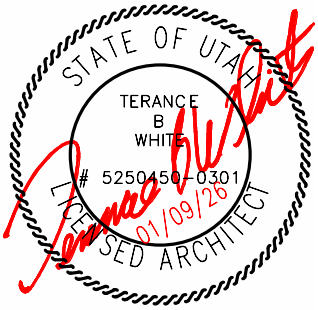
PROJECT MANUAL FOR THE

ICSD BUS GARAGE

LOCATED AT
2884 – 2974 NORTHFIELD RD.
CEDAR CITY, UTAH 84721

IRON COUNTY
SCHOOL DISTRICT
BUILT IRON STRONG

2077 WEST ROYAL HUNTE DRIVE
CEDAR CITY, UTAH 84720



VOLUME 3
DIVISIONS 31 – 33

NWL Project No. 163.028

SECTION 00 0105
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VOLUME THREE

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SECTION 31 2200
BUILDING PAD PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 – General Requirements Specification Sections, apply to the Work of this Section.

B. Furnish all labor, equipment, services and materials to fully complete all blading off, stripping, excavation, earth-moving, engineered compacted fill for building pad preparation, (including outbuildings).

C. Work included in the section:
   1. All required excavation and removal of existing soil material.
   2. Construction of engineered compacted fill of imported granular materials or on site materials if acceptable to the Soils Engineer in controlled lifts to at least ninety-five percent (95%) of maximum laboratory density as determined by ASTM D 1557 or ASTM D-698 (latest edition). See Geotechnical Report and paragraph 2.1.B (this section) for specific details.
   3. Coordination of all work with Geotechnical Engineer / construction materials testing agency provided by Owner.

D. Do not include sales tax, refer to Section 00 0103 - Notice to Contractors.

1.02 RELATED WORK

A. Site preparation for asphalt paving, street development, concrete and remainder of site, refer to Civil Drawings and Sections 32 1216 - Asphalt Paving and Repair and 03 3000 - Cast-In-Place Concrete.

B. Site concrete, including curb, gutter, and sidewalks, Sections 03 1000 - Concrete Formwork, 03 2000 - Cast-In-Place Concrete and Masonry Reinforcement and 03 3000 - Cast-In-Place Concrete.

C. Excavation and backfill related to footings, foundations, water lines, sanitary and storm sewer, natural gas and electric lines, etc., Sections 31 2210 - Building Excavation and Backfill and 31 2220 - Site Excavation and Backfill.

D. Granular base and vapor barrier under floor slab, Section 31 2210 - Building Excavation and Backfill.

1.03 SUBMITTALS

A. Shop drawing and information submittal:
   1. Copies of shop drawings and information sheets showing all items of this trade shall be submitted to the Civil Engineer and Architect for review. Refer to Section 01 3300 - Submittals and 01 3323 - Samples and Shop Drawings.
      a. As a part of the Shop Drawings, Provide a Site Plan Showing:
         1) Vegetation removal limits.
         2) Areas for temporary construction and field offices.

B. Closeout submittal:
   1. Submit Closeout Documentation in compliance with Section 01 7700 - Project Closeout.
   2. Submit Warranties, Guarantees, and Bonds in compliance with Sections 01 7833 - Warranties and Bonds and 01 7836 - Form of Guarantee.

1.04 QUALITY ASSURANCE

A. Earthwork Contractor shall be a Company specializing in the type of work required, and be able to demonstrate a minimum of three (3) years of documented experience.

1.05 FINISHED GRADES

A. “Finished Grades” as used herein, refers to the required final grade elevations indicated on the Drawings. If the finished grades shown by spot elevations conflict with those shown by contours, the spot elevations shall be used. Do all grading necessary to bring to underside of respective surfacing at grades shown on the Drawings.

1.06 GENERAL SITE INFORMATION

A. The Contractor will be held to have examined the site personally to ascertain the state thereof and to understand the complexities of the Work. This trade will be held to have compared the site with the Drawings and to have satisfied himself as to the conditions of the premises, the actual elevations, existing obstructions, areas of work and other conditions that would affect the completion of the Work.

B. Refer to Section 01 7123 - Field Engineering for general site related services information.

C. Soils Report: The Contractor will be held to have examined the geotechnical report prepared by Applied Geotechnical Engineering Consultants, 1420 South 270 East, St. George, Utah, telephone (435) 673-6850. This report is bound in this project manual under Section 02 3200 - Geotechnical Investigation. The Contractor shall become fully aware of the natural conditions that exist and are noted in this report.

D. The Contractor shall observe soil conditions throughout the duration of his sitework operations and shall notify the Soils Engineer of any deviation in actual soils conditions from those expected based on soils report bound herein.

1.07 PERMITS AND COMPLIANCE WITH LOCAL CODE AND ORDINANCE

A. This Contractor shall be required to obtain permits (if required) by City of Cedar City, Utah, and shall be required to work in strict conformance to "International Building Code," current edition. Any costs or fees shall be paid by the Owner.

B. This Contractor shall be responsible to comply to the provisions of this ordinance and all other applicable codes and ordinances controlling all phases of the Work as set forth on the Drawings and in this Specification.

1.08 DISPOSITION OF UTILITIES

A. Rules and regulations covering the respective utilities shall be observed in executing all work under this heading.

B. Contractor shall contact all utilities companies to determine if subsurface lines exist which could be damaged.

C. Active utilities shown on the Drawings shall be adequately protected from damage and removed or relocated only as indicated or specified.

D. By the Work of this Contract, active utilities not shown on the Drawings shall be located and protected or relocated in accordance with written instruction of the Civil Engineer. The Owner will not be held responsible for damage to any underground utilities.

1.09 BENCH MARKS AND MONUMENTS

A. Carefully maintain all bench marks, monuments and other reference points, if disturbed or destroyed, replace as directed.

1.10 GUARANTEE:

A. Warranties and Guarantees shall comply with Sections 01 7833 - Warranties and Bonds and 01 7836 - Form of Guarantee.

B. This Contractor shall guarantee the Work for a period of one (1) year from the date of Substantial Completion.

C. Repairs or replacement under the warranty shall be performed in a timely manner at no additional expense to the Owner.

1. Furnish three (3) copies of written guarantee on form bound within Section 01 7836 - Form of Guarantee.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Imported structural fill shall be granular, non-gypsiferous, non-expansive and meet the recommendations listed below:

Area	Fill Type	Recommendations
Footings/Pad	Structural Fill	-200 < 35% LL < 30% Maximum size: 4 inches
Roadways/Parking	Site Grading	-200 < 35% LL < 30% Maximum size: 4 inches
Under Slab	Base Course	Type 2 Road Base -200 < 10% Maximum size: 1 inch

B. Compaction: Compaction of fill materials placed at the site should be equal or exceed the following percentages.

Area	Minimum Compaction
Subgrade Re-compaction	90%
Footings / Foundation	95%
Building Pad Fill	95%
Interior Slabs	95%
Utility Trench Backfill (inside building)	95%
Utility trench Backfill (outside building)	95%
Wall Backfill (nonstructural)	95%
Wall Backfill (inside building)	95%

Fill tested should be compared to the Maximum dry density as determined by ASTM D-1557. Fill should be moisture conditioned to within two percent (2%) of the optimum moisture content and tested to verify proper compaction. Fill should be placed in lift thickness which do not exceed the capacity of the compaction equipment utilized. Generally 4” to 6” lift thicknesses are adequate for hand compactors and 6” to 9” for heavy equipment.

PART 3 - EXECUTION

3.01 SITE STRIPPING

A. Refer to soils report and/or Civil Drawings.

3.02 EARTHWORK AND ENGINEERED FILL

A. Refer to soils report and/or Civil Drawings and Site Development Plans.

B. Preparation of building pad under entire new building area and for a minimum distance of at least 5'-0" outside building wall lines, including free standing exterior columns and/or piers, and out building.
   1. Strip and remove existing vegetation and cultivated soil as required by Soils Engineer. (Refer to soils report.)
   2. Removal of the natural collapsible soils should extend at least 5’ beyond the limits of the proposed building/buildings.
      a. In cut areas which extend below collapsible soils, or at areas where natural collapsible soils are not encountered, the natural soils should be removed down to an elevation of 4’ below finished pad grade. The removal shall extend at least 5’ beyond the limits of the proposed building.

1) Transport and removal from site of excess dirt from excavations if not needed for backfill, or landscaping. (Note: Only excess materials that are 4" minus may be used as backfill.)
   (a) A qualified representative of the Soils Engineer shall observe base of excavation work procedure.
      (1) Construct engineered compacted fill of properly processed on-site material or imported material constructed in lifts not to exceed 8" of uncompacted depth. Compact backfill material to at least ninety-five percent (95%) of the maximum laboratory density as determined by ASTM D-1557. Each compacted lift is to be inspected and tested by the soils testing agency prior to installation of additional lifts.
      (2) (Note: Only materials that are 4" minus are to be used in the top 4'-0" of the building pad, whether they are on site or imported materials. In cases where the required structural excavation is less than 4'-0" below the footings, then the engineered, compacted fill shall be entirely made up of 4" minus materials.)
      (3) If imported structural fill is required to grade the proposed site, the imported fill materials should be used below the proposed building pad.
      (4) Proceed with successive lifts until rough grade is within 1" plus or minus of grades posted minus the allowance for 4" of concrete over 4" of road base course and bottom of concrete footings.
2) Field Density Tests: Shall be made by a soils engineer or his representative at base of excavation after compaction of each layer or lift. Soils Engineer shall determine number and locations of tests to be taken.

3.03 WATER PROTECTION

A. The Contractor shall take all precautionary measures to protect all exposed natural soils from inundation or severe wetting. This could result in damage to future building improvements.

3.04 COMPACTION TESTING

A. The General Contractor shall coordinate on-site earth work with the construction materials testing agency personnel and schedule.

B. Each lift or layer must be tested by soils testing laboratory personnel under the direction of a licensed professional engineer in the state of Utah. Every lift or layer shall be tested and no additional layer shall be placed upon a compacted layer until the test results are complete and satisfactory. Should the test results indicate inadequate compaction, the further compactive force must be applied and further testing be performed until it is apparent from test results that the densities specified have been obtained.

C. In certain instances where it is questionable that the gradation of the soils is the same as the soils used in performing the maximum density determination in the laboratory, then additional laboratory maximum density determinations at the existing fill moisture contents shall be made from the samples removed during the field testing. The maximum density determinations will also be reported, along with other data, as indicated above.

3.05 COST OF COMPACTION TEST:

A. All costs of compaction tests shall be paid by the Owner under a separate contract.

3.06 GRADING

A. The entire area shall be graded uniformly and in accordance with the grades shown on the Drawings. Grading shall be set to accommodate the following:
   1. Floor Slab: Set grade to allow for 4" of concrete over 4" of road base.

3.07 PROTECTION OF PERSONS AND PROPERTY:

A. Barricade open excavations occurring as part of this work and post with warning signs and/or lights.

END OF SECTION 31 22 00

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SECTION 31 2210
BUILDING EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 – General Requirements Specification Sections, apply to the Work of this Section.

B. Provide and perform earthwork as indicated and specified, complete. Contractor shall review Civil Drawings showing existing grades and verify actual site conditions as part of preparing the bid for work under this Contract.

C. Principal items of work include:
   1. Excavation and related compacted fill and/or backfill as required for building volume below grade, continuous wall and spot footings, foundations, slabs-on-grade, site structures, and utilities within the building, etc. (Note: All fill and backfill shall be 4” minus - 4’ to below grade.)
   2. Excavation and removal as required for depressed, recessed or thickened slabs and control joints and at:
      a. Elevator Pits.
      b. Grease Interceptor Tank.
      c. Fine grading for all concrete floor slabs.
      d. Transport and removal from site of excess dirt from excavations if not needed for backfill, or landscaping. (Note: Only excess materials that are 4" minus may be used as fill or backfill.) Refer to Paragraph 3.4.A.
      e. Furnish and install 4" of road base under all interior concrete slabs, and as detailed elsewhere within the building.
      f. Install vapor barrier membrane between base course and slab-on-grade inside the building.
         1) Vapor barrier shall not be installed under areas that are to receive thick set ceramic tile floors or outbuildings.
      g. Clean-up and removal of debris as a result of this Work.

D. Do not include sales tax, refer to Section 00 0103 - Notice to Contractors.

1.02 RELATED WORK

A. Site preparation, grading and engineered compacted fill for building pad, Section 31 2200 - Building Pad Preparation.

B. Excavation and compacted backfill related to storm sewer, sanitary sewer, domestic water, electrical conduit, etc. (Refer to Section 31 2220 - Site Excavation and Backfill.) Note: All underground utilities inside the building pad area will be installed by the trades performing the work. Backfill of these utility trenches shall conform to the same compaction requirements set forth herein.
   1. Construct engineered compacted fill in loose lifts which do not exceed 8" uncompacted depth, with a field in-place density of at least ninety-five percent (95%) of modified proctor (ASTM D 1557 - latest edition). Refer to geotechnical study for specific related materials and methods. Backfill in all utility trenches shall allow for 6" of clean sand below and 12" of clean sand above all piping, conduits, cable, etc.

C. All costs relating to testing services, by Owner.

1.03 FINISHED GRADES

A. "Finished Grades," as used herein, refers to the required final grade elevations indicated on the drawings. If the finished grades shown by spot elevations conflict with those shown by contours, the spot elevations shall be used. Do all grading necessary to bring to underside of respective surfacing at grades shown on the drawings.

1.04 GENERAL SITE INFORMATION

A. The Contractor will be held to have examined the site personally to ascertain the state thereof and to understand the conditions and complexities of the Work. This trade will be held to have compared the site with the drawings, and to have satisfied himself as to the conditions of the premises, the actual elevations, existing obstructions, areas of work and other conditions that would affect the completion of the Work. Contractor shall be alert to soil conditions as they affect his work. Refer to previous rough grading conducted at the site and log of borings in the geotechnical investigation for information. Any deviations in actual soil conditions must be reported to the Geotechnical Engineer prior to proceeding with any fill operations.

1.05 PERMITS AND COMPLIANCE WITH LOCAL CODE AND ORDINANCE

A. This Contractor shall be required to obtain permits by the City of Washington, Utah and shall be required to work in strict conformance to "International Building Code," current edition. Any fees or costs to be paid by the Owner.

B. This contractor shall be responsible to comply with the provisions of this ordinance and all other applicable codes and ordinances controlling all phases of the Work as set forth on the drawings and in this Specification.

1.06 SUBMITTALS

A. Road base mix.

B. Vapor retarder/barrier.
   1. Manufacturer samples, literature.
   2. Manufacturer installation instructions, for placement, seaming and pipe boot installation.

C. Refer to Sections 01 3300 - Submittals and 01 3323 - Samples and Shop Drawings.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Material: All fill and backfill to be used on site will be as indicated in Geotechnical Report and/or as modified in Sections 31 22 00, “Building Pad Preparation”, 31 22 10, “Building Excavation and Backfill”, or 31 22 20, “Site Excavation and Backfill”.

B. Type 2 Untreated Base Course Under Slab On Grade: The base course aggregate shall consist of natural angular gravel, crushed gravel, crushed rock, or crushed slag and conform to the gradation hereinafter specified placed on a prepared sub-grade as specified herein.
   1. The dry mineral aggregate shall be uniformly graded within the gradations listed below when tested in accordance with AASHTO T-27. The size of aggregate shall be at the option of the Contractor unless otherwise specifically designated.

PERCENTAGES PASSING SIEVES

Sieve Size	Percent Passing
3/4 inch	100
1/2 inch	70 - 100
No. 4	41 -68
No. 16	21 -41
No. 50	10-27
No. 200	4 - 10

2. Moisture content in the base material shall be less than six percent (6%) at the time the slab-on-grade is poured.

C. Vapor barrier between base course and concrete slab shall be as follows:
   1. Six (6) mil polyethylene vapor retarder with minimum 6" lapped joints shall be used at interior floor slab area unless heavier membrane is called for. (refer to drawings)
   2. When called for in drawings, and/or required by soils report, provide extremely low permeance vapor barrier with minimum 0.008 WVTR as tested by ASTM E96 shall be used at floors.
      a. Stego Wrap (15 mil) Vapor Barrier by Stego Industries LLC, San Juan Capistrano, CA, (877) 464-7834, www.stegoindustries.com
      b. W.R. Meadows Premolded Membrane with Plasmatic Core.
      c. Vapor Guard by Reef Industries.
      d. Vaporlock (15 mil) by Raven Industries.
      e. Poly-America Husky Yellow Guard (15 mil)
   3. No vapor barrier shall be installed below slabs that are to receive ceramic tile floors.
   4. No vapor barriers are required below Out Buildings. (refer to site plan)
   5. Note: If contractor elects to use a laser screeding system - the vapor barrier shall be upgraded to a 15 mil minimum system that is rated as able to withstand being driven on. Contractor to be aware that interior slabs-on-grade may require a mat of #3 rebar. Refer to structural drawings.
   6. Provide fifteen (15) ml vapor barrier between base course and post tensioned concrete tennis court slab (Refer to Site Plan).
   7. Seam Tape
      a. High density polyethylene tape with pressure sensitive adhesive. Minimum width 4”.
      b. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavate to dimensions shown on the drawings, plus ample space for construction, allowing for structure, gravel fill where applicable, etc.

B. Soft or loose earth or quicksand in trench excavations shall be reported to the Architect or Geotechnical Engineer immediately. The geotechnical investigation provided in Section 02 3200 - Geotechnical Investigation provides guidance for stabilization of soft soils.

C. The Contract will be based upon the elevations as shown on the drawings or called for in the Geotechnical Investigation Report. In the event that additional excavation is required due to unknown soil conditions at the excavated depths indicated, a unit price per cubic yard for additional excavation will be in accordance with the unit prices furnished with the Contractor's proposal.

D. Forms for both sides of footings and walls must be provided. Place footings and foundations upon properly compacted and tested subgrade.

E. Concrete any excess cut under footings and foundations. Fill excess cut under slabs with well tamped bank run sand or gravel. Material to be accepted by the Soils Engineer.

3.02 REMOVAL AND REDEPOSITING

A. All excess earth which is surplus after construction of all backfill shall be loaded and transported off the site and disposed of properly.

3.03 PROTECTION

A. This Contractor shall take all necessary precautions to protect public and private property adjacent to the site. He shall provide all barricades, flagmen, signs, warning devices, etc., if required.

3.04 BACKFILL AND FILL

A. Material: All backfill to be used for the building pad will be either imported or on-site non-expansive material free of organic matter and other deleterious substances and shall not contain rocks or lumps greater than 4” in maximum dimensions as allowed by the Geotechnical Investigation. Structural fill below footings should consist of imported granular material. Imported fill or backfill, if required, shall meet the requirements listed in the Geotechnical Investigation.

B. Placing, Spreading, and Compaction: Construct engineered compacted fill and backfill of material in lifts not to exceed 8" of uncompacted depth to field in-place densities as follows:
   1. Refer to Section 02 32 00, “Geotechnical Investigation” for compaction specification.

3.05 VAPOR BARRIER MEMBRANE

A. Install Vapor Barrier
   1. Installation shall be in accordance with manufacturer's instruction and ASTM E 1643-98.
      a. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
      b. Lap vapor barrier over footings and seal to foundation walls.
      c. Overlap joints 6” and seal with manufacturer's tape.
      d. Seal all penetrations (including pipes) with manufacturer's pipe boot made from vapor barrier material taped in place.
      e. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
      f. Repair damaged areas by cutting patched of vapor barrier. Overlap damaged area 6” and tape all four (4) sides.

3.06 COMPACTION TESTING

A. Each lift or layer must be tested by soils testing laboratory personnel under the direction of a registered Professional Engineer in the state of Utah. A minimum of one (1) in-place density test shall be taken for every forty (40) lineal feet in trenches filled under bearing walls or column footings, and one (1) test every two thousand (2,000) square feet for under floor areas. Every lift or layer shall be tested and no additional layer shall be placed upon a compacted layer until the test results are complete and satisfactory. Should the test results indicate inadequate compaction, further compactive force must be applied and further testing be performed until it is apparent from test results that the densities specified have been obtained.

B. Number of tests may vary at the discretion of the Architect or Geotechnical Engineer.

C. Adequate proctors shall be run during field placement to verify materials are properly compacted.

3.07 GRADING AND FINE GRADING

A. All areas excavated, filled or backfilled or disturbed by construction, all disturbed site soils under base courses shall be graded uniformly in accordance with grades shown on drawings making allowance for concrete flatwork with base course. Grades shall be to within 3/8" plus or minus in 16'-0".

END OF SECTION 31 22 10

SECTION 31 2220
SITE EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 – General Requirements Specification Sections, apply to the Work of this Section.

B. Provide and perform earthwork as indicated and specified, complete. Contractor shall review Civil Drawings showing existing grades and verify actual site conditions as part of preparing the bid for work under this Contract. Principal items of work include:
   1. Structural excavation.
   2. Structural backfill. (Note: 6" minus shall be allowed in fill areas up to 4'-0" below finish grade - only 4" minus will be allowed in the upper 4'-0" of fill areas).
   3. Landscape backfill and sub grading to posted subgrades (finish elevation minus 12" - refer to landscape plans).
   4. Fine grading as required.
   5. Excavation and related compacted backfill as required for sidewalks, parking lots, sign posts, etc., and all other site areas.
   6. Excavation and removal as required for curb and gutter, sidewalks.
   7. Transport and removal from site of excess soil and rock from excavations if not needed for backfill. Transportation and removal of all excavated material 12” in diameter or larger.
   8. Furnish and install road base under all sidewalks, curb & gutter and other areas as shown on the plans.
   9. Trench excavation and backfill of all utility and storm drain piping.
      a. On site - construct engineered compacted fill in loose lifts not to exceed 8" uncompacted depth, with a field in-place density of at least ninety-five percent (95%) of modified proctor (ASTM D 1557 - latest edition). Refer to geotechnical investigation for specific related materials and methods. Backfill in all utility trenches shall allow for 6" of clean sand below and 12" of clean sand above all piping, conduits, cable, etc.
      b. At public right-of-ways - all trench excavation and backfill for all utility trenching shall conform to City of St. George, Utah Standards and Specifications.
   10. Clean-up and removal of debris as a result of this Work.

C. Do not include sales tax; refer to Section 00 0103 - Notice To Contractors

1.02 RELATED WORK

A. Building Excavation and Backfill, refer to Section 31 2210 - Building Excavation and Backfill

B. Engineered, compacted road base below asphalt areas by Section 32 1216 - Asphalt Paving and Repair.

C. All costs relating to testing services by Owner.

1.03 FINISHED GRADES

A. "Finished Grades," as used herein, refers to the required final grade elevations indicated on the drawings. If the finished grades shown by spot elevations conflict with those shown by contours, the spot elevations shall be used. Do all grading necessary to bring to underside of respective surfacing at grades shown on the drawings.

1.04 GENERAL SITE INFORMATION

A. The Contractor will be held to have examined the site personally to ascertain the state thereof and to understand the conditions and complexities of the Work. This trade will be held to have compared the site with the drawings, and to have satisfied himself as to the conditions of the premises, the actual elevations, existing obstructions, areas of work and other conditions that

would affect the completion of the Work. Contractor shall be alert to soil conditions as they affect his work. Refer to previous rough grading conducted at the site and logs of borings in geotechnical investigation for information. Any deviations in actual soil conditions must be reported to the Geotechnical Engineer prior to proceeding with any fill operations.

1.05 PERMITS AND COMPLIANCE WITH LOCAL CODE AND ORDINANCE

A. This Contractor shall be required to obtain permits (if required) by City of Washington, Utah, and shall be required to work in strict conformance to "International Building Code." Any fees or costs to be paid by the Owner.

B. This Contractor shall be responsible to comply to the provisions of all other applicable codes and ordinances controlling all phases of the Work as set forth on the Drawings and in this Specification.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Road base material (under sidewalks)
   1. 4" Type 2 Road Base as accepted by the Engineer.
   2. 6” Type 2 road base (as accepted by the Engineer) under concrete paving at Fire Lane – refer to Site Development Drawings.

B. Fill Material: Refer to geotechnical report for clarification of acceptable materials.

C. Weed Barrier Fabric: Mirafi or De-Whitt Weed Barrier.

D. Perforated PVC Pipe: Refer to Civil Drawings.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavate to dimensions shown on the drawings, plus ample space for construction, allowing for structural fill where applicable, etc.

B. Soft or loose earth or quicksand in trench excavations shall be reported to the Architect or Geotechnical Engineer immediately.

3.02 REMOVAL AND REDEPOSITING

A. All excess earth which is surplus after construction of all backfill shall be loaded and transported off the site and disposed of properly.

3.03 PROTECTION

A. This Contractor shall take all necessary precautions to protect public and private property adjacent to the site. He shall provide all barricades, flagmen, signs, warning devices, etc., as required.

3.04 BACKFILL AND FILL

A. Material: All backfill to be used for the building will be either imported or on-site non-expansive material free of organic matter and other deleterious substances and shall not contain rocks or lumps greater than 4” in maximum dimensions. As allowed by the Geotechnical Investigation.

B. Placing, Spreading, and Compaction: Construct engineered compacted fill and backfill of material in lifts not to exceed 8" of uncompacted depth to field in-place densities as follows:
   1. Refer to Section 02 32 00, “Geotechnical Investigation” for compaction specification.

3.05 COMPACTION TESTING

A. Each lift or layer must be tested by soils testing laboratory personnel under the direction of a registered Professional Engineer in the state of Utah. Every lift or layer shall be tested and no additional layer shall be placed upon a compacted layer until the test results are complete and satisfactory. Should the test results indicate inadequate compaction, the further compactive force must be applied and further testing be performed until it is apparent from test results that the densities specified have been obtained.

B. Number of tests may vary at the discretion of the Architect or Geotechnical Engineer.

C. In certain instances where it is questionable that the gradation of the soil is the same as the soils used in performing the maximum density determination in the field in-place, then additional laboratory maximum density determinations at the existing fill moisture contents shall be made from the samples removed during the field testing. The maximum density determinations will also be reported, along with the other data, as indicated above.

3.06 GRADING AND FINE GRADING

A. All areas excavated, filled or backfilled or disturbed by construction, all disturbed site soils under base courses etc. shall be graded uniformly in accordance with grades shown on drawings making allowance for concrete flatwork with base course. Grades shall be to within 3/8" plus or minus in 16'0".

B. At Landscape Areas
   1. Below landscape areas - grade subgrade to allow for 12" of topsoil. Note: The Landscape Contractor is to place the stockpiled and imported topsoil (if required).

C. At Asphalt Areas
   1. Refer to Civil Drawings, Site Development Drawings (SD Sheets) and Section 32 1216 - Asphalt Paving and Repair for asphalt depths, road base depth requirements to determine required subgrades for each area.
   2. Refer to geotechnical investigation for on-site and off-site subgrade preparation at pavement areas.

END OF SECTION 31 2220

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SECTION 32 3100
CHAIN LINK FENCING

PART 1 - GENERAL

1.01 SECTION INLCUDES

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 - General Requirements Specification Sections, apply to the Work of this Section.

B. Furnish all labor, materials, equipment necessary as required to fully complete all chain link fencing as indicated on the drawings or specified herein.

C. Do not include sales tax, refer to Section 00 0103 - Notice to Contractors.

1.02 REFERENCE STANDARDS

A. ASTM A 121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire; 2007.

B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

D. ASTM A 392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2007.

E. ASTM A 428/A 428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles; 2006.

F. ASTM A 491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric; 2007.

G. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.

H. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2008.

I. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.

J. ASTM F 567 - Standard Practice for Installation of Chain-Link Fence; 2007.

K. ASTM F 668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2007.

L. ASTM F 1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework; 2008.

M. ASTM F 1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2008.

N. ASTM F 1665 - Standard Specification for Poly(Vinyl Chloride)(PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence; 2008.

O. CLFMI CLF 2445 - Product Manual; Chain Link Fence Manufacturers Institute; 1997.

1.03 LOCATION

A. 6'-0" high site fencing where referenced. See Site Development (SD) sheets. See Architectural Site Plan (AS Sheets).

B. Swinging and/or rolling gates as shown on the Drawings. See Site Development (SD) sheets. See Architectural Site Plan (AS Sheets).

1.04 SHOP DRAWINGS

A. Submit complete shop drawings. See Section 01 3323 - Samples and Shop Drawings. Shop drawings must be reviewed by the Architect prior to shipment or erection.

1.05 WARRANTY

A. The chain link fencing Contractor shall provide a written guarantee of components for a period of one (1) year from the date of Substantial Completion, and shall be on form bound within Section 01 7836 - Form of Guarantee.

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

A. All materials provided under this Contract shall be manufactured and produced in compliance with applicable industry standards, codes, and regulations, including the requirements of all local and state authorities having jurisdiction. All concrete work shall be done in accordance with the requirements for concrete walks found elsewhere in these Specifications.

B. Heights: Heights of fence shall be 4', 6', and 16' or as detailed.

C. Posts: Galvanized Steel (ASTM A120).
   1. Corner posts shall be 2.875" outside diameter with wall thickness of .160" and weight of 4.64 lbs/ft. (4'-0" and 6'-0" fences.)
   2. Line posts shall be 1.90" outside diameter with wall thickness of .120" and weight of 2.28 lbs/ft. (4'-0" and 6'-0" fences.)
   3. End, corner and line posts shall be 2.875" outside diameter with wall thickness of .160" and weight of 4.64 lbs/ft. (Sixteen foot fences.)
   4. Gate posts at man gates and corner posts at gas meter enclosure shall be 4" o.d. galvanized pipe filled with concrete.
   5. Provide bracing posts at the Baseball “Batters Eye” fencing posts. These shall be the same size vertical posts as those to which they are attached.

D. Lengths: All line and corner posts shall be a minimum of 5’, 6’ and 8’ in length unless otherwise called for in the Contract Drawings. Finished height shall be 6’ above the finish grade or as shown. Gate posts shall correspond as necessary with height of fence.

E. Spacing of Posts: All line posts shall be spaced at no greater than 8’ intervals.

F. Rails: Galvanized Steel (ASTM A120)
   1. Shall be 1.66" outside diameter with wall thickness of .111" and weight of 1.84 lbs/ft.
   2. Shall be maximum of 20'-0" long sections joined with couplings as listed below.
   3. Provide top rail at all fencing.

G. Gates and Miscellaneous Hardware: All gate hardware and fittings shall be galvanized. Nuts and bolts may be zinc or cadmium plated.
   1. Man gates shall be constructed of 1.90" o.d. galvanized pipe all welded construction per Drawings.
   2. Provide lockable hardware per standard manufacturer’s hardware at all gates.

H. Chain Link Fabric: All chain link fabric used in fence and gate construction shall conform to the requirements of ASTM A-392. The fabric shall be eleven (11) ga. galvanized wire and shall be a 2” wire mesh. Provide 1 3/4" colored wire mesh at Tennis Court fencing. Fabric shall be installed on the outward facing side of the posts with the dripside down. All fabric shall be stretched taut and securely fastened to posts, top rail and to the bottom tension wire with eleven (11) ga. tie wire.

I. Couplings: Couplings used to connect individual lengths of rail shall be of the outside sleeve type of at least 7” long. The bore of the sleeves shall be sufficiently true to maintain adjacent lengths of rail in alignment.

J. Changes In Angle: Change in line where the angle of deflection is thirty degrees (30°) or more shall be considered as corner posts and corner or end posts, as required, shall be installed at these locations.

K. Caps: All posts shall be fitted with tops designed to fit securely over the posts and carry a top rail.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All fence posts shall be set in a concrete footing or sleeve as shown on the Contract Drawings. Concrete mix shall be the same as required for all concrete walks as contained elsewhere in these specifications. Each post shall be plumbed after setting post and prior to setting of concrete.

B. Installation of Mesh: The chain link mesh fabric shall be installed, as identified below, for each type of fence required under these specifications. The fabric shall be taut and securely fastened to the posts, top rail, and the bottom edge of the fabric shall extend to within 1” of the top of the finished ground level, or to the top of the footing to which the post is secured.

C. Fastening: Chain link fabric shall be fastened to each end of corner post with 1/4” high carbon steel tension bars with bands spaced at intervals of approximately 16” and to line posts and top rail with wires or metal bands. Tie wires or bands shall be placed on the line posts at intervals of approximately 16” on top rail. Where a bottom rail is not required in the Contract Drawings, a tension wire of seven (7) ga. coil spring wire shall be installed along the bottom edge of all fences and shall be fastened with wire clips at 24” intervals.

3.02 CLEAN-UP

A. Upon completion of all fencing phases of this Contract, the Contractor shall clean all excess materials, pipe, mesh wire, concrete, etc., and remove the same from the construction site, leaving the site clean and neat.

END OF SECTION 32 31 00

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