforming to the following grading requirements:

Sieve Size	% Passing Sieve
1"	100
1/2"	50 to 100
#4	40 to 100
#8	0 to 40
#30	0 to 40
#50	0 to 5
#200	0 to 3

Class 1 "permeable material" conforming to the State of California Department of Transportation Standard Specifications Section 68-1.025 shall be suitable.

D. GEOTEXTILE

Geotextiles for use in subdrains or as directed by the Soil Engineer shall be of nonwoven, needlepunch construction and consist of long chain polymeric fibers composed of polypropylene, polyethylene, or polyamide. The fibers shall be oriented into a multidirectional, stable network. The geotextile shall conform to the physical property requirements listed below:

Physical Property	Test Method	Acceptable Typical Test Results
Tensile Strength, wet, lbs	ASTM D1682	90 (minimum)
Elongation, wet, %	ASTM D1682	40 (minimum)
Coefficient of Water Permeability, cm/sec	Constant Head	0.10 (minimum)
Pore Size--EOS, U.S. Standard Sieve	Corps of Engineers CW-02215	40 (maximum)

E. LAYING AND PLACEMENT

The drain pipe and filter material shall be placed as shown on the plans or as determined by the Soil Engineer in the field. Unless otherwise directed by the Soil Engineer, perforated pipe shall be laid with the perforations at the bottom. Corrugated metal pipe sections shall be joined with couplers.

Subsurface drains shall be placed to the depths, lines, and grades shown on the plans and as directed by the Soil Engineer in the field. Subsurface drains shall discharge to a suitable outlet as defined in the field by the Soil Engineer or as shown on the plans.

After excavating the subsurface drain trench but before placing the drain pipe, a minimum of 4 inches of filter material shall be placed on the trench bottom. The filter material shall be rounded to conform to the curvature of the pipe so that the pipe is carefully bedded. The trench shall then be backfilled to the top of the pipe, and the backfill tamped or hand wedged into place to provide firm support at the sides of the pipe. In general, the installation shall follow the guidelines of ASTM Designation D2774, except that compaction of the filter material in the trench shall not be required.

The contractor shall, at his expense, replace pipes damaged during the installation or subsurface drains not placed at the lines and grades called for on the plans or as determined by the Soil Engineer in the field.

The geotextile shall be placed in the manner and at the locations shown on the plans. The surface to receive the fabric and/or the trench into which the fabric is to be placed shall be prepared to a smooth condition free of obstructions and debris.

The geotextile shall be covered with a permeable material within two weeks of its placement. Should the fabric be damaged

during construction, the torn or punctured section shall be repaired by placing a piece of fabric that is large enough to cover the damaged area and to meet the overlap requirement. Adjacent borders of the geotextile shall be overlapped a minimum of 12 inches or sewn. The preceding roll shall overlap the following roll in the direction the material is being placed.

F. CLEANOUTS

At the direction of the Soil Engineer, cleanouts shall be provided at the ends of pipes and at junctions and connections of pipelines. Junction angles should be no steeper than 45 degrees where cleanout pipes connect to the subdrain pipes. Cleanouts should be provided with lockable caps.

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ENGINEERING CALCULATIONS

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