Addendum B – Geotechnical Report

DRAFT

February 25, 2011
Project No. 11B-G2195

Civil Science
3160 W. Clubhouse Drive
Lehi, UT 84043

Attention: Mike Echevarria, PE

SUBJECT: Proposed Salt Storage Facility
Lehi, Utah
Geotechnical Observations and Recommendations

Dear Mike,

This letter constitutes our report of findings relating to the subject salt storage facility. The proposed facility will be located near the south east quadrant of 2600 N and 300 W in Lehi, Utah.

The salt storage facility will consist of an open-ended 50'x80' metal building. The walls will be 20 feet high. The bottom ten feet of the walls will be reinforced concrete. Spread footings are planned. A hot mix asphalt pavement is planned for the floor of the building and the immediate area surrounding the building.

The proposed site is within an area of historic landfill activity. Presently, the site is mounded with 6 to 8 feet of undocumented fill mixed with municipal trash and rubble debris.

On the 22nd of February 2011, our engineer observed five auger holes that were advanced to depths of around 11 feet below ground surface by the Lehi city power department. One auger hole was placed at each of the four corners of the building and in the center of the building. In general, the subsoils appeared to dominantly consist of loose sandy soil with intermixed layers of trash and rubble. From the auger holes, it appeared that the subsoils were comprised of less than about 10 percent trash and rubble. The auger holes caved within several feet of the surface indicating a loose soil condition. No groundwater was observed on the day the auger holes were advanced.

Recommendations

The proposed site has a special geotechnical condition that requires special considerations due to loose soil, and hidden trash and debris. The owner should be advised that there is a risk of adverse settlement

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at this site for the building and subsidence of the pavement due to the aforementioned conditions. Much of the risk associated with adverse settlement or subsidence can be substantially reduced with the recommendations herein. All of the risk associated with adverse settlement or subsidence cannot be eliminated without the entire removal of loose soil, trash, and debris.

We understand that the owner plans to partially remove the mound of undocumented fill on site such that the site will become nearly level with the existing parking lot to the north. Based on our understanding of the subsurface conditions and the planned development, the following is recommended.

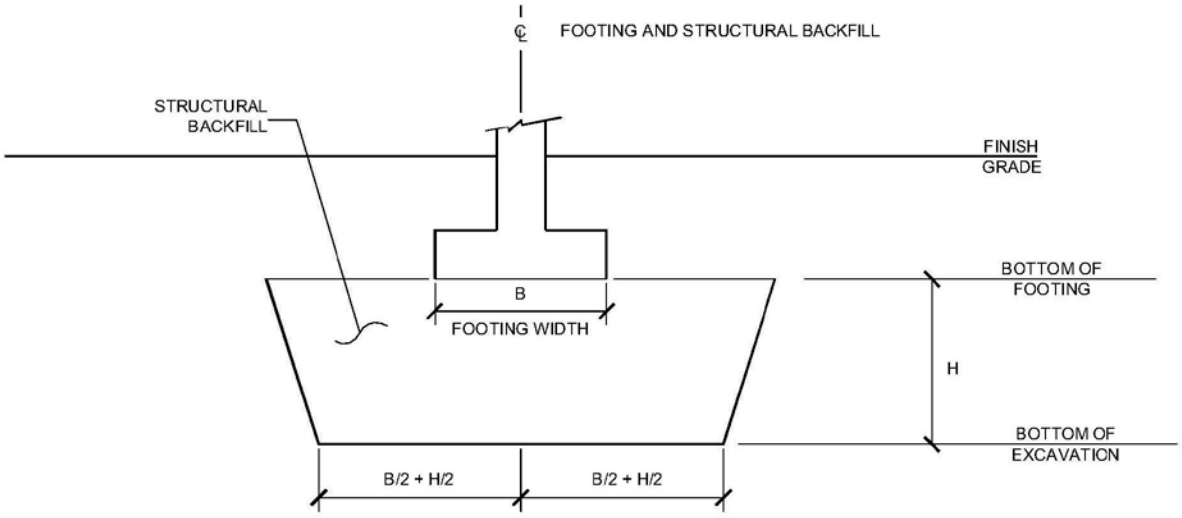
General Site Preparation

Following removal of the mounded soil and a rough graded condition is achieved; the entire site should be heavily watered or briefly flooded and then compacted with an extra heavy compactor. A soon as possible after the site has sufficiently drained to support compaction equipment, then the entire surface of the building area and surrounding area be compacted with at least 16 coverages of a minimum 60,000-lb vibratory roller.

We recommend that our geotechnical engineer observe the site preparation. As appropriate, excavation of compaction may be recommended.

Subgrade Preparation for Foundations

Based on the likely presence of loose soil, trash and debris, we recommend that the foundation excavations be extended below the design base of the spread footings and brought back up to design base with structural backfill as illustrated below.



The depth, H, of footing excavation should be at least 4 feet. The invert of the foundation excavation should be centered on the footing. The invert of the excavation should be compacted with at least 12 coverages of a minimum 30,000-lb vibratory roller.

We recommend that our engineer observe compaction of the foundation excavation invert. As appropriate, our engineer may recommend removal of unsuitable materials and compaction.

Structural backfill should be obtained from approved borrow sources and should consist of clean, hard granular material conforming to the following:

Sieve Size	**Percent Passing**
3-inch	100
No. 4	30-90
No. 200	2-20

Liquid Limit less than 30%.
Plasticity Index less than 10.

Materials that are frozen, contaminated, contain excess moisture, or organic matter (such as strippings or roots), trash, debris, stones larger than 3 inches are not suitable for structural backfill.

Structural fill in the building construction area should be placed in maximum 8-inch loose lifts and compacted to at least 95% of the maximum dry density as determined by the ASTM D698 – Standard Proctor Compaction Test.

Spread Footing Design

For footings placed on a prepared subgrade, conventional spread footings may be proportioned for an allowable net bearing pressure of 2500 psf. This allowable net bearing pressure is applicable provided that:

- continuous wall footings are at least 48 inches wide, and
- footings are placed at least 30 inches below the lowest adjacent final grade for frost protection.

To reduce the risk of adverse differential settlement, the following is recommended.

- Isolated spread footings should be precluded.
- Sufficient reinforcement steel should be provided such that a grade-beam footing is created with the combined footing and concrete wall.
- The final lines and grades at buildings should rapidly direct surface water away from all buildings with at least 4 percent grade (1/2-inch per foot) for at least 15 feet.

The designer should provide a minimum of one cross-section in each direction through each building and site development area showing the footing bearing elevations, limits of structural fill, approximate existing ground surface, and finish grades.

Subgrade Preparation for Pavements

The pavement subgrade should be compacted with a minimum 30,000-lb vibratory roller until a subgrade density of at least 95 percent of the maximum laboratory dry density is achieved according to ASTM D698.

Pavements

Heavily loaded front-end loaders are anticipated. The following pavement section is recommended.

Pavement Section		
Material	**Interior Pavement (inches)**	**Exterior Hardstand Areas (inches)**
Hot Mix Asphalt	5	--
Recycled Asphalt	--	6
Untreated Base	8	8
Granular Borrow	15	16

Closure

The affect of flooding the site with water is beyond the scope of our study. office…

February 25, 2011

Respectfully Submitted

American Geotechnics

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Stanley G. Crawforth
Geotechnical Engineer

Vaughn J. Thurgood, P.E.
Geotechnical Engineer