NEW CASTAIC HIGH SCHOOL
SUMMARY OF PRELIMINARY GEOTECHNCIAL SITE EVALUATIONS

WILLIAM S. HART UNION HIGH SCHOOL DISTRICT

Presented to WSHUHSD Board Members
May 5, 2010

Previous Work

- Geotechnical design studies have been conducted by Geosoils, RSA, and GWV, for the property owners of each site for *residential development* since the 1970's and 1980's. Neither site was developed although grading was performed on portions of Hasley-Sloan in 1980's.

- AES provided an opinion of the potential geohazards that may exist at the Hasley-Sloan site for a 3rd party in early 2010.

- ERI summarized site conditions and performed preliminary geologic evaluations of each site for the District in early-2010.

  - ERI's studies were based on work by previous consultants and provided preliminary opinions for slope stability, seismicity, and geohazards for each site. Preliminary findings relative to geotechnical conditions and considerations are not addressed by ERI's geologic evaluations.

Purpose

The purpose of Fugro's work is to provide *independent* reconnaissance-level geotechnical studies for both sites that include:

- A summary of anticipated geotechnical conditions that may exist at each site based on the data review and site reconnaissance,
- Preliminary geotechnical opinions relative to site development for the proposed school project, including
  - potential geologic hazards,
  - input to preliminary seismic design and preliminary foundation design, and
  - preliminary excavation and grading considerations
- Recommendations for design-level scope of work if the project proceeds to design at either site.

Fugro's Work Scope

- Data review
  - Existing published geologic and geotechnical data
  - Existing geologic and geotechnical data by previous consultants
  - Aerial photo review of sites and vicinity for evidence of landsliding, slope instability, faulting, erosion, springs/seeps, previous grading, geologic material distribution
- Site reconnaissance to verify opinions of site conditions from data review

- Meeting attendance
  - Meetings with project team (4 to date)
  - Board meetings (3 to date)

- Provide a preliminary geotechnical report for each site summarizing the findings from work performed

Scope *does not* include subsurface exploration and lab testing to validate opinions and findings from this reconnaissance-level study or geotechnical recommendations for project design.

Preliminary Findings and Opinions Hasley-Sloan Site

Site Conditions – Hasley-Sloan

- Moderately steep hilly terrain in northern 2/3-site; graded low-lying terrain in southern 1/3-site.
  - Hilly terrain ranges from 1,485’ on ridge at northern property limit to 1,360’ near toe of hilly terrain (125’ elevation difference).
  - Low-lying graded area ranges from 1,360’ to 1,315’ along the northern bank of Hasley Creek (45’ elevation difference).
  - About 170’ elevation change overall across site.
- Portions of site graded over 20 years ago but never developed. Grading included cut and fill slopes of granular soil that have subsequently eroded with time; erosional gullies common within access roads and existing slopes.
- Soil materials consist of artificial fill, granular alluvial sediments, colluvial soil in swale areas of hilly terrain, potential landslides, and bedrock of the Saugus Formation.

Preliminary Geotechnical Interpretation - Hasley–Sloan

Potential Geohazards that could affect the Hasley-Sloan Site

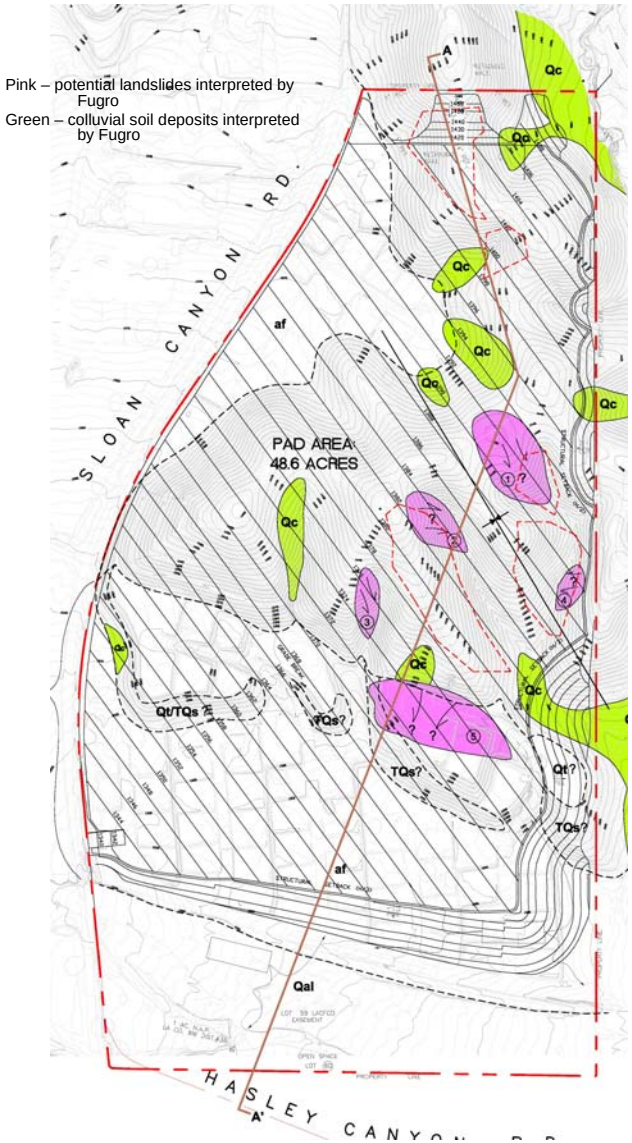
- Landsliding/slope instability
- Restricted use areas designated on Assessors parcel map
- Effects of seismicity
- Flooding/scour of Hasley Creek banks

Construction-related considerations at Hasley-Sloan

- Proposed 55’-high cut slope at northern portion of property could expose laterally unsupported geologic bedding that should be considered in project design.

- Fills up to about 50 feet deep are planned that will require extra compactive effort.

Potential Landsliding - Hasley–Sloan



- Landsliding can be common in the Saugus Fm and have been mapped in the project vicinity.
- Geomorphology observed in aerial photo review and site reconnaissance suggests that landsliding may be present on the H-S site. Work to date has not interpreted landsliding onsite.
- Landslides appear to be relatively shallow features, possibly tens of feet thick, rather than extensive deep-seated features 100’ or more thick.
- Conceptual grading plan indicates majority of potential landslides will be removed during grading.
- Some remedial grading to remove landslide debris below elevations in conceptual grading plan may be required.
- Currently no subsurface data within any of these interpreted features, but would be evaluated as part of design-level study.
- Conceptual grading plan indicates that Restricted Use areas shown on Assessors map will be removed or buttressed by the cut-fill grading activities,

Seismicity – Hasley-Sloan

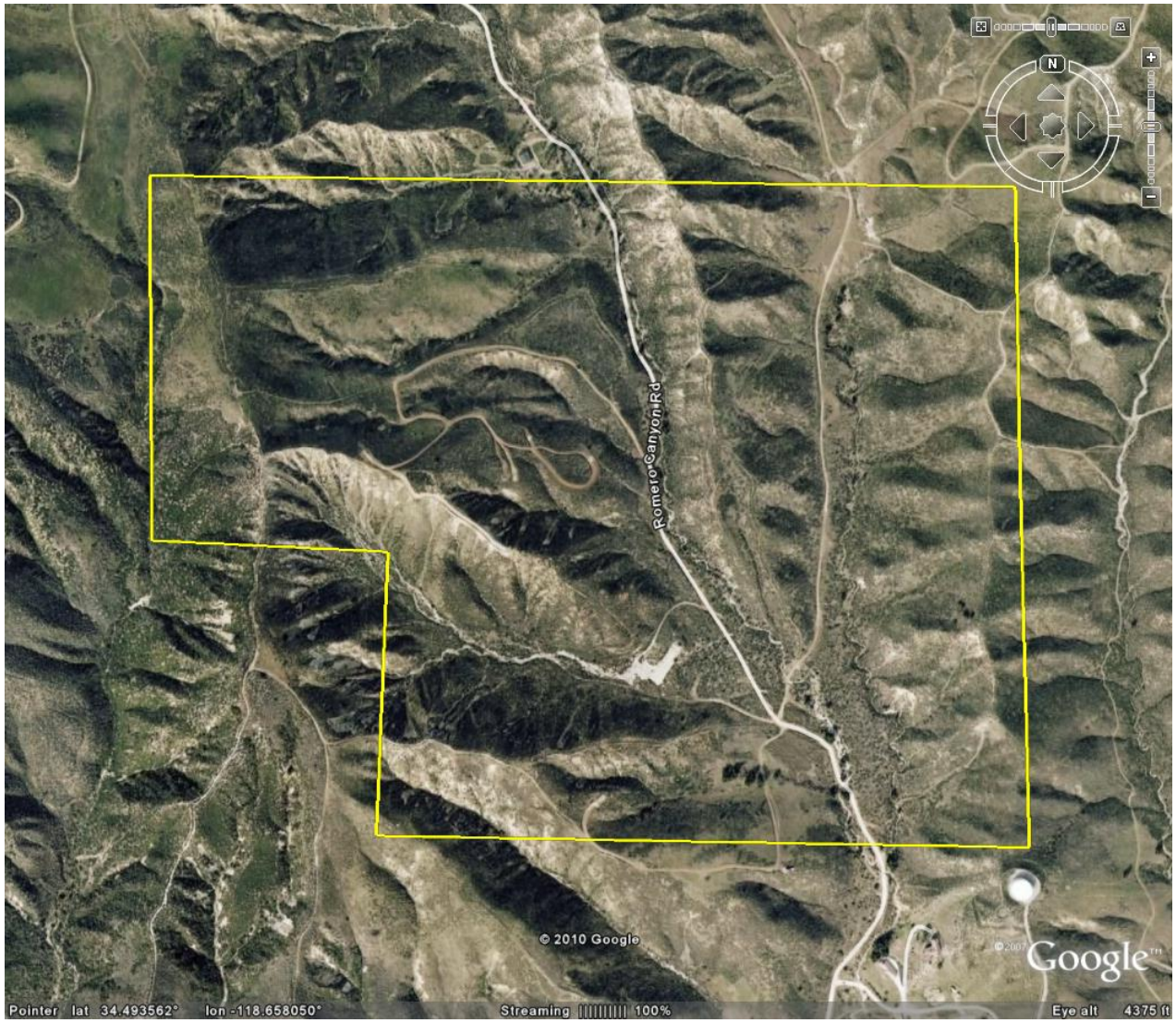
- Site located in seismically active area of southern California and is proximal to several faults considered active and potentially active by CGS and County of LA.
- No known faults considered active or potentially active by CGS or County of LA cross or trend toward the site.
- Potential for strong ground shaking to affect site; can be mitigated through design.
- Potential for liquefaction and/or seismic settlement of existing fill and/or alluvial soils during seismic event. Should be evaluated by design study and mitigated if appropriate.
- Potential for lateral spreading toward Hasley Creek. Should be evaluated by design study and mitigated if appropriate.
- AES suggests there is potential for faulting onsite based on their work at a site 3/4 –mile east. Based on our data review, and work to date, in our opinion, there does not appear to be a potential for faulting/rupture at this site. However, fault-rupture potential may need to be evaluated further during the design level study.

Preliminary Recommendations – Hasley-Sloan

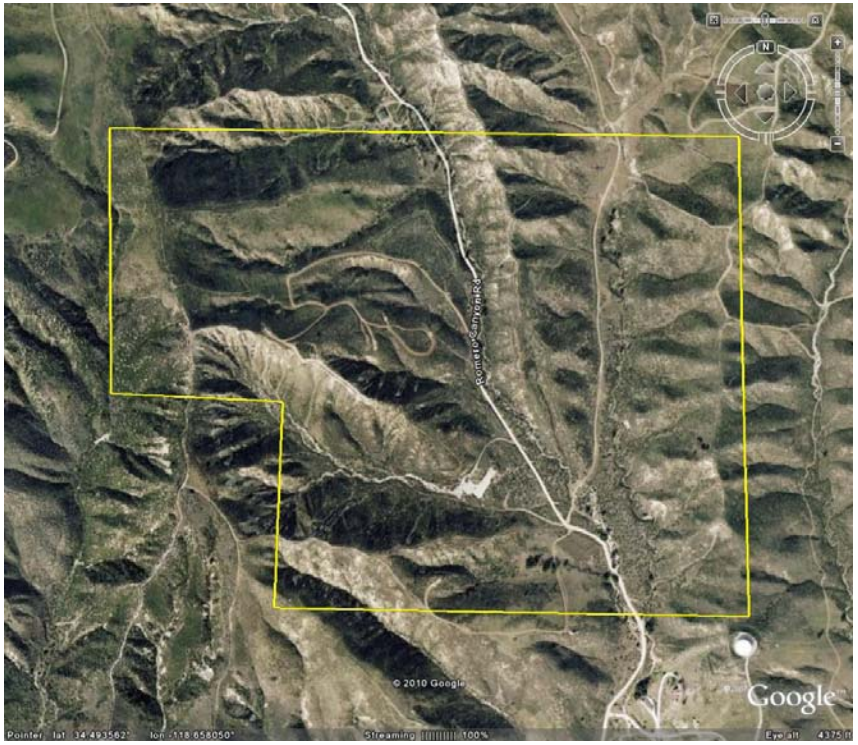
Preliminary recommendations if the project proceeds to design at the Hasley-Sloan site

- Supplemental subsurface exploration to evaluate presence of interpreted landslides and to characterize landslide geometries if present. Input into grading design for landslide removals.
- Supplemental subsurface exploration in alluvial and previously graded areas for liquefaction, dry settlement, and lateral spreading evaluations and for recommended removals of unsuitable materials.
- Supplemental laboratory testing to characterize soil properties for slope stability analyses.
- Further evaluation of potential for active or potentially active faulting to occur onsite.
- Geotechnical design parameters and final design report will be required if the project proceeds to design.

Findings and Opinions Romero Canyon Site



Site Conditions – Romero Canyon



- Moderately steep to steep hilly terrain with alluvial filled valleys.
  - Topography ranges from 2,380’ on ridge at NW property limit to 1,730’ in SE valley portion.
  - About 650’ elevation change overall across site.
  - Natural slopes range from gentle to nearly vertical.
  - Extensive landsliding previously identified on east-facing slopes.
- Soil materials consist of artificial fill, granular alluvial sediments, colluvial soil in swale areas of hilly terrain, potential landslides, and bedrock of the Saugus Formation.

Preliminary Geotechnical Interpretation – Romero Canyon

Potential Geohazards that could affect the Romero Canyon Site

- Landsliding/slope instability
- Effects of seismicity

Construction related considerations

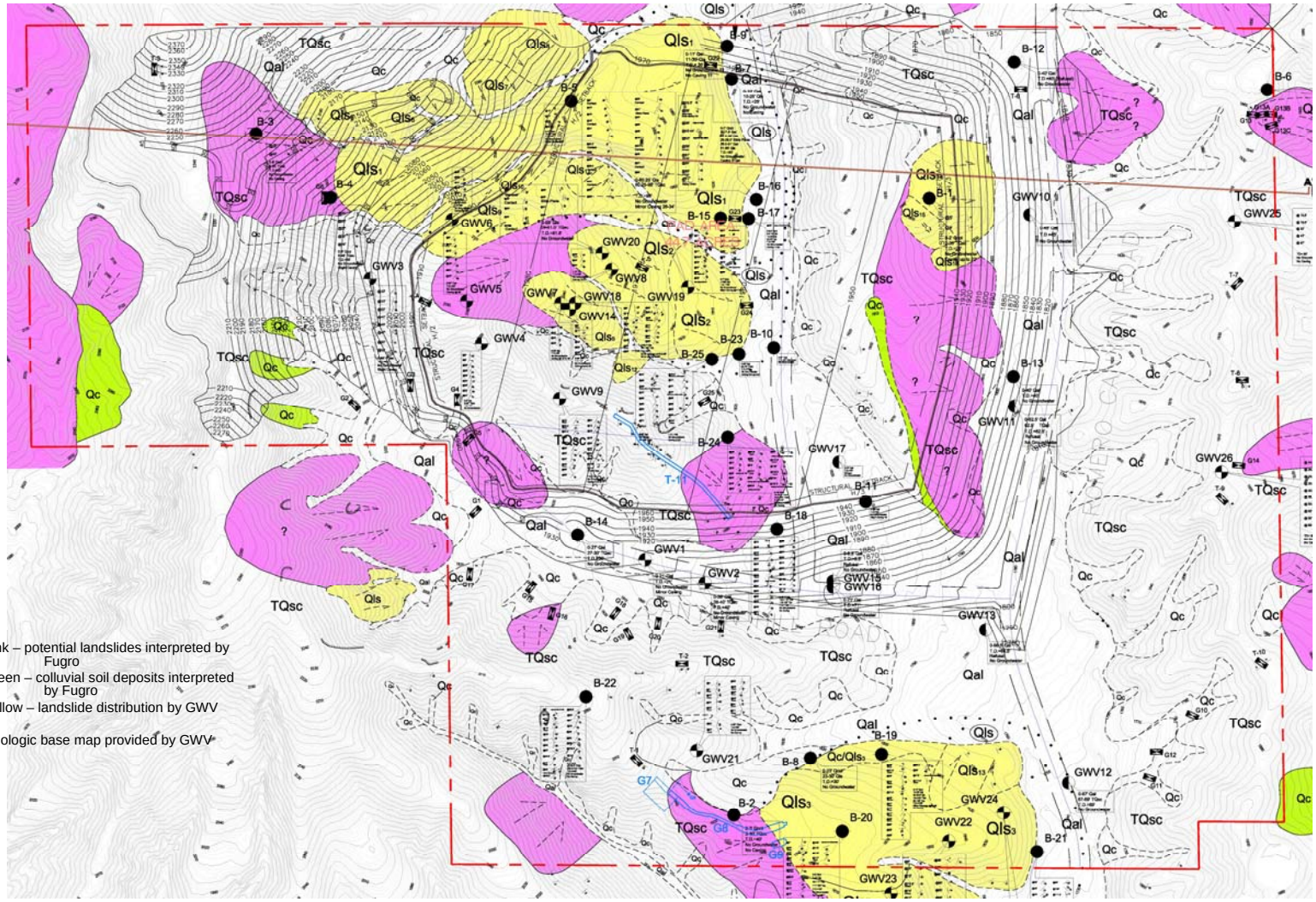
- A significant 380'-high cut slope planned in the NW portion of the site that could expose laterally unsupported geologic bedding and could result in failure of the slope during grading that could extend offsite. Slope may need to be re-graded as a buttressed slope to achieve acceptable factors of safety against slope instability, significantly increasing amount of grading required. Slope and geologic conditions should be considered in project design and execution.

- A 100' to 170' high fill slope planned along Romero Canyon Road at the eastern property margin.

- Fills to about 120' deep are planned. However, remedial grading to remove landslide debris below planned excavation depth likely to be extensive and could result in fill depths 200' or more to remove landslide debris.

- Deep fills can be challenging to limit effects of settlement of the fill materials with time. Site-specific design, settlement monitoring (possibly over a period of time), and extra compactive effort will be required to reduce potential for damage as a result settlement and/or hydroconsolidation (and thus damage to structures and facilities) of the fill with time.

Preliminary Geotechnical Interpretation – Romero Canyon



Pink – potential landslides interpreted by Fugro

Green – colluvial soil deposits interpreted by Fugro

Yellow – landslide distribution by GWV

Geologic base map provided by GWV

Preliminary Landslide Interpretation – Romero Canyon

- Landslides have been identified on site by published researchers and previous consultants.
- Geomorphology observed in air photo review and site reconnaissance suggests that landsliding may be more extensive on the Romero Canyon site than previously interpreted.
- Based on the data review and interpretations, the landslides in the NW portion of site appear to be relatively extensive deep-seated features that may be in excess of 150’ to 200’ thick. Other mapped and potential landslides may be 100’ or more thick.
- Subsurface data do not exist in several of the potential slide locations. The large complex in the NW corner has not been adequately characterized and the depth and extent are not known.
- Additional exploration will be required to characterize and evaluate the landslide properties in sufficient detail for project design.

Seismicity – Romero Canyon

- Site located in seismically active area of southern California and is proximal to several faults considered active and potentially active by CGS and County of LA.
- No known faults considered active or potentially active by CGS or County of LA cross or trend toward the site.
- Potential for strong ground shaking to affect site; can be mitigated through design.
- Potential for liquefaction and/or seismic settlement of alluvial soils during seismic event; may be removed as part of remedial grading for landslides.

Preliminary Recommendations – Romero Canyon

Preliminary recommendations if the project proceeds to design at the Romero Canyon site

- Extensive subsurface exploration to evaluate presence of interpreted landslides and to characterize landslide geometries for input into design of remedial grading for landslide removals.
  - Exploration anticipated to consist of supplemental large-diameter drill holes, test pits, and trenches to characterize landslide distribution and geometries.
  - Exploration within large landslide complex in NW portion of site anticipated to consist of continuous coring and down-hole geophysical tools to characterize material distribution, characteristics, and depth of slides within complex.

- Subsurface exploration in alluvial areas for liquefaction and dry settlement evaluations and for recommended removals of unsuitable materials.

- Geotechnical design parameters and final design report will be required if the project proceeds to design.

Thank You