Fugro Summary – Board Meeting 6/9/2010

Hasley Sloan Site. As described in the geotechnical report, the Hasley Sloan site is characterized by gentle to moderately steep terrain with an elevation difference of about 200 feet across the site. Based on review of the available data and site reconnaissance, the site appears to have limited geohazards that would impact development for the school project. The potential geohazards at the Hasley Sloan site consist of:

- Several shallow landslides,
- liquefaction of alluvium,
- standard cut slope height (60 feet) and fill depths (40 feet).

In our opinion, based on the available data those geohazards can be addressed using standard engineering and construction procedures and practices. One geohazard issue that may require additional study is the potential for faulting and surface fault rupture onsite. However, in our opinion the existing data do not indicate that faulting is present onsite and therefore mitigations for surface fault rupture potential are considered unlikely.

Romero Canyon Site. The Romero Canyon site is characterized by steep hillside terrain with an elevation difference of over 650 feet across the site. The data review and site reconnaissance indicates that the proposed building area is underlain by large landslide complexes. Further, conceptual grading plans include a significant 380-foot-high cut slope to the west of the large landslide complexes. A detailed exploration program will be required to evaluate the landslide geometries, and geotechnical conditions in the proposed cut slope area. Development of the Romero Canyon site likely will require significant grading and engineering evaluation and input to address several key geotechnical issues:

- deep landslide removal,
- slope stability of the proposed 380-foot-high cut-slope, and
- settlement of up to 200-foot deep fills beneath the building pad area.

Stability of the cut slopes may require buttressing or other mitigations to meet current code requirements. Deep overexcavation of landslides will likely result in specialized fill requirements and monitoring programs to establish suitable building conditions at the site.

FUGRO WEST, INC.

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June 2, 2010
Proposal No. 2010.062

William S. Hart Union High School District
21515 Centre Pointe Parkway
Santa Clarita, California 91350

Attention: Michael Otavka, Director of Facilities, New Construction

Subject: Proposal for Geotechnical Study, New Castaic High School - Hasley Sloan Site, William S. Hart Union High School District, Santa Clarita, California

Dear Mr. Otavka:

This proposal summarizes a scope of work and fee estimate to perform a geotechnical study for the William S. Hart Union High School District (WSHUHSD) new Castaic High School at the Hasley Sloan site in Santa Clarita, California. The 69.5-acre Hasley-Sloan site is located near Hasley Canyon Road and Sloan Canyon Road. Site conditions for the Hasley Sloan site are described in our preliminary geotechnical report (Fugro 2010) and consist of:

- The site generally consists of moderately steep hilly terrain in about the northern two-thirds of the site and a previously graded low-lying area in the southern one-third of the site. Topography within the hilly terrain ranges from a high of about 1,485 feet on the ridge area at the northern property limit to about 1,360 feet near the toe of the slopes. Topography within the low-lying graded area in the southern portion of the property ranges from about 1,360 feet near the hills to about 1,315 feet along the northern bank of Hasley Creek near the southern portion of the property. Natural slopes are inclined at about 2h:1v to 2.5h:1v with locally steeper slopes.
- As discussed previously, portions of the site were graded over 20 years ago for a mobile home park development that was never constructed. Rough grading included construction of 2h:1v cut-slopes and fill-slopes of granular soil materials. Based on our site visit, the 2h:1v cut- and fill-slopes have been eroded and gullies are common within the access roads and existing slopes. Up to approximately 24 feet of fill was placed in the southern portion of the site.
- The hilly terrain in the northern portion of the Hasley-Sloan site is underlain by Saugus Formation bedrock.
- Aerial photographic mapping by Fugro identified several potential landslides that appear to be several tens of feet thick.
- Mapping by the California Geologic Survey indicates that the alluvial sediments may be susceptible to liquefaction.

- The design study will also need to address the potential for fault rupture.
- Previous exploration at the site consisted of 12 drill holes (4 by GeoSoils and 8 by Geolabs Westlake Village - GWV) and 18 backhoe test pits by GWV.

The intent of this study is to provide geotechnical design parameters consistent with CGS Note 48 which includes geotechnical design requirements for California Schools and Hospitals. We note that some of the final geotechnical design parameters may need to be modified pending development of final grading plans and other design criteria established by the design team. The geotechnical study will incorporate the previous subsurface exploration data however new data will be required to address CGS Note 48 guidelines for potential landslides, slope stability, potential liquefaction and dry seismic settlement of alluvial soils, and settlement. In general, the CGS guidelines require one exploration for each 5,000 square feet of planned structures (approximately 30 explorations). In most cases the explorations need to be within the proposed structure footprints. Depending on the final site layout supplemental exploration or analyses may be required.

PROPOSED WORK SCOPE

The proposed work scope consists of subsurface exploration, laboratory testing, geotechnical analyses, and preparation of a geotechnical report for the site.

Task 1 - Subsurface Exploration

Project Planning, Safety Plan, and Underground Service Alert. We will coordinate with the design team and school district staff relative to the proposed project elements and site plan to prepare our exploration plan. Prior to performing our exploration we will prepare a site health and safety plan and contact underground service alert (USA) to identify onsite utilities. Fugro will not be responsible for damage to un-located or mis-located utilities.

Subsurface Exploration. To help evaluate the subsurface geotechnical conditions we propose the following explorations:

Type of Exploration	No. of Drill Holes/Estimated Depth	Comments
Bucket-Auger Drill Rig	4 / 60 feet	Slope stability, potential landslides, colluvium
Hollow-stem-auger drill rig	6 / 50 feet	Explore Fill and alluvium
Backhoe Test Pits	12 / 10 feet	Collivum and Saugus Form.
Cone Penetration Test	10 to 12 / 50 feet	Explore fill and alluvium
Supplemental Backhoe Trenching (Fault Evaluation)	1,000 feet / 10 to 12 feet	Fault Evaluation

The bucket-auger drill holes will be advanced to a depth of about 50 feet, sampled at 5-foot intervals using a modified California sampler, down-hole logged as safe conditions permit. The hollow-stem-auger drill holes will be advanced to a depth of about 50 to 60 feet, sampled at about 5-foot intervals using SPT and modified California (split-spoon) samplers. Bulk samples also will be collected from the excavated materials. We will backfill the drill holes with the excavated materials and tamp the soil materials upon completion of exploration at each location. Excess materials from the bucket-auger drill holes will be mounded somewhat over the excavation locations. We will advance cone penetration tests (CPTs) to a depth of 50 feet or refusal in fill and alluvial areas to evaluate engineering parameters of those materials. The CPT provides continuous data collection versus samples at 5-foot intervals in drill holes. We have assumed a track mounted bucket-auger rig will be used to access hillside areas and a rubber tired HSA and CPT rig can be utilized in fill areas. Backhoe test pits will be excavated to evaluate the depth of colluvium in slope areas and provide information on bedrock strata in cut slope areas. Backhoe trenching for evaluation of fault rupture potential is listed as a separate item pending further evaluation of surface fault rupture potential at the site.

Task 2 - Laboratory Testing

We will perform laboratory testing on selected earth materials sampled in the drill holes to estimate engineering parameters of the encountered soil materials. The laboratory testing program is expected to consist of moisture/density relationships, grain size, Atterberg limits, direct shear, consolidation, expansion index, limited soil chemistry (pH, resistivity, sulfates, and chlorides), compaction, permeability, and R-value.

Task 3 - Geotechnical Analyses and Report

On the basis of the above tasks, we will provide geotechnical opinions and recommendations regarding the following:

- Soil and groundwater conditions at the site;
- Geohazard evaluation consisting of fault rupture (based on published information), liquefaction potential, seismically-induced settlement, and expansive soils;
- 2007 California Building Code (CBC) seismic design criteria including soil profile type, seismic coefficients, and near-source factors;
- Site preparation and grading and compaction requirements for fill placement;
- Suitability of on-site soil for use as compacted fill;
- Evaluation of cut and fill slope stability (buttress design if required for cut slope);
- Considerations for temporary excavations;
- Design of shallow foundations (overexcavation recommendations, maximum allowable bearing pressures and potential footing settlement under static and seismic conditions);
- Static and dynamic lateral earth pressures for cantilever, below-grade and restrained retaining walls;
- Resistance to lateral loads, passive soil pressures, and friction coefficients;
- Allowable lateral resistance for light standards,
- Requirements for imported soils and fill materials placed below slabs;

- Expansion potential of on-site soils;
- Slabs-on-grade,
- Construction considerations including groundwater, dewatering, temporary excavations, and stabilization of wet excavation bottoms;
- Utility trench backfill placement and compaction;
- Asphalt concrete pavement section thicknesses for auto and truck traffic areas, and
- Estimated subsurface infiltration rates for onsite storm water disposal.

Upon completion of the above tasks, we will document our findings and submit six copies of our design-level geotechnical engineering report for review by the design team. The report will provide a general discussion of the geotechnical conditions encountered at the site, and recommendations based on our geotechnical evaluation. An electronic file (Microsoft Word and PDF plates) of the report will be transmitted to the design team and District.

Task 4 - Meetings and Project Management

We have provided for attendance of our project manager/engineering geologist or geotechnical engineer at up to three board meetings. We have also provided for preparation and attendance of a half day meeting by our project manager/engineering geologist and geotechnical engineer to discuss findings of the geotechnical study. We anticipate that the meetings will be held in the Santa Clarita area and will be attended by WSHUHSD and other team members as appropriate. Additional time required for meeting attendance will be billed on a time and expense basis in accordance with our current fee schedule.

FEE ESTIMATE

The work can be initiated upon receiving written authorization to proceed. We assume that the work will be completed as an extension of our existing agreement. We estimate the fee to provide the above described services to be about $ 78,000 ($138,000 with supplemental fault evaluation task). The fees estimated herein remain valid for a period of 90 days from the proposal date. Fees will be invoiced monthly on a time and material basis assuming prevailing wage. We will not exceed the total estimated fee without prior written consent from the District. A breakdown is provided in the following tables.

Table 1. Fee Estimate

Description	Estimated Fugro Staff-Hours	Estimated Fee
GEOTECHNICAL STUDY		
Task 1 - Subsurface Exploration	120	$ 51,000
Supplemental Task 1A - Backhoe trenching for fault evaluation	150	60,000
Task 2 - Laboratory Testing	-	9,500
Task 3 - Geotechnical Analyses/Reporting	145	21,750
Task 4 - Meetings and Project Management	28	4,250
Estimated Total:		**$86,500**
Estimated Total WITH supplemental TASK 1A:		**$ 146,500**

SCHEDULE

The estimated duration for Tasks 1 through 3 is summarized in the table below. The time frame for Task 4 (Meetings) will be based on meeting schedule determined by WSHUHSD.

Table 2. Time Schedule Estimate

Description	Duration (weeks)	Estimated Schedule from Contract Execution (weeks)
Task 1 - Subsurface Exploration	3*	3
Task 2 - Laboratory Testing	2	5
Task 3 - Geotechnical Analyses/Report	5	10
Task 4 - Project Meetings	As needed	As needed

* An additional 3 weeks will be required to incorporate the backhoe trenching (optional fault evaluation task) into the exploration program.

PERSONNEL

The project will be managed by Ms. Lori Prentice, CEG. Ms. Prentice has about 20 years experience and is a Certified Engineering Geologist registered in California. Geotechnical engineering will be provided by Mr. Greg Denlinger, GE, a California registered geotechnical engineer, who also has more than 20 years experience. Both Mr. Denlinger and Ms. Prentice have worked on various school and hospital projects in both northern and southern California in addition to providing third-party geotechnical review services to the City of Santa Clarita. Mr. Denlinger and Ms. Prentice will be assisted by various professionals within Fugro as the project proceeds.

ASSUMPTIONS

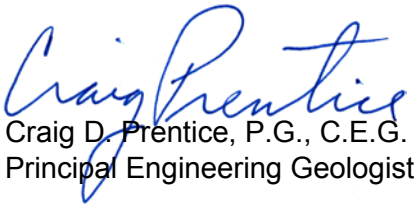
- Access onto site provided by WSHHSD
- Exploration locations accessible by standard truck mounted drill rig
- No permits required for exploration

CLOSURE

Thank you for the opportunity to provide this proposal for geotechnical review services for the William S. Hart Union High School District's proposed high school sites in the Castaic area of Los Angeles County. Please call if you have any questions regarding information presented in this proposal.

Sincerely,

FUGRO WEST, INC.



Craig D. Prentice, P.G., C.E.G.
Principal Engineering Geologist

Copies Submitted: (1-Pdf) Addressee

FUGRO WEST, INC.

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June 2, 2010
Proposal No. 2010.062

William S. Hart Union High School District
21515 Centre Pointe Parkway
Santa Clarita, California 91350

Attention: Michael Otavka, Director of Facilities, New Construction

Subject: Proposal for Geotechnical Study, New Castaic High School - Romero Canyon Site, William S. Hart Union High School District, Santa Clarita, California

Dear Mr. Otavka:

This proposal summarizes a scope of work and fee estimate to perform a geotechnical study for the William S. Hart Union High School District (WSHUHSD) new Castaic High School at the Romero Canyon site in Santa Clarita, California. Site conditions for the Romero Canyon site are described in our preliminary geotechnical report (Fugro, 2010). As discussed in our preliminary report, development of the Romero Canyon site will likely require significant grading and engineering input to address several key geotechnical issues: 1) landslide removal, 2) slope stability of the proposed 380-foot high cut-slope, and 3) settlement of up to 200-foot deep fills beneath the building pad. Site conditions and key issues consist of:

- **Site Conditions.** The Romero Canyon site has steep hilly terrain with alluvial filled valleys. Elevations range from a high of about 2,380' along the ridge at the northwestern property limit to a low of about 1,730 feet in the southeastern portion of the site in Romero Canyon. Total elevation change across the site is about 650 feet. Natural slopes range from gently inclined in stream channel areas to nearly vertical in hillside areas. Previous mapping by Barrows (1986), CDMG (2002), and GWV (2007) indicates the presence of large landslide complexes in the hillside areas.
- **Landsliding.** Geomorphology observed in air photo and site reconnaissance, and previous exploration indicate that several large landslide complexes are within the proposed building area at the Romero Canyon Site. Based on the data review and interpretations, the landslide complex in the NW portion of site appears to contain relatively extensive deep-seated landslides that are documented to be in excess of 100 feet thick and could extend to depths of greater than 150 feet. Other mapped and potential landslides may be 100 feet or more thick. Minimal subsurface data exist in several of the potential landslide complexes. The large complex in the NW portion of the site has not been adequately characterized and the depth and geometry of that slide are not known.
- **Cut Slope.** A 380-foot-high cut-slope is planned in the NW portion of the site. Based on previous exploration, the cut-slope could expose laterally unsupported

"daylighted" geologic bedding or create a dip-slope condition and could result in failure of the slope that could extend offsite. The proposed 380-foot-high cut-slope is in the area of the unexplored landslide complex. As described by GWV, the landsliding in the western portion of the site is likely associated with the presence of a higher percentage claystone and clayey siltstone beds within the Saugus Formation. A likely cause of the existing landslides is scour at the base of slopes undercutting the slope and laterally unsupporting "daylighting" the claystone beds, which moved downslope.

- **Deep Fills.** A 100- to 170-foot-high fill-slope is planned along Romero Canyon Road at the eastern property margin. In addition, remedial grading to remove landslide debris below the planned excavation depth could result in fill depths of 200 feet or more beneath proposed structures. Site-specific design will need to address the estimated settlement and provide recommendations to reduce settlement to within project requirements.

The intent of this study is to provide geotechnical design parameters consistent with CGS Note 48 which includes geotechnical design requirements for California Schools and Hospitals. We note that some of the final geotechnical design parameters may need to be modified pending development of final grading plans and other design criteria established by the design team. The geotechnical study will incorporate the previous subsurface exploration data however new data will be required to address CGS Note 48 guidelines for potential landslides, slope stability, potential liquefaction and dry seismic settlement of alluvial soils, and settlement. In general, the CGS guidelines require one exploration for each 5,000 square feet of planned structures (approximately 30 explorations). In most cases the explorations need to be within the proposed structure footprints, however explorations to characterize the landslides and slope stability issues will be needed to supplement those in the building areas. Depending on the final site layout supplemental exploration or analyses may be required.

Exploration is anticipated to consist of a combination of large-diameter bucket-auger drill holes, test pits, and trenches to characterize landslide distribution and geometries and subsurface conditions in the proposed cut-slope area. Exploration within the large landslide complex in the NW portion of the site is anticipated to consist of continuous coring and possibly down-hole geophysical tools to characterize material distribution, characteristics, and depth of slides within the complex. Subsurface exploration in alluvial areas for liquefaction and dry settlement evaluations and for recommended removals of unsuitable materials.

PROPOSED WORK SCOPE

The proposed work scope consists of subsurface exploration, laboratory testing, geotechnical analyses, and preparation of a geotechnical report for the site.

Task 1 - Subsurface Exploration

Project Planning, Safety Plan, and Underground Service Alert. We will coordinate with the design team and school district staff relative to the proposed project elements and site plan to prepare our exploration plan. Prior to performing our exploration we will prepare a site health and

safety plan and contact underground service alert (USA) to identify onsite utilities. Fugro will not be responsible for damage to un-located or mis-located utilities.

Subsurface Exploration. To help evaluate the subsurface geotechnical conditions we propose the following explorations:

Type of Exploration	No. of Drill Holes/Estimated Depth	Comments
Bucket-Auger Drill Rig	8 to 10/ 80 to 100 feet	Landslide geometry, slope stability
Continuous Coring Drill Rig	5 / 200 feet	Deep landslide geometry
Hollow-stem-auger drill rig	4 / 50 feet	Explore alluvium
Backhoe Test Pits	16 / 10 feet	Colluvium and Saugus Formation

The bucket-auger drill holes will be advanced to depths of about 80 to 100 feet, sampled at 5-foot intervals using a modified California sampler, and down-hole logged as safe conditions permit. Continuous coring drilling will be utilized in the large landslide complex along the northern portion of the site to help characterize the geometry of the deep landslide debris. Depending on the core recovery supplemental electric wireline logging may be needed to characterize the landslide slip surface geometry. The hollow-stem auger drill holes will be advanced to a depth of about 50 to 60 feet, sampled at about 5-foot intervals using SPT and modified California (split-spoon) samplers. Bulk samples also will be collected from the excavated materials. We will backfill the drill holes with the excavated materials and tamp the soil materials upon completion of exploration at each location. Excess materials from the bucket-auger drill holes will be mounded somewhat over the excavation locations. We have assumed a bulldozer will be required to create access roads and pads for bucket auger rig and continuous coring rig in hillside areas and that a rubber tired HSA rig can be utilized in alluvial areas. Backhoe test pits will be excavated to evaluate the depth of colluvium in slope areas and provide information on bedrock strata in cut slope areas.

Task 2 - Laboratory Testing

We will perform laboratory testing on selected earth materials sampled in the drill holes to estimate engineering parameters of the encountered soil materials. The laboratory testing program is expected to consist of moisture/density relationships, grain size, Atterberg limits, direct shear, consolidation, expansion index, limited soil chemistry (pH, resistivity, sulfates, and chlorides), compaction, permeability, and R-value.

Task 3 - Geotechnical Analyses and Report

On the basis of the above tasks, we will provide geotechnical opinions and recommendations regarding the following:

- Soil and groundwater conditions at the site;
- Geohazard evaluation consisting of fault rupture (based on published information), liquefaction potential, seismically-induced settlement, and expansive soils;

- 2007 California Building Code (CBC) seismic design criteria including soil profile type, seismic coefficients, and near-source factors;
- Site preparation and grading and compaction requirements for fill placement;
- Suitability of on-site soil for use as compacted fill;
- Evaluation of cut and fill slope stability (preliminary buttress design for one cut slope configuration, if required);
- Considerations for temporary excavations;
- Design of shallow foundations (overexcavation recommendations, maximum allowable bearing pressures and potential footing settlement under static and seismic conditions);
- Estimated settlement and development of settlement monitoring program for deep fills;
- Static and dynamic lateral earth pressures for cantilever, below-grade and restrained retaining walls;
- Resistance to lateral loads, passive soil pressures, and friction coefficients;
- Allowable lateral resistance for light standards,
- Requirements for imported soils and fill materials placed below slabs;
- Expansion potential of on-site soils;
- Slabs-on-grade,
- Construction considerations including groundwater, dewatering, temporary excavations, and stabilization of wet excavation bottoms;
- Utility trench backfill placement and compaction;
- Asphalt concrete pavement section thicknesses for auto and truck traffic areas, and
- Estimated subsurface infiltration rates for onsite storm water disposal.

Upon completion of the above tasks, we will document our findings and submit six copies of our design-level geotechnical engineering report for review by the design team. The report will provide a general discussion of the geotechnical conditions encountered at the site, and recommendations based on our geotechnical evaluation. An electronic file (Microsoft Word and PDF plates) of the report will be transmitted to the design team and District.

Task 4 - Meetings and Project Management

We have provided for attendance of our project manager/engineering geologist or geotechnical engineer at up to three board meetings. We have also provided for preparation and attendance of a half day meeting by our project manager/engineering geologist and geotechnical engineer to discuss findings of the geotechnical study. We anticipate that the meetings will be held in the Santa Clarita area and will be attended by WSHUHSD and other

team members as appropriate. Additional time required for meeting attendance will be billed on a time and expense basis in accordance with our current fee schedule.

FEE ESTIMATE

The work can be initiated upon receiving written authorization to proceed. We assume that the work will be completed as an extension of our existing agreement. We estimate the fee to provide the above described services to be about $ 232,850. The fees estimated herein remain valid for a period of 90 days from the proposal date. Fees will be invoiced monthly on a time and material basis assuming prevailing wage. We will not exceed the total estimated fee without prior written consent from the District. A breakdown is provided in the following tables.

Table 1. Fee Estimate

Description	Estimated Fugro Staff-Hours	Estimated Fee
GEOTECHNICAL STUDY		
Task 1 - Subsurface Exploration		
Bucket Auger Drill Rig	100	58,000
Continuous Coring Drill rig	100	54,000
Hollow-stem auger Drill Rig	24	12,500
Backhoe Test pits	24	4,500
Bulldozer	10 days	24,000
Geophysical Logging	3 holes	15,000
Task 2 - Laboratory Testing	-	16,500
Task 3 - Geotechnical Analyses/Reporting	260	38,750
Task 4 - Meetings and Project Management	48	9,600
Estimated Total:		**$232,850**

SCHEDULE

The estimated duration for Tasks 1 through 3 is summarized in the table below. The time frame for Task 4 (Meetings) will be based on meeting schedule determined by WSHUHSD.

Table 2. Time Schedule Estimate

Description	Duration (weeks)	Estimated Schedule from Contract Execution (weeks)
Task 1 - Subsurface Exploration	6	6
Task 2 - Laboratory Testing	3	9
Task 3 - Geotechnical Analyses/Report	6	15
Task 4 - Project Meetings	As needed	As needed

PERSONNEL

The project will be managed by Ms. Lori Prentice, CEG. Ms. Prentice has about 20 years experience and is a Certified Engineering Geologist registered in California. Geotechnical engineering will be provided by Mr. Greg Denlinger, GE, a California registered geotechnical engineer, who also has more than 20 years experience. Both Mr. Denlinger and Ms. Prentice have worked on various school and hospital projects in both northern and southern California in addition to providing third-party geotechnical review services to the City of Santa Clarita. Mr. Denlinger and Ms. Prentice will be assisted by various professionals within Fugro as the project proceeds.

ASSUMPTIONS

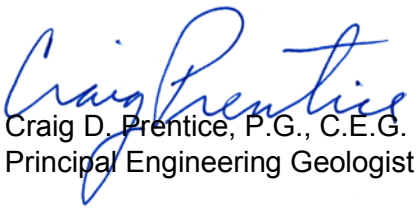
- Access onto site provided by WSHHSD
- Exploration locations accessible by standard truck mounted drill rig
- No permits required for exploration

CLOSURE

Thank you for the opportunity to provide this proposal for geotechnical review services for the William S. Hart Union High School District's proposed high school sites in the Castaic area of Los Angeles County. Please call if you have any questions regarding information presented in this proposal.

Sincerely,

FUGRO WEST, INC.



Craig D. Prentice, P.G., C.E.G.
Principal Engineering Geologist

Copies Submitted: (1-Pdf) Addressee