# GEOTECHNICAL ENGINEERING REPORT
# PROPOSED WHITEROCKS RACEWAY COVERS
# WHITEROCKS STATE FISH HATCHERY
# WHITEROCKS, UTAH

**PSI PROJECT No: 710-95029**

**July 14, 2009**

**Prepared For:**
**State of Utah**
**Division of Facilities Construction and Management**
**4100 State Office Building**
**Salt Lake City, Utah**

**Attn: Mr. Darrell Hunting**

**Prepared By:**

**PROFESSIONAL SERVICE INDUSTRIES, INC.**
**2779 South 600 West**
**Salt Lake City, Utah**
**(801) 484 - 8827**

Information To Build On
Engineering • Consulting • Testing

July 14, 2009

Mr. Darrell Hunting
State of Utah
Division of Facilities Construction and Management
4100 State Office Building
Salt Lake City, Utah 84116

**SUBJECT: Geotechnical Investigation Report**
**Proposed Whiterocks Raceway Covers**
**Whiterocks State Fish Hatchery**
**Whiterocks, Utah**
**PSI Project No. 710-95029**

Dear Mr. Hunting:

Professional Service Industries, Inc. (PSI) is pleased to submit this report of a geotechnical investigation for the proposed raceway covers at the Whiterocks State Fish Hatchery in Whiterocks, Utah. This report summarizes the work accomplished and provides our recommendations for design and construction of the project.

Based on the results of our field investigation, laboratory testing, and engineering analysis, the proposed site is suitable for the construction from a geotechnical standpoint provided the recommendations of this report are followed. Recommendations regarding the geotechnical aspects of project design and construction are presented in the attached report.

PSI is committed to providing quality services to its clients, commensurate with their wants, needs, and desires. PSI appreciates the opportunity to provide its services on this project. If you have questions pertaining to this project or if we may be of further assistance, please call the undersigned. We appreciate your business and look forward to our next project with you.

Respectfully Submitted,
**PROFESSIONAL SERVICE INDUSTRIES, INC.**

**MANUEL E. ZEA, PEI**
Staff Engineer

**CHRIS T. GARRIS, PE**
Principal Consultant

MEZ/ctg
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## TABLE OF CONTENTS

**1.0 INTRODUCTION** ..... **1**

**2.0 PROJECT DESCRIPTION** ..... **1**

**3.0 SITE DESCRIPTION** ..... **1**

3.1 Site Conditions and Topography ..... 1
3.2 Regional Geology ..... 1

**4.0 FIELD EXPLORATIONS** ..... **2**

**5.0 LABORATORY TESTING** ..... **3**

**6.0 SUBSURFACE CONDITIONS** ..... **3**

6.1 Soils ..... 3
6.2 Groundwater ..... 3

**7.0 CONCLUSIONS AND RECOMMENDATIONS** ..... **4**

7.1 Geotechnical Discussion ..... 4
7.2 Site Preparation and Earthwork ..... 4
7.3 Excavations ..... 4
7.4 Structural Fill ..... 5
7.5 Compaction ..... 5
7.6 Foundations ..... 5
7.7 Foundation Settlements ..... 6
7.8 Earthquake and Seismic Design Parameters ..... 7
7.9 Utility Trenches ..... 7
7.9.1 Utility Trench Backfill ..... 8
7.10 Surface Drainage ..... 8

**8.0 DESIGN REVIEW AND CONSTRUCTION SERVICES** ..... **8**

**9.0 GEOTECHNICAL RISK** ..... **8**

**10.0 LIMITATIONS** ..... **9**

**APPENDIX A**

VICINITY MAP — Figure A-1
SITE MAP WITH BORING LOCATIONS — Figure A-2

**APPENDIX B**

BORING LOGS — Figures B-1 through B-3
SUMMARY OF LABORATORY TEST RESULTS — Figure B-4

## 1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed raceway covers at the Whiterocks State Fish Hatchery in Whiterocks, Utah. The services for this project were performed in accordance with Professional Service Industries, Inc (PSI) Proposal No. PO710-950038 dated June 26, 2009 and authorized by the State of Utah, Division of Facilities Construction and Management (DFCM) by means of Purchase Order (P.O.) Number 72409.

The purpose of this investigation was to explore subsurface materials and conditions at the site and to develop recommendations for earthwork and design and construction of foundations. This report describes the work accomplished and presents our conclusions and recommendations for the design and construction of the project.

## 2.0 PROJECT DESCRIPTION

Based on the information provided by Mr. Darrel Hunting of DFCM, PSI understands the proposed construction will consist of a cover for the existing raceways at the fish hatchery. The design of the covers is unknown at the present time. The geotechnical information generated for DFCM will be delivered to a design builder firm for use in their design. Actual structural loads were not available at the time of this report. However, we anticipate maximum column loads will not exceed 60 kips for the proposed structure.

The geotechnical recommendations presented herein are based on the available project information, location, and the subsurface conditions described in this report. If the assumed structural loads or any of the noted information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report where appropriate.

## 3.0 SITE DESCRIPTION

### 3.1 Site Conditions and Topography

The project site is located at the existing Whiterocks State Fish Hatchery in Whiterocks, Utah. At the time of PSI's field investigation, the project site was developed with the existing fish hatchery, office building, and paved parking and drive areas. Based on available topographic information and our observations the ground surface at the project site slopes downward to the south at approximately 2 percent. The proposed project site is bounded by an asphalt-paved driveway followed by the existing hatchery office building to the north, and by vacant land to the east, west and south. Figure A-1 in Appendix A shows the general vicinity of the subject site.

### 3.2 Regional Geology

According to available geologic maps of the area, the project site is mantled with alluvium deposits. These deposits typically consist of gravel and sand with varying amounts of sand and silt. The project site is located approximately 30 miles southwest of the Diamond Gulch Fault. No fault is mapped on the project site. Earthquake design parameters including Site Class are provided in Section 7.8 of this report.

## 4.0 FIELD EXPLORATIONS

Subsurface conditions at the project site were explored with three (3) borings, designated as B-1 through B-3 explored at the approximate locations indicated on Figure A-2 in Appendix A. Hollow stem auger refusal was encountered in dense gravel and possibly cobbles in all borings at depths ranging from 4 feet to 6½ feet below existing site grades. Refusal is a designation applied to materials that can not be explored further with conventional hollow stem auger drilling techniques and is normally an indicative of dense to very dense soil conditions. It should be noted that the original scope of work of six (6) borings could not be completed because we were not allowed to drill on the east side of the raceways by fish hatchery on-site personnel.

The borings were located on the site by a PSI representative by measuring approximate distances from known site landmarks. The borings were drilled to characterize the nature, density, and variability of the subsurface soils beneath the proposed construction. The investigation was performed under the supervision of a PSI Geotechnical Engineer. The borings were logged and the soil encountered was classified in general accordance with the Unified Soil Classification System (USCS). Boring logs, which include project designation and project location, boring number, method of boring, type drill rig and sampling, date of boring, depth of various soil layers, a description of each soil layer including color, consistency and visual grain-size classification, water level information, laboratory test data, stratifications, and classifications based on the USCS are included in Appendix B.

The borings were drilled using a CME-55 truck-mounted drill rig using 3¼-inch inside diameter continuous-flight hollow-stem augers. Drilling and sampling were performed under the direction of a PSI Geotechnical Engineer who maintained detailed logs of the subsurface materials and conditions encountered in the borings, and collected representative samples.

Samples were obtained at about 2½ foot intervals in each boring. Disturbed samples of the soils were obtained, for subsequent laboratory testing and examination, by driving a standard 2-inch outside diameter (O.D.) split-spoon sampler into the soil a distance of 18 inches using a 140-lb hammer dropped from a height of 30 inches. The number of blows required to drive the sampler the last 12 inches is known as the standard penetration resistance, or N-value. The N-values provide a measure of the relative density of granular soils, such as sand, and the relative consistency, or stiffness, of cohesive soils, such as clay or silt.

Disturbed soil samples were examined in the field and representative portions were stored in sealable plastic bags. The samples were transported to our laboratory for further examination and testing. The borings were backfilled up to the ground surface with auger cuttings and on-site soils. Due to the in-situ soil conditions, undisturbed samples were not possible.

## 5.0 LABORATORY TESTING

Representative samples of soils were tested to evaluate physical and engineering properties. The laboratory testing program included measurements of natural water content, grain size analyses, Atterberg limits, and soil classification. The results of the analyses are presented on the Boring Logs (Figures B-1 through B-3), and the Summary of Laboratory Test Results (Figure B-4) in Appendix B.

## 6.0 SUBSURFACE CONDITIONS

### 6.1 Soils

Soil conditions generally encountered in the borings consist of approximately 3 inches of asphalt-concrete pavement underlain by very dense silty gravel with sand (GM), dense to very dense silty sand with gravel (SM), and loose to medium dense poorly-graded gravel with silt and sand (GP-GM) to the maximum depth explored of approximately 6½ feet.

Standard penetration resistance values ranged from about eight (8) blows per foot to more than 50 blows per foot of penetration in the granular soils. Soil moisture contents of selected soil samples tested in the laboratory ranged from about four (6) to eight (8) percent. For a detailed description of the materials and conditions encountered at boring locations, please refer to Figures B-1 through B-3 in Appendix B.

The subsurface profile described above is a generalized interpretation provided to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for more specific information. These records include soil description, stratifications, standard penetration resistances, location of samples, and laboratory test data. The stratifications shown on the boring logs represent the conditions only at the boring locations for this study. The stratifications indicated on the boring logs represent the approximate boundary between subsurface materials. The actual transitions may be gradual. Subsurface materials and conditions may vary across relatively short distances at the site and may become apparent with additional explorations or excavation. If soil conditions are found to be different than described herein, we should be allowed to reevaluate our recommendations if necessary.

### 6.2 Groundwater

Free water was not encountered in the borings at the time of drilling to the maximum depth of exploration. An irrigation pond is located to the east of the raceways with a water level approximately 5 to 10 feet below existing grade, based on visual observations. It should be noted that it is possible for the groundwater levels to fluctuate during the year depending upon climatic, local irrigation practices and other factors. Additionally, discontinuous zones of perched water may exist at varying locations and depths beneath the ground surface. As a result, groundwater conditions during or after construction may be different than those observed during the field investigation.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Geotechnical Discussion

The following geotechnical-related recommendations have been developed based on the subsurface conditions encountered in the borings and PSI's understanding of the proposed construction. The primary geotechnical considerations with respect to the development include anticipated difficulties in excavation, particularly in deeper or confined excavations due to very dense soil conditions and possibly cobbles. Further details are provided in the following sections of the report.

### 7.2 Site Preparation and Earthwork

PSI recommends that the ground surface within the proposed development and all other areas to receive structural fill be cleared of asphalt and unsuitable material. In general, we anticipate that stripping to depths of about 6 inches will be required to remove all asphalt and other unsuitable material; however, a greater or lesser amount of stripping may be required locally.

If the subgrade is disturbed during construction, loose or otherwise disturbed soils should be over-excavated to firm, undisturbed soil and backfilled with compacted granular materials as outlined in Section 7.4. PSI recommends that site preparation and earthwork be accomplished during warmer, drier months, typically extending from mid-May to mid-October of the year.

Excavations made immediately adjacent to the existing raceways should be properly shored to avoid undermining of adjacent footings or floor slabs.

### 7.3 Excavations

Excavations should be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor should evaluate the soil exposed in the excavations as part of the required safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified by local, state, and federal safety regulations. PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

During wet weather, earthen berms or other methods should be used to prevent surface runoff water from entering the excavations. The bottom of the excavations should be sloped to a collection point. Collected water within the foundation and utility trench excavations should be discharged to a suitable location outside the construction limits.

### 7.4 Structural Fill

Based on the results from PSI's field and laboratory investigation, on-site soils may generally be suitable for use as structural fill providing that they meet the gradation criteria below and can be effectively segregated and stockpiled on site without contamination by the finer grained soils or other debris. On-site soils intended for use as structural fill should be stockpiled and tested to ensure they meet the gradation requirements below. The onsite soils may contain some oversized materials, including cobbles, which may require screening prior to placement and compaction. Imported structural fill should consist of well-graded sand and gravel materials that are free of organic or other deleterious materials. Imported fill material should be approved by the Geotechnical Engineer prior to its delivery to the project site. Structural fill material should meet the specifications presented in Table 1.

**Table 1:** Structural Fill Gradation Requirements

| Sieve Size | Percent Passing by Weight |
|---|---|
| 3 inch | 100 |
| ¾ inch | 85 - 100 |
| No. 4 | 40 - 80 |
| No. 40 | 10 – 40 |
| No. 200 | 5 - 15 |
| Liquid Limit (LL) | ≤ 35 |
| Plasticity Index (PI) | 15 (Max.) - 4 (Min.) |

### 7.5 Compaction

Structural fill materials should be moisture conditioned to two (2) percent below optimum to two (2) percent above optimum moisture content. Structural fill should be placed in loose lifts not exceeding nine (9) inches thick and compacted to at least 95 percent of the maximum dry density as determined by the ASTM D 1557 Test Method. Site grading fill or backfill placed beneath floor slabs or flat work should be compacted to at least 90 percent of the maximum dry density as determined using ASTM D 1557.

Placement and compaction of all fill materials should be observed, tested, and documented by a representative of the Geotechnical Engineer. Tested fill materials that do not achieve either the required dry density or moisture content requirements should be recorded, the location noted, and reported to the contractor and owner. A re-test of that area should be performed after the contractor has performed all necessary remedial measures including moisture conditioning (wetting or drying) and reworking the fill. The Geotechnical Engineer should be retained to observe site stabilization, if required.

### 7.6 Foundations

The proposed covers for the raceways can be supported on spread footings bearing on undisturbed native soils or on properly placed and compacted granular structural fill extending

down to undisturbed native soils. Loose and/or otherwise disturbed soils are not suitable for supporting foundations should be removed down to firm native soils and replaced with properly placed and compacted structural fill. The following design parameters are recommended for footing design and construction:

- Footings bearing on undisturbed native soils or on properly placed granular structural fill may be designed using a maximum allowable bearing pressure of 3,000 psf. The recommended allowable bearing pressure refers to the total dead load and may be increased by 1/3 to include transient live loads such as wind and seismic.
- Footings should bear at a minimum depth of 30 inches below final grade for frost protection. For non-frost areas, such as interior footings, a minimum embedment depth of 18 inches is recommended. If the proposed structure is to be constructed during winter months or if the footings may be subjected to freezing temperatures after foundation construction, then all footings should be protected from freezing.
- Foundations should have minimum lateral dimensions of 18 inches for continuous footings and 24 inches for isolated column footings.
- Structural fill, where required, should extend a minimum of ½ the depth of the fill laterally beyond the outside edge of the footings.
- Footings should be designed in accordance with the International Building Code (IBC), 2006 edition.

Horizontal shear forces can be resisted partially or completely by frictional forces developed between the base of footings and the underlying soil. The total frictional resistance between the footing and the soil is the summation of vertical forces (dead load) times the coefficient of friction between the soil and the base of the footing. We recommend a value of 0.35 for the coefficient of friction for concrete placed on the native soils and/or on properly placed and compacted granular structural fill extending down to undisturbed natural soil. If additional lateral resistance is required, passive soil resistance from embedded retaining walls and/or foundations bearing on or placed in intimate contact with undisturbed native soil may be evaluated on the basis of an equivalent fluid having a unit weight of 275 pcf.

We recommend that the footing excavations be observed and documented by PSI's Geotechnical Engineer or designated technical representative prior to placement of structural fill, concrete or reinforcing steel to verify their suitability for foundation support.

### 7.7 Foundation Settlements

Total settlement of an individual foundation will vary depending on the plan dimensions of the foundations and the actual load supported. We estimate that total settlement under static loads will not exceed one (1) inch for footings designed according to the recommendations described

in Section 7.6 above. Differential settlements are expected to approach about 75 percent of the estimated total settlement under static conditions.

### 7.8 Earthquake and Seismic Design Parameters

The project site is located approximately 30 miles southwest of the Diamond Gulch Fault. No faults are indicated to pass through or adjacent to the project site. A search of the U.S. Geological Survey National Earthquake Hazard Reduction Program (NEHRP) database resulted in the following probabilistic ground motion values at the bedrock elevation for the project site located at 40.4826 degrees North Latitude and 109.9553 degrees West Longitude as shown in Table 2.

**Table 2:** Earthquake Design Factors Using the NEHRP Database (IBC-2006)

| Intensity Measure Type | Intensity Measure Level | |
|---|---|---|
| | 2% in 50 Years | 10% in 50 Years |
| Peak Ground Acceleration - PGA (g) | 0.186 | 0.066 |
| 0.2 Sec. Spectral Acceleration - $S_s$ (g) | 0.336 | 0.142 |
| 1.0 Sec. Spectral Acceleration - $S_1$ (g) | 0.102 | 0.051 |

The 2006 Edition International Building Code (IBC) requires the assignment of Site Class for the calculations of earthquake design forces and the structural design based on a 2 percent probability of exceedance in 50 years. Site Class is a function of soil profile i.e., depth of soil and strata type in the top 100 feet below site grades. Based on subsurface conditions encountered at the site and PSI's experience in the area, the soil profile at the project site can be best characterized as Site Class D. Accordingly, site coefficient values Fa = 1.531 and Fv = 2.393 with corresponding $SM_s$ = 0.515 and $SM_1$ = 0.243 may be used for short and long period seismic design of structures for a seismic event resulting from a 2 percent probability of exceedance in 50 years earthquake only if the period of vibration of the structure is less than or equal to 0.5 seconds.

The parameters provided above are based on subsurface information obtained from shallow explorations and PSI's experience in the project area. The International Building Code (IBC) 2006 Site Class is based on the top 100 feet of subsurface profile, which may require a deeper test boring to a depth of at-least 100 feet below existing site grades or other geophysical methods to obtain information for the upper 100 feet of the subsurface profile. Other methods such as Refraction Microtremor (ReMi®) survey may also be used to further evaluate and refine the IBC-2006 Site Class designation.

### 7.9 Utility Trenches

Utility trenches should be kept free from water during excavation, fine grading, pipe laying, jointing, and embedment operations. Surface water should be prevented from entering trenches. If unstable soils are encountered at invert elevations, it may be necessary to over-excavate and replace the unstable soils with free draining gravel backfill. The depth of over-excavation, if necessary, should be determined by field observation.

### 7.9.1 Utility Trench Backfill

The backfill placed in utility trench excavations within the limits of the structure and paved areas should consist of sand, sand and gravel, or crushed rock with a maximum size of up to 1½ inches, and with not more that 5 percent passing the No. 200 sieve (washed analysis). This backfill should be uniformly moisture conditioned, placed in maximum 9 inches-thick lifts (loose) and compacted using vibratory compaction equipment or tamping units to at least 90 percent of the maximum dry density as determined by ASTM D 1557. Flooding or jetting the backfilled trenches with water to attempt to achieve compaction should not be permitted.

Even when placed and compacted under optimum conditions, trench backfill may settle over time. Therefore, all improvements such as floor slabs, footings, and pavements placed over trench backfill should be designed to span over localized irregularities or be designed to allow some differential movement.

### 7.10 Surface Drainage

Positive site drainage away from the foundations should be established during the construction and maintained throughout the life of proposed construction. Water should not be allowed to collect near the foundations either during or after construction. Undercut or excavated areas should be sloped towards one corner to facilitate removal of any collected rainwater, groundwater seepage, or surface runoff. Water from roof downspouts of the proposed covers should be conveyed in pipes that discharge in areas at least ten (10) feet away from the structure. PSI recommends that a minimum five (5) percent gradient should be maintained for a distance of at least ten (10) feet away from any foundation wall in unpaved areas. Site perimeters should be prepared with silt fences and/or other erosion control devices to keep storm water properly contained and controlled within the site boundaries.

## 8.0 DESIGN REVIEW AND CONSTRUCTION SERVICES

PSI should be retained to review all geotechnical related portions of the plans and specifications to evaluate whether they are in conformance with the recommendations provided in our report. Additionally, it is our opinion that all construction operations dealing with earthwork and foundations should be observed by a PSI representative to observe compliance with the intent of our recommendations, design concepts, and the plans and specifications. PSI's construction services will allow for timely design changes if site conditions are encountered that are different from those described in this report. If site conditions are different than described in this report, PSI should be notified so that we can re-evaluate our recommendations if necessary.

## 9.0 GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which Geotechnical Engineer uses are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should

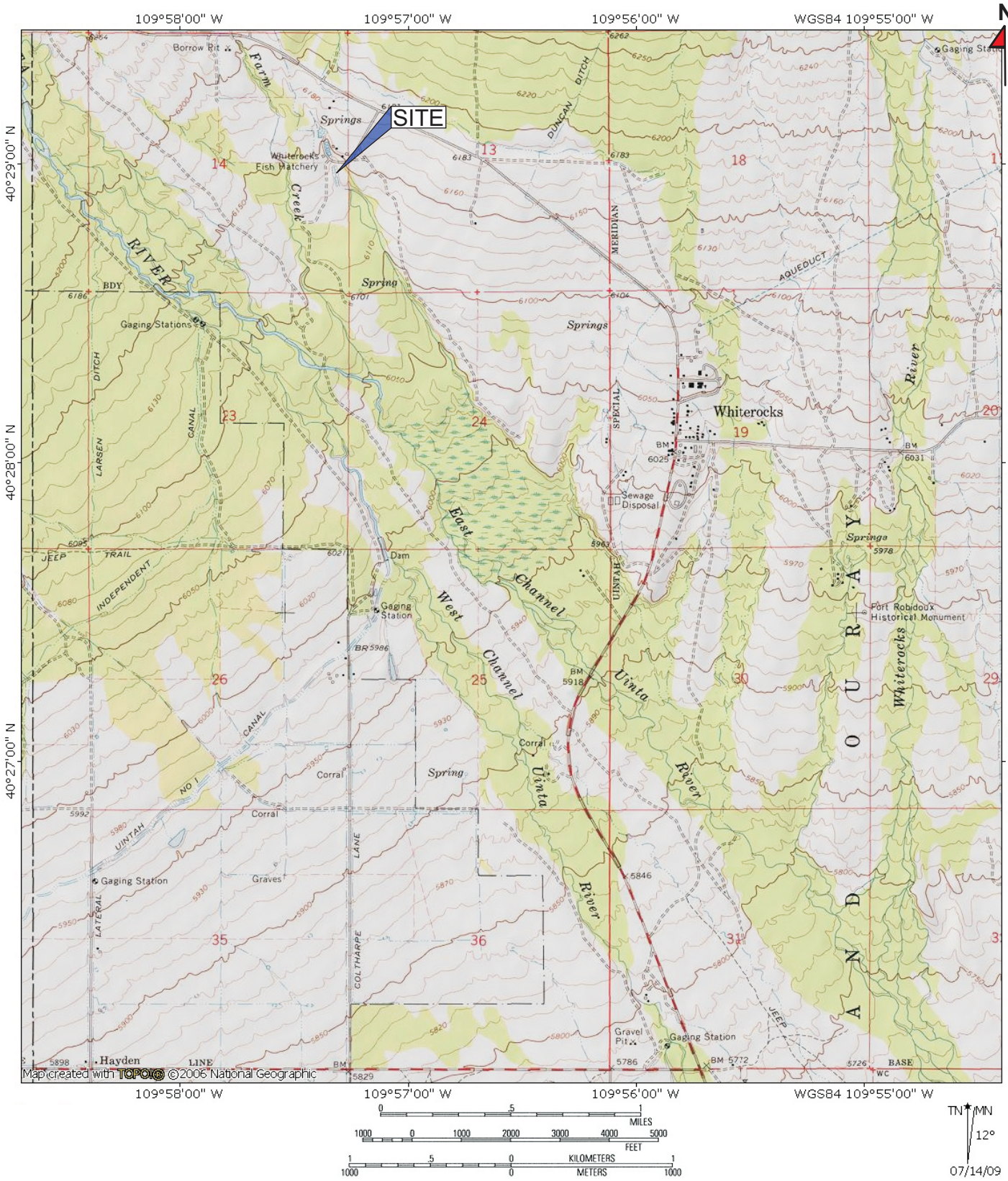
not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding sections constitute PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

## 10.0 LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI, and information provided by the State of Utah Division of Facilities Construction and Management. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation and/or other recommendations are required. If PSI is not retained to perform these functions, PSI cannot be responsible for the impact of those conditions on the performance of the project. The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed. The Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of State of Utah DFCM and their respective successors and assigns for the specific application to the proposed Whiterocks Fishery Raceway Covers project to be located in Whiterocks, Utah.

# APPENDIX A

## Vicinity Map
## Site Plan with Boring Locations




| | | |
|---|---|---|
| psi Information To Build On<br>Engineering • Consulting • Testing | Project:<br>Proposed Whiterock Raceways Covers<br>Whiterock State Fish Hatchery<br>Whiterocks, Utah<br><br>Project No: 710-95029 | VICINITY MAP<br><br>Drawn By: MEZ<br>Checked By: CTG<br>Date: July, 2009<br><br>Scale: As Shown<br>Figure: A-1 |

Whiterocks State Fish Hatchery and Raceways, August 2008

Site Plan Provided by DFCM, Salt Lake City Utah
Looking North

APPROXIMATE BORING LOCATION

| | | | |
|---|---|---|---|
| psi Information To Build On<br>Engineering • Consulting • Testing | Project:<br>Proposed Covers for Raceways<br>Whiterocks State Fish Hatchery<br>Whiterocks, Utah<br><br>Project No: 710-95029 | Drawn By: MEZ<br><br>Checked By: CG<br><br>Date: July, 2009 | SITE MAP WITH BORING LOCATION<br><br>Scale: Not to Scale<br>Figure: A-2 |

# APPENDIX B

## Boring Logs
## Summary of Laboratory Test Results

2779 South 600 West
Salt Lake City, Utah 84115
PH: (801) 484-8827
Fax: (801) 487-3312

# LOG OF BORING: B-1



PSI Job No.:710-95029
Project: Proposed Covers for Raceways
Location: Whiterocks State Fish Hatchery
Whiterocks, Utah

Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Hammer Type: 140-lb/30-in. drop
Latitude: N
Longitude: W

| WATER LEVELS | |
|---|---|
| While Drilling | Dry |
| Upon Completion | Dry |
| Delay | N/A |

| Elevation, (feet) | Depth, (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | Standard Penetration Resistance (per 6-inch) | Dry Density (pcf) | Moisture (%) | PENETRATION RESISTANCE blows/ft ◎ ● Moisture ◪ PL ✚ LL (1 – 50 – 100) / STRENGTH, tsf ▲ Qu ✳ Qp (0 – 2.0 – 4.0) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Surface Elev.: ft ± | | | | | | |
| | 0 | | | | | **ASPHALT (3")** | | | | | | |
| | | | | | | **Silty Gravel with Sand**: -- very dense, brown | | | | | | |
| | | | | 1 | 6 | | | 21-50/6 | | 4 | ● | |
| | | | | | | -- Auger Refusal @ 4-feet | | | | | | |

Completion Depth: 4.0 ft
Date Drilling Started: 7/6/09
Date Drilling Completed: 7/6/09
Logged By: AA
Driller & Rig Type: Great Basin Drilling, Inc

Sample Types:
Auger Cutting
Split-Spoon (SS)
Rock Core
Shelby (SH)
Mod. California (MCAL)

Remarks:

Figure B-1

2779 South 600 West
Salt Lake City, Utah 84115
PH: (801) 484-8827
Fax: (801) 487-3312

# LOG OF BORING: B-2



PSI Job No.:710-95029
Project: Proposed Covers for Raceways
Location: Whiterocks State Fish Hatchery
Whiterocks, Utah

Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Hammer Type: 140-lb/30-in. drop
Latitude: N
Longitude: W

| WATER LEVELS | |
|---|---|
| While Drilling | Dry |
| Upon Completion | Dry |
| Delay | N/A |

| Elevation, (feet) | Depth, (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | Standard Penetration Resistance (per 6-inch) | Dry Density (pcf) | Moisture (%) | PENETRATION RESISTANCE blows/ft ◎ / Moisture ● / PL ◪ / LL ✚ (1–50–100) / STRENGTH, tsf ▲ Qu ✳ Qp (0–2.0–4.0) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Surface Elev.: ft ± | | | | | | |
| | 0 | | | | | **ASPHALT (3")** | | | | | | |
| | | | | | | **Silty Sand with Gravel:** -- very dense, brown | | | | | | |
| | | | | 1 | 10 | | | 6-20-31 | | 8 | | |
| | 5 | | | | | -- dense | | | | | | |
| | | | | 2 | 10 | | | 18-21-9 | | | | |
| | | | | | | -- Auger Refusal @ 6.5-feet | | | | | | |

| | |
|---|---|
| Completion Depth: | 6.5 ft |
| Date Drilling Started: | 7/6/09 |
| Date Drilling Completed: | 7/6/09 |
| Logged By: | AA |
| Driller & Rig Type: | Great Basin Drilling, Inc |

Sample Types:
Auger Cutting
Split-Spoon (SS)
Rock Core
Shelby (SH)
Mod. California (MCAL)

Remarks:

Figure B-2

2779 South 600 West
Salt Lake City, Utah 84115
PH: (801) 484-8827
Fax: (801) 487-3312

# LOG OF BORING: B-3



PSI Job No.:710-95029
Project: Proposed Covers for Raceways
Location: Whiterocks State Fish Hatchery
Whiterocks, Utah

Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Hammer Type: 140-lb/30-in. drop
Latitude: N
Longitude: W

| WATER LEVELS | |
|---|---|
| While Drilling | Dry |
| Upon Completion | Dry |
| Delay | N/A |

| Elevation, (feet) | Depth, (feet) | Graphic Log | Sample Type | Sample No. | Recovery (inches) | MATERIAL DESCRIPTION | USCS Classification | Standard Penetration Resistance (per 6-inch) | Dry Density (pcf) | Moisture (%) | PENETRATION RESISTANCE blows/ft ◎ ● Moisture ◪ PL ✚ LL (1 – 50 – 100) / STRENGTH, tsf ▲ Qu ✳ Qp (0 – 2.0 – 4.0) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | Surface Elev.: ft ± | | | | | | |
| | | | | | | **ASPHALT (3")** | | | | | | |
| | | | | | | **Poorly-Graded Gravel with Silt and Sand:** -- loose, brown | | | | | | |
| | | | | 1 | 14 | | | 4-4-4 | | 4 | | |
| | 5 | | | | | -- medium dense | | | | | | |
| | | | | 2 | 14 | | | 5-2-14 | | | | |
| | | | | | | -- Auger Refusal @ 6.5-feet | | | | | | |

Completion Depth: 6.5 ft
Date Drilling Started: 7/6/09
Date Drilling Completed: 7/6/09
Logged By: AA
Driller & Rig Type: Great Basin Drilling, Inc

Sample Types:
Auger Cutting
Split-Spoon (SS)
Rock Core
Shelby (SH)
Mod. California (MCAL)

Remarks:

Figure B-3

| Boring ID | Depth (feet) | Liquid Limit (LL) | Plastic Limit (PL) | Plasticity Index (PI) | Qu (psf) | % < #4 Sieve | % < #200 Sieve | Water Content (%) | Dry Density (pcf) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| B-1 | 2.5 | NP | NP | NP | | 50 | 13 | 3.9 | | |
| B-2 | 2.5 | | | | | 64 | 18 | 8.4 | | |
| B-3 | 2.5 | NP | NP | NP | | 44 | 12 | 4.3 | | |

**2779 South 600 West**
**Salt Lake City, UT 84115**
**Phone: (801) 484-8827**
**Fax: (801) 487-3312**

## Summary of Laboratory Test Results

PSI Job No.: 710-95029
Project: Proposed Covers for Raceways
Location: Whiterocks State Fish Hatchery
Whiterocks, Utah

Figure B-4

**American Recovery and Reinvestment Act Requirements**

Funds for this project are provided by the Federal Government from the American Recovery and Reinvestment Act, Public Law 111-5, (ARRA) and the following provisions apply.

A. REQUIRED USE OF AMERICAN IRON, STEEL, AND MANUFACTURED GOODS—SECTION 1605 OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (2 CFR §176.140)

This award term and condition implements (i) Section 1605(a) of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5) (Recovery Act), by requiring that all iron, steel, and manufactured goods used in the project are produced in the United States.

"Domestic iron, steel, and/or manufactured good"

(1) Is wholly the growth, product, or manufacture of the United States; or

(2) In the case of a manufactured good that consists in whole or in part of materials from another country, has been substantially transformed in the United States into a new and different manufactured good distinct from the materials from which it was transformed. There is no requirement with regard to the origin of components or subcomponents in manufactured goods or products, as long as the manufacture of the goods occurs in the United States.

“Manufactured good” means a good brought to the construction site for incorporation into the building or work that has been--

(1) Processed into a specific form and shape; or

(2) Combined with other raw material to create a material that has different properties than the properties of the individual raw materials.

“Public building” and "public work" means a public building of, and a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions).

The award official may add other iron, steel, and manufactured goods to the list in paragraph (b)(3) of this award term and condition if the Federal government determines that—

The cost of domestic iron, steel, and/or manufactured goods would be unreasonable.
The cost of domestic iron, steel, and/or manufactured goods used in the project is

unreasonable when the cumulative cost of such material will increase the overall cost of the project by more than 25 percent;

The iron, steel, and/or manufactured goods is not produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality; or

The application of the restriction of section 1605 of the Recovery Act would be inconsistent with the public interest.

B. WAGE RATE REQUIREMENTS UNDER SECTION 1606 OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

a) Section 1606 of the Recovery Act requires that all laborers and mechanics employed by contractors and subcontractors on projects funded by the Recovery Act shall be paid Davis-Bacon wage rates (as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code). These regulations also apply to any sub-contract.

Davis-Bacon wage rates for Uintah County, Utah may be found at the following website:

http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=Davis-Bacon&docid=UT20080054

See: GENERAL DECISION: UT20080054 10/31/2008 UT54-For Construction Type: Building

The contractor will be required to submit weekly a copy of all payrolls to the DIVISION. The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

| STATE OF UTAH<br><br>DIVISION OF WILDLIFE RESOURCES<br><br>ADMINISTRATION | **NO.** W2ADM-3 | **NO. PAGES:** 2 |
|---|---|---|
| | **EFFECTIVE DATE**: DRAFT | |
| | **APPROVED:** | |
| **SUBJECT:** DISINFECTION OF NON-HATCHERY EQUIPMENT ENTERING DIVISION FISH CULTURE FACILITIES | | |
| **DISTRIBUTION:** ALL DIVISION EMPLOYEES | | |

## I. PURPOSE

The purpose of this procedure is to prohibit the introduction of disease and unwanted organisms into Division fish culture facilities (hatcheries). These include: viruses, fungi, parasites and bacterial pathogens, as well as invasive non-native plants, mollusks, and invertebrates. Whirling Disease and aquatic or terrestrial nuisance species are now distributed throughout the state of Utah. When these organisms are introduced into a hatchery, the facility will be shut down and trout production may end indefinitely.

## II. Policy

To ensure the protection of state fish production facilities (hatcheries), the Division must require that all equipment entering fish production areas of a fish hatchery be free of dirt, mud and organic material that may harbor disease and/or Aquatic Nuisance Species and are disinfected.

## III. DEFINITIONS

A. "**Equipment"** means any vehicle including heavy equipment and off-highway vehicles, buckets, nets, coolers, seines, etc.

B. "**5,000-ppm solution of chlorine**" means a solution of 360 milliliters of household bleach (active ingredients 5.25% sodium hypochlorite) per one gallon of water.

C. **"Production Areas**" means areas of the fish hatchery where eggs and fish are incubated, hatched and reared. Areas are further defined as rearing and incubation areas within a building, fenced or covered areas outside that supply/distribute water, rear, or process fish.

## IV. PROCEDURE

Division employees not from the hatchery, other agencies' employees and construction company field supervisors shall notify the Hatchery Supervisor before any equipment is brought into a hatchery's production area. The Hatchery Supervisor shall inspect all equipment before it is allowed to enter the facility. The Hatchery Supervisor or designee must inspect equipment each time it enters the facility.

All equipment shall be cleaned and disinfected before being brought into the hatchery's production areas. Anyone bringing equipment onto a Division fish culture facility must follow the steps listed below:

1. Equipment must be cleaned with a hot water pressure washer (minimum temperature of 140 degrees F.) to remove all dirt, mud and organic material.

2. Following cleaning, the equipment must be disinfected with a 5,000-ppm solution of chlorine for a minimum of 15 minutes. The solution must be sprayed onto the entire vehicle/heavy equipment, paying particular attention to the underside, tires and wheels**.** The solution shall be thoroughly rinsed off the vehicle/equipment with water from a culinary source.

3. Heavy construction equipment that is removed from a hatchery does NOT need to be washed upon return if:
    a. It has gone directly to a landfill and is returning to the hatchery job site; or
    b. It has NOT gotten muddy or come in contact with a waterway.

4. Equipment that is removed from a hatchery and becomes muddy, must be disinfected again according to the standard described in Section III (1) and (2).

5. All small equipment: buckets, boots, waders, raingear, nets, seines, etc. must first be washed and then disinfected as described below.
    a. Wash with water that is a minimum 140 degrees F. to remove all mud, dirt and organic material.
    *b.* Spray item with a 5,000-ppm chlorine solution, paying particular attention to areas that could hold dirt or mud**.** After being in contact with chlorine solution for a minimum of 15 minutes, items shall be thoroughly rinsed with culinary water. Items must then be allowed to air-dry for 12 hours.

## V. REVIEW DATE

This procedure shall be reviewed on or before _____