

OLY1401.004

December 17, 2015

Shaun Boulton, P.E. – Project Engineer
City of Las Vegas – Department of Building & Safety
Civil and Planning Department
333 N. Rancho Drive
Las Vegas, NV 89106

**Subject: Amended Special Provisions for
Skye Canyon Detention Basin 1 (H#60604)**

Dear Mr. Boulton:

In coordination with Nevada Division of Water Resources – Dam Safety regarding obtaining the dam safety permit for the project, several comments were generated in review of the specifications. As a result, the special provisions for this project have been amended to ensure consistency between the local City permit construction requirements and those included in the State Dam Safety permit. The following is a summary of the changes to the special provisions included in this submittal.

1. Section 201 has been added to make sure clearing and grubbing is properly performed within the dam embankment footprint.
2. Section 202 has been added to specify that if excavated material is utilized in the embankment, it shall meet the selected backfill specifications.
3. Sections 203.03.10 and 203.03.16(C) and (E) are deemed unsuitable for dam embankment construction; therefore, they have been removed for this project.
4. Section 203.03.16(F) has been removed because there is no sediment berm proposed in the detention basin.
5. Section 203.03.17 has been removed in lieu of use of Section 203.03.73 that has remained in the provisions.
6. In order to match the plans and geotechnical report requiring 95% compaction in the dam embankment, Sections 203.03.18(E), 203.03.70(A) and 203.03.73(B) have been modified accordingly.
7. Sections 207.03.01(C), 207.03.03(A) and 207.03.03(F) have been modified and/or added to correctly identify the construction of the backfill is properly performed within the dam embankment footprint.

8. Sections 208.03.09, 208.03.12, 208.03.13, 208.03.14, 208.03.15, 208.03.16 and 208.03.17 have been modified to add a provision that if backfill is performed within the dam embankment to reference Sections 203.03.73 and 207.02.01 in order to meet dam safety guidelines.

Additionally, comment from CCRFCD during concurrence review has required the following modifications:

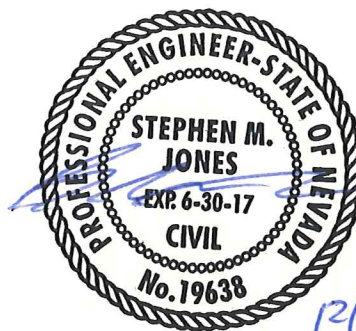
- Section 104 has been updated to reflect the current design of one (1) 60-inch RCP outlet pipe, as opposed to the previous submitted provisions identified 2 pipes.
- Section 310 specifies 2,000 psi strength for the proposed high-strength soil cement, as compared to the previous submitted strength of 1,800 psi.

Respectfully Submitted,

SLATER HANIFAN GROUP

Steve Jones, P.E.
Project Manager - Flood Control Division

cc: Marc Bolduc – Olympia Companies
Bobby Williamson – Olympia Companies
Jerry Slater, P.E. – SHG
Mark Failla, P.E., CFM – SHG



Steve Jones

From: Shaun Boulton <sboulton@LasVegasNevada.GOV>
Sent: Wednesday, October 21, 2015 1:15 PM
To: Steve Jones
Subject: RE: Skye Canyon Detention Basin 1 H#60604

Hi Steve,

What you are proposing to do is acceptable.

Thank You,

Shaun Boulton, P.E. Project Engineer
City of Las Vegas - Department of Building & Safety
Civil and Planning Development
Development Services Center
333 N. Rancho Dr.
Las Vegas, NV 89106
(702) 229-6565 fax (702) 631-3000
sboulton@lasvegasnevada.gov

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From: Steve Jones [mailto:sjones@shg-inc.com]
Sent: Wednesday, October 21, 2015 11:20 AM
To: Shaun Boulton
Subject: RE: Skye Canyon Detention Basin 1 H#60604

Shaun,

To summarize our phone conversation, we have been required by Nevada Dam Safety to provide a "stand-alone" specifications book for the project combining the Special Provisions we submitted to you previously merged with the Uniform Standard Specs copied into the document. Nevada Dam Safety provided the explanation they want the opportunity to review and amend even the Standard Specifications in their review. I have attached the comments for your records.

SHG wishes to proceed with this "stand-alone" specifications book for Dam Safety as a separate submittal, not changing the method of the process of having just Special Provisions provided to the City. If indeed Dam Safety makes comment that changes a Standard Specification, the separate Special Provisions book for the City will be updated accordingly.

Please review our situation and advise if this is acceptable to the City.

Steve Jones, P.E.
Project Manager

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PHONE: (928) 202-4104
FAX: (602) 483-1007

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From: Shaun Boulton [<mailto:sboulton@LasVegasNevada.GOV>]

Sent: Tuesday, October 06, 2015 3:29 PM

To: Steve Jones

Subject: RE: Skye Canyon Detention Basin 1 H#60604

Hi Steve,

You don't need to add Appendix B to the special provision. I thought you were referencing the section however I now can't locate where that reference was. Please revise section G. on sheet SP-637-1 where it references Appendix D as the location of the SWPPP Submittal Checklist. You are calling out the SWPPP Submittal Checklist as Appendix A in the Table of Contents and in the back.

Thank You,

Shaun Boulton, P.E. Project Engineer

City of Las Vegas - Department of Building & Safety

Civil and Planning Development

Development Services Center

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From: Steve Jones [<mailto:sjones@shg-inc.com>]

Sent: Tuesday, October 06, 2015 1:40 PM

To: Shaun Boulton
Subject: RE: Skye Canyon Detention Basin 1 H#60604

Shaun,

In incorporating your comments to add Appendix B to the special provisions, we feel this isn't applicable to our project. Appendix B relates to trenching in a roadway, which this project does not propose. Is there a specific reason why this Appendix needs to be added to the special provisions that I am not clear on?

Steve Jones, P.E.
Project Manager

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From: Shaun Boulton [<mailto:sboulton@LasVegasNevada.GOV>]
Sent: Tuesday, September 22, 2015 2:54 PM
To: Shannon Cooper <scooper@shg-inc.com>
Subject: Skye Canyon Detention Basin 1 H#60604

Hi Shannon,

The plans for Skye Canyon Detention Basin 1 H#60604 have been denied by Flood Control. The structural plans (building application # 60619) have also been denied and the comments for the structural plans are on the redlines for the Civil Plans for Devco/Traffic/LD. Please forward the structural sheets/comments to the structural engineer. Note that the Special Provisions provided also have minor comments and are included with the redlined plans. Appendix B and E need to be included in the Special Provisions. Appendix E can be downloaded from the following FTP site at <ftp://ftp.lasvegasnevada.gov/outbound/UFLS/>

The file is approximately 37 pages or so.

Please come to DSC counter #15 at 333 N. Rancho Drive to pick up your comments.

Thank You,

Shaun Boulton, P.E. Project Engineer
City of Las Vegas - Department of Building & Safety
Civil and Planning Development
Development Services Center
333 N. Rancho Dr.
Las Vegas, NV 89106
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SPECIAL PROVISIONS

December 2015

SKYE CANYON DETENTION BASIN 1

PREPARED FOR:

NINETY-FIVE MANAGEMENT LLC

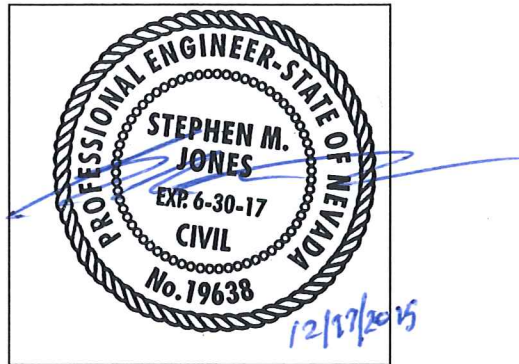
PREPARED BY:

SLATER HANIFAN GROUP

SKYE CANYON DETENTION BASIN 1

SPECIAL PROVISIONS

The following special provisions supplement and modify the "Uniform Standard Specifications for Public Works' Construction Off-site Improvements Clark County Area Nevada", most current edition; and the "Uniform Standard Drawings for Public Works' Construction Off-site Improvements Clark County Area Nevada, Volume I, and Volume II, along with revisions thereto, also referred to as the "Standard Specifications" and "Standard Drawings". Said Standard Specifications and Standard Drawings are hereby incorporated into these Special Provisions.



NOTE: THE ENGINEERS' APPROVAL AND SUBSEQUENT SEAL IS LIMITED TO THE FOLLOWING PORTIONS OF THESE DOCUMENTS AS PREPARED BY OR UNDER THE DIRECT SUPERVISION OF THE ENGINEER:

(1) SPECIAL PROVISIONS, PAGES SP-100-1 THROUGH SP-637-3

ALL OTHER ATTACHMENTS, INCLUSIONS, ENCLOSURES, SCHEDULES, FORMS, GRAPHICS, ETC. WERE PREPARED BY OTHERS AND NOT UNDER THE DIRECT SUPERVISION OF THE ENGINEER.

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ADD THE FOLLOWING SECTION TO DIVISION I – GENERAL REQUIREMENTS**SECTION 100 – GENERAL PROJECT REQUIREMENTS****100.01 REFERENCE SPECIFICATIONS AND DRAWINGS**

- A. Work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Special Provisions or the applicable codes. Wherever references are made in the contract, standards or codes in accordance with which work under this contract is to be performed or tested, the latest edition or latest revision(s) of the standards or codes shall apply.
- B. The following standards and codes are an integral part of the contract and are incorporated herein by reference. The Contractor is advised to become familiar with the contents of the "Uniform Standard Specifications", "Special Provisions" and the "Uniform Standard Drawings", as they shall govern the construction of this Project. Work on any public utility shall be performed in accordance with the Uniform Standard Specifications and Drawings except where modified by the utilities' own standards.
- C. **"Uniform Standard Specifications for Public Works Construction Off-Site Improvements, Clark County Area, Nevada"**, also referred to as the "Uniform Standard Specifications" or "USS". All of the requirements and provisions of said Uniform Standard Specifications shall apply except where otherwise provided herein or otherwise shown on the Contract Drawings. There may be recently adopted changes to the Uniform Standard Specifications and the Contractor should be aware of these before he submits a bid. Copies may be obtained from the Regional Transportation Commission of Southern Nevada, 600 S. Grand Central Parkway, Suite 350, Las Vegas, Nevada 89106 or online at www.rtcsonthernnevada.com
- D. **"Uniform Standard Drawings for Public Works Construction, Clark County Area, Nevada Volume I and Volume II"**, also referred to as the "Uniform Standard Drawings" or "USD" and shall be adhered to except where otherwise provided herein or otherwise shown on the Contract Drawings. Copies may be obtained from the Regional Transportation Commission of Southern Nevada, 600 S. Grand Central Parkway, Suite 350, Las Vegas, Nevada 89106 or online at www.rtcsonthernnevada.com
- E. **"Manual on Uniform Traffic Control Devices"**, also referred to as "MUTCD" and shall be adhered to except where otherwise provided herein or otherwise shown on the Contract Drawings. Copies may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402 or online at mutcd.fhwa.dot.gov
- F. **"State of Nevada Department of Transportation Standard Specifications for Road and Bridge Construction"**, also referred to as the "NDOT Standard Specifications" or the "State of Nevada Standard Specifications" and shall be adhered to when specifically referenced herein or as shown on the Contract Drawings. NDOT is located at 123 E. Washington Blvd., Las Vegas, Nevada 89101; Phone (702) 385-6500 or online at www.nevadadot.com/business/contractor/standards/

- G. **“State of Nevada Department of Transportation Standard Plans for Road and Bridge Construction”**, also referred to as the “NDOT Standard Drawings” or the “State of Nevada Standard Plans” and shall be adhered to when specifically referenced herein or as shown on the Contract Drawings. NDOT is located at 123 E. Washington Blvd., Las Vegas, Nevada 89101; Phone (702) 385-6500 or online at www.nevadadot.com/business/contractor/standards/.
- H. **“Nevada Work Zone Traffic Control Handbook”**, also referred to as the “Work Zone Handbook”. Copies may be obtained from Lisa Cody, University of Reno Nevada, (775) 784-1433.
- I. **“American Society for Testing and Materials”**, also referred to as the “ASTM”. ASTM is located at 100 Barr Harbor Drive, Conshohocken, Pennsylvania, 19428-2959; Phone (610) 832-9585 or online at www.astm.org
- J. **“Uniform Design and Construction Standards for Water Distribution Systems”**, also referred to as the “Water District Standards” or “UDACS”. Copies may be obtained from the Las Vegas Valley Water District, 1001 South Valley View Boulevard, Las Vegas, Nevada 89153 or online at http://www.lvwd.com/html/eng_udacs.html
- K. **“LVVWD Design Guidance Documents”**, Copies may be obtained from the Las Vegas Valley Water District, 3700 W. Charleston Blvd., Las Vegas, Nevada 89153.
- L. **“Design and Construction Standards for Wastewater Collection Systems – Southern Nevada Current Edition”**, also referred to as the “Sewer Specifications” or “DCSWCS”. Issued by the Clark County Water Reclamation District, 5857 E. Flamingo Blvd., Las Vegas, Nevada, 89122; Phone (702) 668-8160.

END OF SECTION 100

SECTION 101 – DEFINITIONS AND TERMS

DELETE SUBSECTION 101.01 BLANK AND REPLACE WITH THE FOLLOWING:

101.01 ABBREVIATIONS

AGA	American Gas Association
AI	The Asphalt Institute
AIEE	American Institute of Electrical Engineers
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ATSSA	American Traffic Safety Services Association
CFR	Code of Federal Regulations
CPM	Critical Path Method
CRSI	Concrete Reinforcement and Steel Institute
EPA	Environmental Protection Agency (USA)
IMSA	International Municipal Signal Association
IPCEA	Insulated Power Cable Engineers' Association
ITB	Instructions to Bidders
NBFU	National Board of Fire Underwriters
NCPI	National Clay Pipe Institute
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NOAA	National Ocean and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRS	Nevada Revised Statutes
OSHA	Occupational Safety and Health Standards
PCA	Portland Cement Association
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code, International Conference of Building Officials
USS	Uniform Standard Specifications for Public Works' Construction Off-Site Improvements, Clark County Area Nevada
USD	Uniform Standard Drawings for Public Works' Construction Off-Site Improvements, Clark County Area Nevada, Volumes I & II

101.06 BASE COURSE

DELETE THIS SUBSECTION IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

- A. The layer or layers of specified or selected material of designated thickness on a subgrade to support a surface course.

101.61 SPECIAL PROVISIONS

DELETE THIS SUBSECTION IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

- A. Special Provisions means the written descriptions of the requirements for the Work incorporated as a part of the Contract.

101.81 AGENCY

- A. The governing body to which a work or facility will be dedicated upon successful completion. Agency may be one or more of the following entities: City of Las Vegas, Nevada; City of North Las Vegas, Nevada; Las Vegas Valley Water District, Las Vegas, Nevada; Clark County Sanitation District, Las Vegas, Nevada; Clark County, Nevada; and state of Nevada Department of Transportation.

101.83 CERTIFIED ENVIRONMENTAL MANAGER (CEM)

- A. One who is certified by Nevada Department of Environmental Protection as an Environmental Manager.

101.85 DEWATERING

- A. The removal and/or lowering of any surface or subsurface water by a method chosen by the Contractor and acceptable to the Engineer, which results in a ground moisture content which enables construction to be carried out under relatively dry and stable conditions. Unless specifically indicated elsewhere in these specifications, no separate payment will be made for dewatering but shall be included in other items of work.

101.88 NOMINAL DIAMETER

- A. The inside diameter of a standard pipe as specified by the manufacturer.

101.91 SERVICE CONNECTION LATERAL

- A. All or any portion of a utility, including pipe, conduit, wire, cable or duct, including meters between a utility distribution (or collection) line and an individual customer or customers.

END OF SECTION 101

SECTION 104 – SCOPE OF WORK***ADD THE FOLLOWING SUBSECTION:*****104.00 LOCATION AND SCOPE OF WORK**

- A. LOCATION: Grand Teton Drive and Puli Drive
- B. SCOPE OF WORK: The project is located at the intersection of Grand Teton Drive and Puli Drive, with improvements extending approximately 2,700 feet north of Grand Teton along the Puli alignment. The project consists of a 72.5 acre-foot detention basin with soil cement lined interior slopes, an emergency overflow stepped spillway structure, a debris dewatering tower, a basin outlet structure consisting of a 60-inch storm drain pipe, a 1,420 linear foot concrete collector channel into a 41-foot wide by 19.5-foot long by 4.5-foot high chute and baffle block stilling basin, approximately 1,330 linear foot of 7-foot wide by 6-inch height concrete low flow u-channels, Type II and concrete access roads/ramps around the entire perimeter and into the detention basin, graded native path for NV Energy access, a flood threat recognition station, riprap erosion control, and block and cable fencing around the basin perimeter.

104.04 MAINTENANCE OF TRAFFIC***ADD THE FOLLOWING TO THIS SUBSECTION:***

- F. The maximum amount of open trench permitted in any one location shall be per Section 624 of these Special Provisions.

END OF SECTION 104

SECTION 105 – CONTROL OF WORK

105.01 AUTHORITY OF THE ENGINEER

ADD THE FOLLOWING TO THIS SUBSECTION:

- E. The Engineer shall not direct Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and program incident thereto and will not be responsible for Contractor's failure to perform the work in accordance with the Contract.
- F. Engineer will not be responsible for the acts or omissions of the Contractor, or any Subcontractor or any of his or their agents or employees or any other persons at the site or otherwise performing any of the work.

105.02 PLANS AND WORKING DRAWINGS

ADD THE FOLLOWING TO THIS SUBSECTION:

- D. The Contractor shall make submittals for all materials prior to use. All submittals shall be via electronic communication (pdf at ≥ 300 dpi) unless otherwise approved by the Engineer.
 - 1. All submittals made and signed by the Contractor shall be accompanied by a submittal coversheet with the Contractor's review stamp and the Contractor's standard transmittal form, containing, at a minimum, the bid item to which the submittal pertains. All submittals are to be numbered by specification section then sequential submittal number (e.g. 203-001, 203-002, etc.).
 - 2. Any submittals not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for re-submittal.
 - 3. Items submitted by anyone other than the Contractor will be returned, without action, for resubmission by the Contractor.
 - 4. All submittals shall be carefully reviewed by an authorized representative of the Contractor prior to submission to the Engineer.
 - 5. Each submittal shall be dated, signed and certified by the Contractor as being correct and in strict conformance with the Contract Documents.
 - 6. All non-certified submittals will be returned to the Contractor without action taken by the Engineer and any delays caused thereby shall be the total responsibility of the Contractor.
- E. The Contractor shall submit any City of Las Vegas acceptance letters for asphalt concrete, aggregate and Portland Cement Concrete in lieu of test data.
 - 1. If the asphalt concrete, aggregate or Portland Cement Concrete mix designs are not on the current IQAC list of approved materials, a mix design for asphalt or Portland Cement Concrete or test data must be signed and approved by a Nevada Licensed P.E.
 - 2. The Contractor shall establish its bid price according to the mix designs that are delineated on the current IQAC list of approved materials.
 - 3. Any additional costs arising from mix designs submitted by the Contractor that are rejected for not meeting the IQAC criteria for any reason whatsoever shall be borne solely by the Contractor.

4. All mix designs are to be submitted thirty (30) days prior to anticipated material placement.
- F. The Engineer's review of working drawings submitted by the Contractor will cover only general conformity to the drawings, specifications and special provisions, external connections and dimensions which affect the layout. Unless otherwise specified within the Special Provisions, allow Owner fifteen (15) Working Days for each submittal review.
1. The Engineer's review does not indicate a thorough review of all dimensions, quantities and details of the material, equipment, devices or items shown.
 2. The Engineer's review of submittals shall not relieve Contractor from responsibility for errors, omissions, or deviations, or responsibility for compliance with the Contract Documents.
 3. Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.
- G. If a submittal is returned to the Contractor marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED", formal revision and resubmission of said submittal will not be required.
- H. If a copy of the submittal is returned to the Contractor marked "AMEND – RESUBMIT", or "REJECTED – RESUBMIT" the Contractor shall revise said submittal and shall resubmit to the Engineer.
1. When corrected copies are submitted, the Contractor shall indicate any revisions not made and any revisions made other than those called for by the Engineer on previous submissions.
 2. Manufacture, fabrications or purchasing of items prior to final acceptance is at the Contractor's own risk.

105.03 CONFORMITY WITH PLANS AND SPECIFICATIONS

ADD THE FOLLOWING TO THIS SUBSECTION:

- D. In the event the Contractor desires to perform work that does not conform with the plans and specifications, the Contractor will make a written request to the Engineer for review and approval.
- E. As a minimum, the written request will address the following:
1. The Contractor will demonstrate that the performed work is of equal or greater value than the work specified in the plans and specifications.
 2. Various requests may require the seal and signature of approval from a licensed Nevada Professional Engineer. Prior to submitting a request, the Contractor shall inquire as to whether the Owner will require the approval of an Engineer, and if so, the Contractor will be responsible for the associated costs of this review.

105.05 COOPERATION BY CONTRACTOR

DELETE PARAGRAPH "C" OF THIS SUBSECTION AND REPLACE WITH THE FOLLOWING:

- C. The Contractor shall provide his own mobile telephone, capable of making and receiving both local and long distance calls to allow communication with the Engineer and Resident Project Representative at all times. The contractor shall provide his own electronic device capable of receiving and sending e-mails from the field. The Contractor shall also provide his own electric power, potable water, construction water and sanitary facilities required in the performance of the work under the contract. All costs associated with these items shall be the responsibility of the Contractor.

105.06 COOPERATION WITH UTILITIES

ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION:

- R. The Contractor shall be responsible for verifying that each utility has responded to each notification.
- S. If, during the course of paving operations, the Contractor paves over water and/or gas distribution valves, the Contractor shall have no more than 48 hours to remove the asphalt over the valves and adjust the valves to grade. The Contractor shall be responsible for adequately marking all such valves prior to paving operations so as to readily locate them after paving. Adjustment of valves may require a temporary adjustment to dense grade prior to the permanent final adjustment to the top of finish grade.

105.08 CONSTRUCTION STAKES, LINES AND GRADES

DELETE THIS SUBSECTION IN IT'S ENTIRETY AND REPLACE WITH THE FOLLOWING:

- A. Construction staking work shall be required of the Contractor, as indicated in Section 622 "Construction Surveying by the Contractor" of these Special Provisions, and shall conform to all requirements therein.

DELETE SUBSECTION 105.09 "BLANK" OF THE USS IN IT'S ENTIRETY AND REPLACE WITH 105.09 "RECORD DOCUMENTS" AS DESCRIBED BELOW:

105.09 RECORD DOCUMENTS

- A. General Instructions
1. Ensure entries are complete and accurate. Current Progress Record Documents shall be available for review by the Owner, Owner's Consulting Engineer and the Owner's Construction Management Consultant (if applicable) at all times during the progress of the work.
 2. Store Progress Record Documents separate from documents used for construction.
 3. Neatly record information concurrent with construction progress. Maintain Progress Record Documents in a clean and orderly manner. The Contractor shall not conceal any work until the required record information has been recorded on the record document set. The Contractor shall bear the cost of uncovering any prematurely concealed work for required record documentation.
 4. Progress Record Documents shall be made available to the Owner, the Owner's Consulting Engineer and the Owner's Construction Management Consultant (if

- applicable) for review at the site, at progress meetings and during Owner's review of the monthly progress bill requesting payment
5. Failure of the Contractor to maintain a current record of information on the Progress Record Documents shall entitle the Owner to withhold payment until corrected. The release of payment to the Contractor shall be contingent upon the Contractor's diligent performance as required herein.
- B. Progress Record Documents - The Contractor shall maintain the following documents, which constitute the Progress Record Documents, at the job site during construction:
1. Drawings – Owner shall provide a full size copy of the approved set of drawings on bond paper for use as the Progress Record Document drawings prior to starting the work.
 - a. The Contractor will supplement the drawing set with approved drawings submitted as deferred submittals. The Contractor shall insert approved Addenda and revision sheets in front of the original sheet
 - b. The Contractor shall legibly mark each sheet to record actual construction including (but not limited to):
 - i. Measured horizontal and vertical locations of underground installations, utilities and appurtenances referenced to permanent surface improvements;
 - ii. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work;
 - iii. Field changes of dimension and detail;
 - iv. Details not on original Contract Drawings
 2. Specifications – The Contractor shall legibly mark and record at each product section description of actual products installed, including (but not limited to) the following:
 - a. Manufacturer's name and product model and number
 - b. Product substitutions or alternates utilized;
 - c. Changes made by addenda and modifications.
 3. The Contractor shall keep copies of and maintain a record of all Change Orders and any other modifications to the Contract.
 4. The Contractor shall keep copies of and maintain a record of all reviewed Shop Drawings, Product Data and Samples.
 5. The Contractor shall keep copies of and maintain a record of all Manufacturer's instructions for assembly, installation and adjusting.
- C. Final Record Documents - Upon completion of the work, including all punch list items and prior to Release of Retention, the Contractor shall provide to Owner a complete set of Final Record Documents. The Final Record Documents shall include (but not limited to) the following:
1. Final Drawings
 - a. The Contractor will supplement the drawing set with approved drawings submitted as deferred submittals. The Contractor shall insert approved Addenda and revision sheets in front of the original sheet including any revisions required for completion of the punch list
 - b. The Contractor shall legibly mark each sheet to record actual construction including, (but not limited to):

- i. Measured horizontal and vertical locations of underground installations, utilities and appurtenances referenced to permanent surface improvements;
 - ii. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work;
 - iii. Field changes of dimension and detail;
 - iv. Details not on original Contract Drawings;
 - v. Changes made during completion of the punch list.
 - c. The Contractor shall mark each sheet as "Record" or "As-Built"
- 2. Specifications
 - a. Manufacturer's name and product model and number
 - b. Product Substitutions or alternates utilized
 - c. Changes made by Addenda and modifications
 - d. Changes made during completion of the punch list.
- 3. Contractor shall keep copies of and maintain a record of all Change Orders and any other modifications to the Contract including any changes made during completion of the punch list.
- 4. The Contractor shall keep copies of and maintain a record of all reviewed Shop Drawings, Product Data and Samples including any additional shop drawings, product data and samples required for completion of the punch list.
- 5. The Contractor shall keep copies of and maintain a record of all Manufacturer's instructions for assembly, installation and adjusting and any Manufacturer's instructions for assembly, installation and adjusting required for completion of the punch list.

END OF SECTION 105

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.02 PERMITS, LICENSES, AND TAXES

ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION:

- B. The Contractor shall obtain Grading and/or Stockpile permits for on-site storage or disposal of materials from the City of Las Vegas Building Department prior to beginning the work.
- C. It shall be the Contractor's responsibility to determine if the permit requirements of Section 637 "Pollution Control" shall be required.
- D. The Contractor shall obtain a permit from the Las Vegas Valley Water District to use a hydrant as a water source.
- E. The contract documents detail the right-of-way and construction easement/AEPs and in some cases staging areas the contractor may occupy during the duration of the project and traffic control requirements associated with the occupation of said areas. If the contractor desires to use any areas outside the limits described in the drawings and specifications, he shall be responsible for meeting the requirements of Title 19 (The Zoning Code) or applicable requirements for jurisdictions outside of the City. The contractor shall obtain all permits required for the use of private property and provide copies to the City prior to any use of the site. If a temporary commercial permit is required for work performed on private property, the Contractor shall ensure that a temporary commercial permit is obtained through the City of Las Vegas Planning Department or other applicable jurisdictions prior to any use of the site. All work, fees, and scheduling associated with compliance to this subsection shall be borne entirely by the contractor and shall not be a justification for delay claims.

ADD THE FOLLOWING SUBSECTION TO THIS SECTION:

107.05 SAFETY

- A. General: Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The name and telephone number of the Contractor's safety officer shall be provided to the Contracting Agency. He shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. All employees engaged in the work and the other persons who may be affected thereby;
 - 2. All the work and all materials or equipment to be incorporated therein, whether in storage or on the project site, and
 - 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the work.
- B. Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them

from damage, injury or loss. He shall erect, install, employ and maintain, as required by the conditions and progress of the work, all necessary safeguards. Contractor's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and a "Notice of Completion" has been issued to the Contractor by the Engineer.

- C. Trench Safety: Trench Safety shall be per Subsection 208.03.01.

107.07 TRAFFIC AND ACCESS

ADD THE FOLLOWING TO PARAGRAPH "C" OF THIS SUBSECTION:

1. When the Contractor's construction operations encroach upon a sidewalk, walkway, or crosswalk area, the Contractor shall take special precautions to protect the pedestrian's safety including provisions to separate pedestrian traffic from the work area and vehicular traffic.
 - a. When pedestrian traffic is routed onto the roadway, at other than existing crosswalk locations, the Contractor shall use portable precast concrete barrier rails to separate the pedestrian traffic from the work area and vehicular traffic.
 - b. All portable precast concrete barrier rails shall be butted tight and pinned in accordance with the requirements of the NDOT Standard Drawing R-8.7.1, entitled "Portable Precast Concrete Barrier Rail."

DELETE PARAGRAPH "K" OF THIS SUBSECTION IN ITS ENTIRETY AND REPLACE WITH THE FOLLOWING:

K. Notifications:

1. The Contractor shall cooperate with, and give written notice to all emergency agencies, public entities, each resident, homeowner, homeowner association, business or school that will be affected by any part of the construction process, particularly concerning temporary interruptions to vehicular access.
2. This notice of the approximate schedule and explanation of work shall be distributed at least fourteen (14) days prior to commencement of work in the area.
3. A second written notice, as well as a verbal notice, including door-to-door communication shall be made at least twenty-four (24) hours prior to construction to remind all affected parties of the construction to take place.
4. The Contractor shall notify by phone the following agencies:

METRO DISPATCH	702-795-3111
FIRE DEPARTMENT DISPATCH	702-382-3001
AMBULANCE DISPATCH CENTER	702-384-3400
RTC – Bus Stop Closures, when applicable	

Contact Carl Scarborough, per SP 624.01.71	702-676-1608
RTC TRANSIT, when applicable	702-676-1731
CLARK COUNTY SCHOOL DISTRICT	702-799-8100 X 5395
NEVADA DEPT. OF TRANSPORTATION (NDOT), when applicable	702-385-6588
CLV - DEPT. OF PUBLIC WORKS PUBLIC INFORMATION SPECIALIST TRAFFIC ENGINEERING DIVISION	702-229-6581 702-229-6327
UNITED STATES POSTAL SERVICE	1-888-275-8777
REPUBLIC SERVICES	702-735-5151 X 314

5. The Owner shall receive a copy of all notifications for acceptance.

ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION:

- M. Construction materials may not be stored in streets, roads or highways for more than five days after unloading. All materials or equipment not installed or used in the construction within five days after unloading shall be stored elsewhere by the Contractor at his expense unless he is authorized additional storage time.
- N. Construction equipment shall not be stored at the work site before its actual use on the work nor for more than five days after it is no longer needed on the work. Time necessary for repair or assembly of equipment may be authorized by the Engineer.
- O. Excavated material, except that which is to be used as backfill in the adjacent trench, may not be stored in public streets, roads or highways unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.
- P. Wherever possible the contractor shall use high early strength concrete for final utility grade adjustments to facilitate reopening the road to traffic.

107.12 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION:

- J. Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in the performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site and the adjacent property.
- K. Contractor shall prevent erosion of soil on the site and adjacent property resulting from his construction activities. Effective measures shall be initiated prior to the commencement of

clearing, grading, excavation or other operation that will disturb the natural protection of the soil.

107.17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICE

ADD THE FOLLOWING PARAGRAPH TO THIS SUBSECTION:

- I. All utility valves, manholes, vaults, pull boxes, etc., which are buried, shall be conspicuously marked by the Contractor to allow their location to be determined by the Engineer or utility personnel under adverse conditions (i.e. inclement weather or darkness).

107.18 FURNISHING RIGHT-OF-WAY

ADD THE FOLLOWING PARAGRAPH TO THIS SUBSECTION:

- B. Contractor shall provide copy of necessary permits and written consent from property owner(s) prior to entering or occupying any lands outside the right-of-way or easement or where no Authorization to Enter Property exists.

ADD THE FOLLOWING SUBSECTIONS TO THIS SECTION:

107.70 CONTRACTOR'S RESPONSIBILITY TO THE PUBLIC

- A. The Contractor is responsible to answer and resolve any conflicts that may arise between a homeowner or business owner and himself during the construction process.

107.71 ALLOWABLE WORK HOURS

- A. No work between the hours of 6 p.m. and 7 a.m. will be allowed in residential areas unless approved by the Engineer or otherwise stated in the Special Provisions. If work after the aforementioned hours is approved, then the Contractor shall provide each affected resident at least forty-eight (48) hours written notice explaining the reason for the work after hours and providing an approximate duration of the activity.

107.72 NATURAL DRAINAGE AND STORM WATER RUNOFF

- A. The Contractor shall be responsible for protecting and preserving public and private property from damage directly or indirectly caused by drainage or storm water runoff leaving the project during construction of all improvements, including downstream properties if damage is a result of the Contractor's actions in diverting or redirecting existing natural runoff patterns.

END OF SECTION 107

**SECTION 201 – CLEARING AND GRUBBING
CONSTRUCTION**

201.03.03 CLEARING AND GRUBBING

DELETE PARAGRAPH “A” AND REPLACE WITH THE FOLLOWING:

- A. Surface objects and trees, stumps, roots, and other protruding obstructions, designated for removal, shall be cleared or grubbed or both. Unless otherwise specified, the Contractor may leave stumps and nonperishable solid objects provided they do not extend more than 6 inches above the ground line or low water level, and are a minimum of 3 feet below subgrade.

DELETE PARAGRAPH “B” IN ITS ENTIRETY:

ADD THE FOLLOWING TO THIS SUBSECTION:

- K. No stumps are allowed in the embankment footprint.

END OF SECTION 201

SECTION 202 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS**CONSTRUCTION****202.03.06 DISPOSING OF MATERIALS*****DELETE PARAGRAPH “A” AND REPLACE WITH THE FOLLOWING:***

- A. Unless otherwise provided, excavated material shall be used in backfilling excavations made in removing the structure, in constructing embankment, or otherwise disposed of in a manner satisfactory to the Engineer. When excavated material is used for backfill or constructing embankment it must be in accordance with Subsection 207.02.01, "Selected Backfill."

END OF SECTION 202

SECTION 203 – EXCAVATION AND EMBANKMENT**DESCRIPTION****203.01.01 GENERAL*****ADD THE FOLLOWING PARAGRAPH TO THIS SUBSECTION:***

- B. The compacted subgrade shall be maintained at optimum moisture content until placement of an aggregate base course.

CONSTRUCTION**203.03.10 SELECTED MATERIAL*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****203.03.16 EMBANKMENT MATERIALS*****DELETE PARAGRAPH "C" IN ITS ENTIRETY:******DELETE PARAGRAPH "E" IN ITS ENTIRETY:*****203.03.17 PLACING EMBANKMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****203.03.18 COMPACT, DIRT EMBANKMENT*****DELETE PARAGRAPH "E" AND REPLACE WITH THE FOLLOWING:***

- E. The top 8 inches of the base of cuts and natural ground having less than 5 feet of embankment, measured from the subgrade, and all embankment material, shall be compacted to not less than 95 percent relative compaction unless otherwise specified. When natural ground material is encountered that cannot be compacted to the required density, compaction requirements shall be determined by the Engineer.

ADD THE FOLLOWING SUBSECTIONS TO THIS SECTION:**203.03.70 OVEREXCAVATION AND BACKFILL**

- A. Where overexcavation below the depths as shown on the plans or required by the specifications is necessary to remove unsuitable material, the Engineer may require the Contractor to remove the unsuitable materials and backfill to the finished graded section with Type I aggregate base, conforming to 3-inch size per subsection 704.03.03, compacted to a minimum of 95% of ASTM D1557 Modified Proctor and in accordance with the methods in the USS.

- B. Unless otherwise provided in the Special Provisions, overexcavation and backfill below the limits shown on the plans will be paid for as "Extra Work".

203.03.71 HAZARDOUS MATERIAL

- A. Hazardous material shall be defined as material or water contaminated with volatile organic compounds, inorganic non-metals, petroleum hydrocarbons or other contaminants as specified by the Nevada Division of Environmental Protection Agency (NDEP).
- B. The Contractor shall retain a Certified Environmental Manager (CEM) for making periodic inspection of the project for potential hazardous materials. In addition, the CEM will be available for inspection of the project as directed by the Engineer and/or NDEP should material be uncovered that may be potential hazardous material.
- C. When potential hazardous material is encountered with the project, the Contractor shall:
 - 1. Immediately contact the CEM, Engineer and City of Las Vegas Environmental Officer.
 - 2. Have the CEM perform the inspection of the potential hazardous material and if required perform the inspection for the removal and disposal of the hazardous material.
 - 3. Retain a certified geotechnical firm to perform the required tests for hazardous materials and/or contaminants.
 - 4. If required, perform the removal and disposal of the hazardous materials as directed by the CEM, Engineer and/or City of Las Vegas Environmental Officer in coordination with NDEP.

203.03.72 EXCAVATION

- A. It is expected excavation for storm drain and detention basin items will require removal of various types of material, including cemented soils and rock (i.e. caliche).
- B. Prior to construction, baseline distress evaluation by a qualified professional shall be conducted by the Contractor. The evaluations shall document existing distress to the structures and other improvements in the area of work.
- C. Vibration monitoring by a qualified professional shall be conducted by the Contractor during excavation of cemented soils. The Contractor shall be required to conduct impact assessment tests of the equipment excavating cemented soils prior to construction. The Contractor shall submit an Impact Assessment Test Plan and Impact Assessment Test Results. The frequency and amplitude of the vibratory equipment shall be calibrated and used to measure ground velocity for conformance to the current regulatory limit of 0.5 inch per second peak ground velocity at the nearest affected structure. The measurements shall comply with the recommendations of the "Office of Surface Mining, Blasting Guidance Manual, 1987."

- D. The Contractor shall submit to the Owner a plan detailing his proposed excavation techniques. This excavation plan shall include the results of a seismic survey performed by a certified seismic survey firm. The plan must show all proposed locations of excavation operations utilizing methods involving headache balling, hoe ram, or other techniques. The excavation plan shall include recommendations from certified seismic survey firm for limiting ball weights, height of drop, etc. for all areas headache balls and/or hoe rams techniques are proposed. In addition, the plan must include the results of a pre-excavation survey and a seismic monitoring plan. The excavation plan shall also include as a minimum; detailed examination of adjacent structures, including videotaping and installation of crack monitoring tape along existing structural cracks. The excavation plan must be approved by the Owner prior to construction.
- E. If damage to structures becomes evident, the Contractor shall immediately cease his excavation operations and submit a new excavation plan detailing new or modified methods to end the adverse effects. The Contractor shall make no claims for any delay caused by the re-submittal nor any additional expense resulting from changing his proposed excavation methods.
- F. The excavation plan shall be updated and resubmitted to the Owner any time the Contractor proposes altering his methods. The plan(s) will be considered shop drawings and will be handled as such. The Contractor shall make no claim for any losses resulting from delays during the review of these submittals in accordance with the limitations detailed for shop drawings in these specifications.
- G. The Contractor's methods for excavation are solely his responsibility. Approval of the excavation plan by the Owner will in no way limit the Contractor's liability regarding property damaged and subsurface damage beyond the excavation limits by his operations, nor will it alter the Contractor's sole responsibility for the safety of his operations. The Contractor shall be responsible for all damage caused by his excavation operations and be responsible for answering all complaints. Provide the Owner with advance warning of the use of excavation techniques which may lead to property damage, to review the proposed techniques, to confirm general compliance with these specifications, and to allow monitoring of the excavation methods.
- H. Excavations near mapped alluvial faults shall be inspected by a qualified professional prior to RCP/RCB installation. If a fault is encountered, appropriate remedial action shall be taken by the Contractor per geotechnical recommendations.

203.03.73 COMPACTED FILL

- A. Compacted fill will consist of native material excavated, hauled, screened, placed, and compacted within the neat lines shown on the Drawings and as specified in Subsection 203.03.16.
- B. All fill materials shall be placed in continuous horizontal layers in maximum 8-inch loose lifts. Each layer shall be moisture conditioned to within 2 percent of optimum moisture content and compacted by rolling with compaction equipment methods to at least 95 percent of the maximum dry density as determined by ASTM D1557.

- C. The existing soil in areas to receive fill along the dam embankment shall be scarified to a minimum of 8 inches, reworked, moisture conditioned, and recompact to at least 90 percent of the maximum density as determined by ASTM D1557. The depth of excavation, replacement, and compaction may be reduced or increased by the Owner's representative depending on his visual inspection of uncovered soils. Hard cemented soils may result in a decrease in required excavation depth while partially cemented soils or soft spongy or deleterious soils may result in an increase in required excavation depth. Any increase in depth shall comply with Subsection 203.03.70, Over-Excavation and Backfill.

203.03.74 EMBANKMENT PROTECTION

- A. Completed excavation and embankment grading planes and other disturbed areas within the limits of construction shall be protected by soil stabilizer placed on all exposed soil surfaces. Soil stabilizer shall be applied to all disturbed soil areas not specified to be covered with riprap, decomposed granite, aggregate base, asphalt pavement or other surfacing. Unless otherwise specified in these Special Provisions, herbicide shall not be placed on any surfaces within the detention basin.
- B. Apply soil stabilizer within 14 days of when no further disturbance of the surface will be made. Protect all structures, walls, landscaping, etc. from overspray. Store and handle soil stabilizer in accordance with the manufacturer's recommendations. Do not spray when weather conditions are windy. Windy conditions are defined as a sustained wind of 8 mph or more, or any condition that may cause dispersal of material to be difficult or inaccurate. Soil stabilizer shall form a crust like barrier within 4 to 8 hours. The use of accelerators is recommended.
- C. Soil stabilizer shall be PLAS-TEX, Enviro-Shield Bonded Fiber Matrix, or approved equal and shall be applied at the manufacturer's recommended application and dilution rates.
- D. Add a color pigment to the soil stabilizer at the time of application. Apply a suitable pigmentation to the soil stabilizer slurry such that is used for pigmenting concrete at an application rate of 50 pounds per acre. The color of the pigmentation shall be approved by the Engineer.

203.03.75 QUALITY CONTROL TESTING

- A. Quality control testing will be performed for Dam Safety Permit compliance in accordance with the State Engineers Office. The testing will be performed by an independent testing laboratory.
- B. The Contractor shall schedule his operations so as to allow and facilitate quality control testing by the independent laboratory.
- C. The following standard tests will be used as a basis for classifying soil materials and for control testing:

<u>Test Designation</u>	<u>Test</u>
ASTM C136 AASHTO T27	Test for Sieve or Screen Analysis of Fine and Course Aggregates
ASTM D1556	Density of Soils In-Place by the Sand-Cone Method
ASTM D1557 AASHTO T180	Moisture-Density Relations of Soils and Soil Aggregate Mixing Using 10 Pound Rammer and 18-Inch Drop
AASHTO T310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D4318 AASHTO T89/T90	Plasticity Index of Soils
AWWA 4500E	Maximum Sulfate Content
Southern Nevada Amendments to the Building Code	Maximum Expansive Potential 60 psf
ASTM C117	Test for Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing
ASTM D422	Particle-Size Analysis of Soils

- D. Two representative soil samples of imported fill will be performed at the beginning of construction. Additional tests will be conducted to classify and establish the moisture density relationship for each type of soil encountered in areas that may yield excavated materials suitable for placement in embankment. Whenever the material encountered is different from previously tested material, a new set of classification and moisture-density tests will be performed.
- E. The number of locations of in-place density tests for embankment and compacted fill construction shall be sufficient to determine that each layer of material placed in embankment has been compacted adequately to obtain the density specified therefore. The minimum number of in-place density tests by ASTM D1556 and AASHTO T310 procedures will be one for each 5,000 square feet per 8-inch lift of fill.
- F. The following standard tests will be used for concrete material quality control testing:

<u>Test Designation</u>	<u>Test</u>
ASTM C1064	Temperature of Freshly Mixed Portland Cement Concrete
ASTM C143	Slump of Hydraulic Cement Concrete
ASTM C173/C231	Air Content of Freshly Mixed Concrete

ASTM C39

Compressive Strength of Cylindrical Concrete Specimens

- G. The concrete will be tested a minimum of once per day and per every 100 cubic yards placed.
- H. The above frequency of tests is approximate and is provided for the Contractor's information in planning Contractor's work and interruptions during testing. The actual number of tests will depend on the variability of materials being placed and uniformity of the Contractor's placement operations.
- I. Quality control test data will be reviewed and submitted monthly. All quality control test data will be compiled in a final report and submitted at the completion of work for Dam Safety Permit compliance. All reports submitted to the City shall be stamped by a Nevada Registered Professional Engineer.

203.03.76 CALICHE EXCAVATION

- A. Caliche is anticipated to be encountered on this project and is defined as a rock-like material that occurs in soil deposits erratically in thickness, hardness, and lateral extent and it is therefore difficult to predict in terms of interference with below-grade construction. Contractor shall take adequate precautions to reduce the potential for vibrational damage to adjacent or nearby structures when using heavy impact equipment during removal of caliche. In the event structures are damaged, Contractor shall be responsible for all repairs.
- B. Generation of oversized material (rocks or hard chunks greater than 6 inches nominal diameter) shall be anticipated by Contractor when excavating caliche. Oversize material shall be crushed prior to being used as structural fill, backfill, and compacted fill, or disposed of in a suitable manner.

METHOD OF MEASUREMENT**203.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****203.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 203**

SECTION 206 – STRUCTURE EXCAVATION**DESCRIPTION****206.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. Where structure over-excavation below the depths as shown on the plans or required by the specifications is necessary to remove unsuitable material, the Engineer may require the Contractor to remove the unsuitable materials and backfill to the required grade with material conforming to subsection 704.03.02, compacted to a minimum of 90% of ASTM D1557 Modified Proctor and in accordance with the methods in the USS.
- D. If groundwater is encountered within the excavated area, dewatering shall be performed as specified in Section 270 "Dewatering".

METHOD OF MEASUREMENT**206.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****METHOD OF PAYMENT****206.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 206**

SECTION 207 – STRUCTURE BACKFILL**MATERIALS****207.02.01 SELECTED BACKFILL*****DELETE PARAGRAPH "A" AND REPLACE WITH THE FOLLOWING:***

- A. Selected backfill shall be of a quality acceptable to the Engineer and shall consist of suitable material from the excavation complying to Table 1 and Table 2. It shall be free from sod, frozen earth, organic materials, rubbish, or debris. If the material does not comply with Table 1, it may be used only if approved by the Engineer.

CONSTRUCTION**207.03.01 SELECTED BACKFILL*****DELETE PARAGRAPH "C" AND REPLACE WITH THE FOLLOWING:***

- C. Mechanically compacted backfill shall be placed outside of the dam embankment footprint in layers of thickness compatible with the characteristics of the backfill and the type of equipment being used. Backfill material shall be placed in uniform horizontal layers with a maximum compaction depth of 12 inches and a maximum loose lift of 16 inches and shall be brought up uniformly on all sides of the structure or improvement.

207.03.03 PLACING AND COMPACTING AT CULVERTS***DELETE PARAGRAPH "A" AND REPLACE WITH THE FOLLOWING:***

- A. After the bedding has been prepared and the culverts installed or constructed as required by the pertinent specifications, "Selected Backfill" or "Granular Backfill" shall be placed along both sides of the culvert equally in uniform layers such that the elevation of the top of the backfill on either side of the culvert does not exceed the elevation of the top of the backfill on the other side of the culvert by more than 6 inches. The thickness of each layer outside of the dam embankment footprint shall be compatible with the characteristics of the backfill and the type of equipment being used, but shall not exceed 12 inches in depth after compaction nor a loose lift of 16 inches. Each layer shall be wetted as required and thoroughly compacted to the density requirements as set forth in Subsection 207.03.01, "General."

ADD THE FOLLOWING TO THIS SUBSECTION:

- F. The thickness of each layer of "Selected Backfill" within the dam embankment footprint shall not exceed 8 inches in depth after compaction.

DESCRIPTION

METHOD OF MEASUREMENT

207.04.01 MEASUREMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

METHOD OF PAYMENT

207.05.01 PAYMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

END OF SECTION 207

SECTION 208 – TRENCH EXCAVATION AND BACKFILL**DESCRIPTION****208.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- E. Frequency of quality control field inspection and testing shall be in accordance with 203.05.02 Testing.
- F. Ponding and jetting will not be allowed on City of Las Vegas projects.

MATERIAL***ADD THE FOLLOWING SUBSECTION TO THIS SECTION:*****208.02.70 STRUCTURAL BACKFILL**

- A. Structural backfill shall consist of material conforming to subsection 207.02.02 "Granular Backfill" or subsection 207.02.01 "Selected Backfill". Additionally, the backfill material shall be non-gypsiferous (solubility less than 4%), have an expansion potential less than 4%, shall be free of vegetation and debris and contain no rocks larger than four inches nominal diameter.

CONSTRUCTION**208.03.01 TRENCH EXCAVATION, GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. Trenching and shoring operations shall be conducted in accordance with 29 CFR (Code of Federal Regulations) Part 1926, Occupational Safety and Health Standards (OSHA) – Subpart P – Excavations (July 1, 1990).

208.03.03 MAXIMUM TRENCH WIDTH***DELETE PARAGRAPH "B" AND REPLACE WITH THE FOLLOWING:***

- B. Except when otherwise specified or ordered by the Engineer, the bottom of the trench shall be excavated uniformly to the grade or depth indicated on the drawings. The maximum amount of open trench permitted in any one location shall be per Section 624 of these Special Provisions. Trench shall be considered open until backfilled to the top of subgrade. Trenches crossing streets shall be completely backfilled immediately after pipe, wire, or conduit installation.

208.03.09 TRENCH BACKFILL***ADD THE FOLLOWING TO THIS SUBSECTION:***

- B. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.12 PIPE BEDDING***DELETE ITEM 1, PARAGRAPH "C" AND REPLACE WITH THE FOLLOWING:***

1. Compaction density minimum = 95 percent of the maximum density as determined by test method AASHTO T180 with exception of the middle uncompacted area.

ADD THE FOLLOWING TO THIS SUBSECTION:

- G. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.13 HAUNCH ZONE BACKFILL***ADD THE FOLLOWING TO THIS SUBSECTION:***

- E. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.14 INITIAL ZONE BACKFILL***ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.15 FINAL ZONE BACKFILL***ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.16 DRAIN BACKFILL***ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.17 COMPACTION***ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. When backfilling within a dam embankment footprint, material must be in accordance with Subsection 207.02.01, "Selected Backfill" and compaction must be in accordance with Subsection 203.03.73, "Compacted Fill."

208.03.21 CUTTING AND RESTORING STREET SURFACING***ADD THE FOLLOWING TO THIS SUBSECTION:***

- Q. Pavement in the area of the trench excavation shall be sawcut.
- R. Cold mix patches will not be allowed.

METHOD OF MEASUREMENT**208.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****208.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 208**

ADD THE FOLLOWING SECTION TO DIVISION II – CONSTRUCTION DETAILS**SECTION 270 – DEWATERING****DESCRIPTION****270.01.01 GENERAL**

- A. This work shall consist of furnishing all materials, labor, equipment and supervision to design, install, operate, remove dewatering systems and to lower the water table sufficient to prevent ground water from entering excavations.
- B. The work shall also consist of, but is not necessarily limited to, the proper disposal of groundwater removed by a dewatering system **in accordance with local, state, and federal regulations**. Prior to discharging groundwater into the storm drain system, the Contractor shall be responsible for obtaining the groundwater discharge permit from the Nevada Division of Environmental Protection, comply with the conditions of the permit and pay all costs associated with the permit requirements such as permit fees, laboratory analysis and treatment of the discharge water, if required. The permit application can be downloaded at: ndep.nv.gov/BWPC. Sampling and laboratory analysis shall be completed by Nevada Certified Environmental Manager and Certified Laboratory.
- C. Dewatering shall conform to the requirements of Section 208 "Trench Excavation and Backfill" and Section 502 "Concrete Structures" unless otherwise specified herein.

MATERIALS**270.02.01 GENERAL**

- A. At or prior to the preconstruction conference, the Contractor shall submit the dewatering plan showing method of dewatering, piping locations, discharge points, sewer and storm drainage facilities utilized and estimated discharge quantities.

CONSTRUCTION**270.03.01 GENERAL**

- A. Dewatering for structures and pipelines shall commence when groundwater is first encountered and shall be continuous until such times as water can be allowed to rise in accordance with the following provisions. Dewatering shall be conducted such that no concrete footings or floors or pipelines are placed in water nor shall water be allowed to rise over them until the concrete or mortar has set at least eight (8) hours. Water will not be allowed to rise in pipeline trenches or drained excavations until pipelines or facilities are backfilled or restrained to prevent flotation.
- B. The Contractor shall remove all dewatering equipment and materials at the completion of the work or as otherwise directed by the Engineer.

- C. The dewatering system shall be kept in operation until all work in the excavation is backfilled and properly compacted to a point three (3) feet above the existing water table elevation.
- D. The Contractor shall arrange for and provide all necessary utilities to operate the dewatering system.

270.03.02 POINT OF DISCHARGE

- A. The Contractor shall dispose of groundwater removed by the dewatering system into the storm drain system in accordance with local, state and federal regulations.

END OF SECTION 270

ADD THE FOLLOWING SECTION TO DIVISION II – CONSTRUCTION DETAILS**SECTION 310 – SOIL CEMENT SLOPE TREATMENT****DESCRIPTION****310.01.01 GENERAL**

- A. This section covers high compressive strength and low compressive strength soil cement concrete in addition to bedding mix, and also includes requirements for producing, transporting, placing, compacting, curing, and other work appurtenant to constructing soil cement concrete. In these Specifications, high strength and low strength soil cement concrete differ in aggregate, cement, water, and performance requirements. All other requirements contained herein including producing, transporting, placing, compacting, curing, performing quality control, etc. apply to all soil cement regardless of its strength classification.
- B. Soil cement concrete shall be placed and compacted to the line, grades, and sections indicated on the drawings. Bedding mix to be used for special treatment of cold joints in soil cement structures shall consist of fine aggregate, cement, and water.
- C. The Contractor shall have full responsibility for administration of a Quality Control Plan for soil cement concrete, which shall meet the same quality control requirements of Section 106 of the Standard Specifications.

310.01.02 GOVERNING STANDARDS

- A. Except as modified or supplemented herein, all materials and construction methods for soil cement work shall comply with the applicable provisions of the ACI and ASTM standards specified.
- B. Mix design proportions will be determined by the Contractor and meet the specification requirements contained herein.

MATERIALS**310.02.01 MATERIALS**

- A. Materials used for soil cement concrete shall conform to the following requirements and no substitutions or alternate material sources shall be permitted without the advance approval of the Engineer:

(a) Portland Cement	ASTM C150, Type V, having a maximum tricalcium aluminate content of 5 percent.
(b) Pozzolan	ASTM C618, Class F.
(c) Water	ASTM C94.

(d) Admixtures (optional)

Retarder ASTM C494, Type D.

(e) Fine Aggregate

Natural onsite soil, or crushed rock, clean and free of organic contaminants (solid or chemical). Clay lumps or balls larger than 2-inch shall be pulverized to pass a No. 4 sieve prior to mixing.

(f) Coarse Aggregate

Natural onsite soil, or crushed rock. Sound crushed rock, in accordance with ASTM C33, free of potential alkali reactivity. Gradation shall be as required to achieve the blended aggregate requirements as specified herein.

(g) Bedding Mortar Aggregate

Neat cement slurry. Mixture of cement, fly ash if desired, and water without any aggregate. Artificial or manufactured sand will not be acceptable.

310.02.02 BLENDED AGGREGATE REQUIREMENTS

- A. Contractor shall screen, blend, and otherwise process aggregates from onsite sources to produce a blended soil cement aggregate with a plasticity index of zero that meets the following requirements in accordance with ASTM C136:

LOW STRENGTH SOIL CEMENT BLENDED AGGREGATE REQUIREMENTS	
U.S. Standard Sieve	Percent Passing By Weight
1"	100
No. 4	30 - 80
No. 200	0 - 25

HIGH STRENGTH SOIL CEMENT BLENDED AGGREGATE REQUIREMENTS	
U.S. Standard Sieve	Percent Passing By Weight
1"	100
3/4"	80 - 100
No. 4	30 - 50
No. 30	10 - 25
No. 200	3 - 12

310.02.03 ONSITE AGGREGATE

- A. Geotechnical analysis indicates that processed onsite aggregate is acceptable for the soil cement mix. Onsite material should be screened of material larger than 1 inch in diameter. Crushing of oversize material for use in soil cement mix is acceptable and is encouraged to increased fractured faces in the mix. Screening (e.g. at the number 4 sieve) of onsite

aggregates and recombining stockpiles (e.g. 50-50 mix) may be required in order to meet specified gradation. Processing methods for aggregate production, including any washing, shall be at the Contractor's discretion.

- B. Contractor shall provide necessary aggregate to allow for overbuild, stockpile bases, trial placement, testing, waste, and materials used for Contractor's convenience.
- C. Unless otherwise approved, Contractor shall maintain sufficient quantities of aggregate on-site for a minimum of three days of soil cement placement at the maximum anticipated production rate.

310.02.04 ADMIXTURES

- A. If used, the admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's recommendations for minimum shrinkage and for compliance with these specifications. Retarding admixture may be used in all soil cement.

310.02.05 BEDDING MIX

- A. Use bedding mix as shown in the drawings between the foundation and soil cement and wherever required between layers of soil cement. Retard bedding mix so that its initial set time exceeds 3 hours at 95° F. It may be re-tempered within this time period before it is spread on the foundation or lift surface. Spread bedding so that the maximum thickness over rock foundations does not exceed 2-Inches or 3/4-Inch on soil cement surfaces. Spread bedding mix to a minimum thickness of 1 inch on rock foundations and 3/8-Inch on soil cement lift surfaces. Spread soil cement over the bedding and begin compacting within 45 minutes from the time the bedding mix was discharged. Use mix proportions of fine aggregate, cement, and water developed by the Contractor, based on trial mix testing approved by the Engineer. Use materials of the same type and from the same source as those used for the trial-mix testing. Proportion the bedding mix within the following general guidelines:

Slump (placed on soil cement)	7 to 9 Inches
Maximum aggregate size	3/8-Inch
Minus 200 material (aggregate)	2% maximum
Water reducing admixture	may be required
Design strength (28 day)	2500 psi minimum
Retarder	as required to achieve the required delayed set time

- B. Admixtures may be introduced into the mix to maintain its workability. Proportion the mix to be broomable and to minimize segregation. Batch bedding mix either on-site or offsite and transport to the lift surface by crane and bucket, transit truck mixer, pump, or other methods approved by the Engineer. Do not use conveyor delivery unless it can be demonstrated that the mix can be transported on the conveyor without any segregation. The mix design shall have 15% to 30% Pozzolan substituted for cement, by volume, provided that all other specification requirements are met.

310.02.06 SOIL CEMENT MIX DESIGNS

- A. At least 90 days prior to construction of the soil cement test sections, Contractor, using the services of an independent testing laboratory acceptable to Owner, shall prepare soil cement mix designs and trial batches for the high strength and low strength mixes. The mix designs and testing shall be conducted under supervision of a Professional Engineer registered in the State of Nevada. Certified reports covering the materials, mix designs, and test results shall be submitted to the Engineer for review.
- B. Mix designs were approximated by Geotek and can be reviewed in the geotechnical report. Based on a preliminary evaluation of potential onsite aggregates are based on these preliminary designs. For estimating purposes, it is assumed the low strength soil cement mix design contains 4.5% Portland Cement by weight and the high strength soil cement mix design contains 11.5% Portland Cement by weight, based on the dry unit weight of the soil cement. The mix design shall have 0% to 30% Pozzolan substituted for cement, by volume, provided that all other specification requirements are met. The final mix designs will be determined by the Contractor's independent testing laboratory based on the following performance specifications:

Performance Specifications for Low Strength Soil Cement	
Minimum 28 day Compressive Strength of Test Cylinders	750 psi
Minimum 28 day Compressive Strength of Core Samples	750 psi

Performance Specifications for High Strength Soil Cement	
Minimum 28 day Compressive Strength of Test Cylinders	2,000 psi
Minimum 28 day Compressive Strength of Core Samples	2,000 psi

The Contractor is solely responsible for conforming to the performance specifications and may adjust proportions as needed to conform to them. Written approval of the Engineer is required for each mix design change, which must include new mix proportions and test results verifying it conforms to the performance specifications.

The mix design shall include the following information as a minimum:

1. Batch weights or proportions and specific gravities for each proposed aggregate size, water, cement, pozzolan and if required, filler.
2. AASHTO T-180 and ASTM D558 maximum density and optimum moisture.
3. Moisture content and dry density of compressive strength specimen.
4. Water/cement ratio of compressive strength specimen.
5. Compressive strength of soil cement at ages 7, 14, and 28 days and 2 specimens based on an average of at least 3 specimens at an age of 28 days and 2 specimens for other ages.

6. Recommended factor of safety used to determine the cement content that will reasonably assure compliance with the strength requirements.

CONSTRUCTION

310.03.01 SUBMITTALS

A. Placement Plan Submittal

Thirty (30) days prior to beginning soil cement placement, Contractor shall prepare and submit a Soil Cement Placement Plan. The plan shall include sketches and a written narrative containing the following information:

- | | | |
|-----|----------------------------|--|
| (1) | Working Hours | Tentative hours of work |
| (2) | Material Storage | Size and capacity of aggregate, cement, fly ash, Pozzolan, and water storage facilities. |
| (3) | Plant | Type, model and description of mixing plant proposed for use. Maximum hourly capacity and anticipated average hourly production rates. Calibration report. |
| (4) | Control of Mix Proportions | Location and type of measuring equipment used to control proportions of all mix ingredients. |
| (5) | Layout Diagram | Diagram showing location of plant, storage facilities, and stockpiles. |
| (6) | Equipment | General description of type and size of equipment to be used for transporting, conveying, placing, spreading, and compacting soil cement. |
| (7) | Form Systems | Description and sketches of forming systems. |
| (8) | Curing | General description of curing plan. |

B. Material Submittals

- | | | |
|-----|----------------------|--|
| (1) | Cement and Pozzolan: | Submit source(s) of cement and Pozzolan. |
| (2) | Aggregates: | Submit source(s) of all aggregates. |
| (3) | Delivery Schedule: | Submit delivery and production schedule for all materials. |

C. Testing Laboratory Material Submittals

Contractor shall submit representative production samples of cement, Pozzolan, aggregates, and admixtures to the independent testing firm laboratory selected by the Contractor and approved by the Owner 90 days prior to soil cement placement. Contractor shall submit samples that are representative of those proposed for the project and include manufacturer's test reports indicating compliance with applicable specification requirements and showing all chemical and physical properties. Contractor shall identify all materials with labels and/or tags as appropriate, and provide minimum quantities of materials as shown in table below:

TESTING LABORATORY MATERIAL SUBMITTALS	
MATERIAL	QUANTITY
Fine Aggregate	2 tons
Coarse Aggregate	2 tons
Cement (in barrels or sealed bags)	0.3 ton
Pozzolan (in barrels or sealed bags)	0.15 ton
Water	Furnished by laboratory
Admixtures (if proposed by Contractor)	1 gallon each

D. Mix Design Submittals

- (1) Bedding Mix Design: Submit mix design and test results for bedding mix showing that the selected mix meets the requirement of Subsection 310.03.05. Submit 28-day compressive strength test results no later than 90 days following Notice-to-Proceed.
- (2) Soil Cement Mix Design: Submit mix design and test results for soil cement mix showing that the selected mix meets the requirement of Subsection 310.02.06. Submit 28-day compressive strength results no later than 90 days prior to the planned start of soil cement activities.

E. Soil Cement Aggregate Production, Delivery Plan, and Schedule Submittal

Prepare and submit to the Engineer for approval, a production and delivery schedule and a plan for stockpiling aggregate onsite. If onsite aggregate is not used for soil cement, submit a plan for transporting the soil cement aggregates from the aggregate plant(s) to the soil cement plant site. Include a map showing the proposed haul route(s); traffic control measures; the number, type, and weights (fully loaded) of haul vehicles to be employed; and height and weight restrictions for all bridges located along the proposed route(s).

F. Delivery Ticket Submittals

Submit delivery tickets for each delivery of cement, Pozzolan, and bedding mix. Include the source, date manufactured or produced, type or class, Contractor's name, project name, and a

certification that the material meets the specification requirements. Include the following information on each delivery ticket for each load or batch of bedding mix:

- (1) Name and location of batch plant
- (2) Ticket number
- (3) Load and truck number
- (4) Date
- (5) Destination
- (6) Concrete class
- (7) Batch weights for all materials
- (8) Amount of concrete
- (9) Time mixer charged with concrete
- (10) Recording of revolution counter (transit-mixed concrete)
- (11) Space for initials of receiving party

G. Hot and Cold Weather Concreting Submittals

Submit proposed plan for placing soil cement during hot and cold weather conditions. Include planned procedures for heating and/or cooling materials, use admixtures, and protection of completed work.

H. Quality Assurance Plan Submittal

At least 30 days prior to soil cement placement, Contractor shall submit a Quality Assurance Plan to the Engineer. The Quality Assurance Plan shall include the names and qualifications of personnel involved in the Contractor's quality assurance program, a description of the procedures and frequency of testing, and a tentative format for the daily plant reports as specified in Subsection 310.03.10.

310.03.02 ENGINEER REVIEW

- A. Owner will review the Soil Cement Placement Plan and Quality Assurance Plan for general conformance with the project requirements and for the purpose of planning its own quality control testing and inspection activities. Contractor must obtain Engineer's approval of all submittals in this section prior to placing soil cement.

310.03.03 SOIL CEMENT TEST SECTION

- A. Prior to beginning placement of the permanent soil cement, the Contractor shall place low strength and high strength soil cement test sections using the mix designs prepared by the independent laboratory. The Contractor shall demonstrate the quality, efficiency, and workability of all the materials and equipment necessary for uninterrupted production and placement of the soil cement, expect that conveyor placement will not be required. Tasks are to include lift surface cleaning, compaction, density testing, cold joints, bedding mix placement, and forming and/or shaping of steps and training walls. Trial placement shall not be initiated until the plant and all equipment required for delivery and placement of the soil cement are operational and fully calibrated. Contractor shall demonstrate various spreading and compaction procedures including, but not limited to, various equipment types and number of passes. The Contractor shall use personnel on the test sections who will be working

directly on the low strength and high strength sections of the project in order to familiarize them with the process and products.

- B. The test section for high strength soil cement and low strength soil cement will be constructed at a location determined by the Engineer and agreeable to Contractor. The test section shall consist of three twelve inch thick lifts of soil cement approximately 100 feet long at the base. The lift width shall be 8 feet. The total volume of high strength soil cement test section will be approximately 30 cubic yards.
- C. The Contractor shall construct the first two lifts, and discontinue work for 24 hours. At that time, the Contractor shall prepare the surface for a cold joint in accordance with Subsection 310.03.07, and proceed with placing the remaining lift.
- D. The trial section is to be placed 28 days prior to production of the remaining soil cement work. Acceptance of the trial section is predicated upon achieving the required strengths.

Subgrade Preparation

The foundation soil for the test section shall be cleared, graded, and compacted in accordance with Section 203. The soil cement and bedding mortar shall be placed with the methods and in the sequence that will occur during the actual construction.

Mixing

Soil cement for test sections constructed shall be batched and mixed in accordance with the same requirements specified in Subsection 310.03.06.

Placement

Soil cement placement for test section construction shall be placed, spread, and compacted in accordance with the requirements specified in Subsection 310.03.06. Equipment used for hauling and placing soil cement shall be clean and free of deleterious substances.

Testing and Quality Control

Prior to initiating the trial placement, Contractor shall perform testing of the aggregates in accordance with the requirements of Subsection 310.03.11 to demonstrate that specification requirements are met. Contractor shall also perform all other tests and quality control measures identified in Section 310.03.11 during the trial placement. In addition, the Engineer will perform his own tests and inspections and the Contractor should anticipate interruptions. Contractor shall allow 3 days from the completion of his work to accommodate such tests and inspections of the trial section until production can begin so the Engineer can perform his evaluation of the test section.

Review Meeting

After completing construction of the test sections but prior to beginning soil cement construction, Contractor, Engineer, and Owner will assemble at a time and location determined by Owner to

discuss the results of test section construction and the suitability of the soil cement mixtures. Soil cement mix proportions may be adjusted based on results obtained from test section construction.

310.03.04 JOB CONDITIONS

A. Cement and Pozzolan Delivery, Storage, and Handling

Cement and pozzolan for soil cement shall be stored in separate bins. Storage bins in which built cement and pozzolan are stored shall be weather tight and protected from exposure to moisture. Interior surfaces of storage bins shall be clean and free of deleterious substances to the satisfaction of the Engineer prior to storage. Each shipment of cement and pozzolan shall be stored in chronological order based on delivery date at the job site and shall be used in the same chronological order to prevent undue aging.

B. Temperature of Cement

Deliver cement to the job site at a temperature not exceeding 160° F. The temperature of the air used to transport cement into storage containers or silos must be less than 180°F. The temperature of the air will be determined by measuring the temperature on the outside of the transport pipe with a surface thermometer.

C. Storage

Immediately upon receipt at the soil cement mixing plant, store bulk cement, and pozzolan in a dry, weather-tight silos. All storage facilities are subject to approval and must permit easy access for inspection and identification. Store sufficient cement, and pozzolan to complete at least 5 hours of placement at the typical production rate being experienced.

D. Admixtures

Deliver admixtures (if proposed by Contractor) to the site in the original manufacturer's containers. Store and handle in accordance with manufacturer's printed instructions.

E. Aggregate Production, Delivery, Storage, and Handling

The Contractor's responsibility includes producing aggregates onsite or providing and delivering aggregates to the site, monitoring delivered quantities, and stockpiling in a manner preventing segregation, intermixing, and contamination.

- (1) General: The requirements of Subsection 310.03.04E (2) through (3) also apply when soil cement is produced off-site and hauled to the project site.
- (2) Aggregate Production: Contractor shall operate the aggregate production plant in an efficient manner to achieve and maintain an adequate level of productivity and ensure that the final aggregate product is consistent and free from contamination by organic material, overburden, or other foreign materials.

(3) Environmental Controls:

- a. Stormwater Control: Implement work to conform to Best Management Practices for control of site runoff and stormwater pollution for the work area that encompasses the aggregate production plant, stockpiles, and related construction site areas.
- b. Pollutant Control: Contractor shall maintain aggregate plant areas in a clean orderly condition, free from spilled fuel, lubricant, coolant, or other potential pollutants. Contractor shall maintain material handling areas to reduce potential for pollutants to enter stormwater runoff and institute special precautions to prevent and to clean up spills of any material that might contaminate stormwater runoff.

(4) Delivery:

- a. Compliance with Regulations: The Contractor's responsibility includes ascertaining and compliance with all state laws and regulations regarding haul vehicle weight limits and other restrictions as they relate to haul vehicles on public roads. Where the point of ingress or egress is connected to a paved public road, provide a stabilized construction entrance adjacent to the paved area to minimize the amount of mud transported onto the paved area. Contractor shall maintain the entrance pad and top dress with aggregate as required.
- b. Delivery Route: Contractor shall deliver aggregates using route(s) identified in the approved delivery plan.
- c. Maintenance of Roads: Contractor shall promptly remove, to the satisfaction of the Engineer and the haul route's jurisdictional authorities, any soil, aggregate, or other debris deposited on roads or adjacent areas as a result of the Contractor's activities associated with the work to be performed under this contract. If the Contractor fails to clean a road surface and adjacent areas in a timely manner, or fails to clean the road surface and adjacent areas to the satisfaction of the Owner of the road, the Owner of the road or the Owner has the right to perform the defective work and charge the Contractor for the cost incurred.

Contractor shall notify the Engineer as soon as any damage or deterioration to the road(s) occur that is likely to require remedial work.

- (5) Stockpiling Procedures: Contractor shall maintain aggregate stockpiles in good condition to prevent segregation and inclusion of foreign materials. Stockpiles shall be located on level ground free of brush, roots, debris, and other deleterious substances. Stockpiles shall be constructed in uniform layers not exceeding 3 feet in thickness. The maximum height of any stockpile shall not exceed 15 feet. Ramps formed for stockpile construction shall be of the same material as that being stockpiled, and shall be considered a part of the stockpile. Prior to steepening or widening stockpile ramps, contaminated surface materials shall be removed. The bottom 6 inches of aggregate piles in contact with the ground shall not be used.
- (6) Moisture Conditioning: If aggregate evaporative cooling is utilized, or if the aggregate is sufficiently dry to require moisture conditioning, continuously mist aggregates during stockpiling until a saturated surface-dry (SSD) condition is achieved. Use sprinklers or fog

spray type nozzles and do not apply pressurized water directly into stockpile. Exercise caution during aggregate stockpile misting to prevent washing of fine material.

- (7) **Stockpile Withdrawal:** Withdraw aggregates from the stockpiles using conveyors, face loading with front-end loaders, or a combination of conveyors and face loading. Regardless of the method employed, withdraw materials that are representative of the entire stockpile, both in terms of gradation and moisture content. Blend any obviously segregated material with other material in a manner that will result in a gradation that meets the specifications. If the material cannot be suitably blended, separate it from the stockpile and use for other non-critical purposes, or waste the material.

F. Material Certification

With each shipment of cement and Pozzolan delivered to the project site, Contractor shall provide Engineer with one copy of the material supplier's certification as to the source quality, and weight of the material delivered to the project site.

G. Plant Calibration

After mobilizing and erecting plant equipment at the project site and prior to beginning soil cement production, Contractor shall perform, at his expense, all necessary shakedown and trial runs of his proportioning, mixing, hauling, handling, and conveying equipment so that when put into production operation for construction of the Work, the equipment shall consistently and accurately produce a uniform soil cement mixture of the quality specified.

Contractor shall calibrate the plant scales and other mixture proportion control devices and shall submit a calibration report prior to initiating soil cement placement. The accuracy of all scales and control devices shall be certified in accordance with State of Nevada standards for weights and measurement of concrete batching and mixing equipment. Contractor shall recalibrate the plant following each 30 shifts or 5,000 cubic yards of placement, whichever is less, or when quality control testing indicates a potential problem.

H. Flood Protection

The plant and all related equipment shall be built so that if the plant areas are temporarily inundated by flood waters, damage to the equipment or stockpiles shall not result in a delay caused by rebuilding of the plant or replacing stockpiles.

310.03.05 BATCHING AND MIXING

A. General

The Contractor shall select the type of concrete mixing plant to be used and shall determine the plant layout. The plant shall include all necessary mixers, volumetric or weight controls, storage bins, feed systems, and discharge mechanisms. A description of the plant shall be submitted to the Engineer for review and acceptance as described in Subsection 310.03.01. The plant may be a continuous pugmill or a batch type pugmill. The Contractor shall perform, at his expense, all necessary shakedown and trial runs of his mixing and proportioning equipment so that when put into production operation for construction, the equipment shall consistently and accurately provide

mixtures of the quality specified. The minimum sustainable capacity of the plant(s) must be at least 300 tons per hour using the specified mixes. Material not meeting the specified requirements will be rejected and not allowed in the construction. The Owner will require the Contractor to remove rejected material at the Contractor's expense.

B. Batching or Proportioning Tolerances

Batching or proportioning of soil cement materials shall conform to the mixture proportions directed, within the following tolerances:

BATCHING OR PROPORTIONING TOLERANCES	
MATERIAL	PERCENT*
Cement	2.0
Water	2.0
Blended Aggregate	3.0
Admixtures	3.0
Pozzolan	3.0

- * For continuous mixing plants, the variation is in percent by weight of the total weight of each material for the specified mix in the total sample obtained for a given duration of time. The minimum sample collected shall be one to three cubic feet.

C. Continuous-Mixing Plant Requirements

(1) General

Continuous mix plants shall be capable of producing concrete of the same quality and uniformity as would be produced in a conventional batch-type plant. In general, the plants shall conform to the requirements of ASTM C685, except that proportioning tolerances shall be as specified herein and adaptation to accommodate aggregate size shall be made as needed.

The plant may be a central-type plant and shall have a stationary twin-shaft pugmill mixer and shall be a continuous-mixing type. The plant shall be equipped with positive means for controlling the mixing time maintaining constant mixing time, and maintaining a constant rotation speed of the pugmill shafts.

Mixers shall not be charged in excess of the capacity recommended by the manufacturer and shall be capable of combining the materials into a uniform mixture and shall be capable of discharging the mixture without segregation. The plant's transfer systems must be capable of charging and discharging the constituents and mixed product without bridging or choking.

Mixers shall be maintained on satisfactory operating condition and mixer paddles shall be kept free of hardened concrete. Mixer paddles shall be replaced when their face area has been reduced to less than 80% of their original area. The minimum mixing time for continuous mixing pugmills or batch type pugmills is 15 seconds. The minimum mix retention time for batch type pugmills is 90 seconds.

The intent is to operate continuous pugmills in a continuous manner at one set of feed rates with a minimum number of shutdowns and startups during soil cement production placing. Contractor shall calibrate and operate the plant so that all materials simultaneously begin feeding into the mixer at the specified rates when the mixer is started, and all materials simultaneously stop feeding into the mixer when it is stopped. No lag or lead-time between materials will be allowed at the point where they enter the mixer. After material feeds are shut down, discharge all remaining material in the mixer. The initial soil cement produced after a plant re-start may not conform to the specification requirements. If the plant can be stopped and re-started at the same mix proportions, no material has to be wasted. The need to waste material after a re-start will be evaluated for consistency and uniformity on a case-by-case basis by the Engineer. When the plant is shut down for over 30 minutes, waste the first one-half cubic yard of material.

(2) Aggregate Feed

Separate bins or compartments with steep side slopes, large gate openings, and the capability of handling aggregate in a damp condition shall be used for each aggregate group used in the soil cement mix. Each bin shall be of sufficient capacity to supply the mixer continuously while operating at full capacity. The bins shall be arranged to ensure separate and adequate storage of appropriate fractions of aggregate. Each compartment shall be provided with some means of preventing backing up of material into other bins. Unless the aggregate in the bin is readily visible to operating personnel, each aggregate bin shall be equipped with mechanical or electrical sensors to indicate when aggregate in the bin is below the level to permit accurate proportioning to the mixing unit. Each bin shall be constructed or equipped in such a manner that a representative sample may be taken readily and safely from each bin discharge during plant operations.

Feed cement and aggregates uniformly, continuously, and simultaneously, at the appropriate ratios for the mix design specified, into the mixer by belt or other acceptable method. Feed controls may be by volume or weight. Aggregate feed may be accomplished by a single belt from each stockpile or from feed bins of the various size groups through openings at the bottom of the feed bins. Provide each opening in aggregate feeders with a gate that can be locked at the necessary opening size to provide the correct feed rate. Keep return side of all belts clean. Keep bins sufficiently full to allow a uniform flow of aggregate at an essentially constant rate. Particular attention may be needed to guarantee a continuous flow of the fine aggregate if it is very damp and is graded towards the fine side of the specified gradation band. Feed cement (and Pozzolan) continuously in a manner that can be controlled by adjusting the belt speed or feed rate. Provide special attention to the cement (and Pozzolan) feed equipment so that it consistently and uniformly delivers materials even at low (100 lb./yd³ or less) dosage rates.

Use feeds capable of gradual adjustment while in operation. Use continuously correcting automated gate openings and/or belt-feed rates by electronic feedback of weight sensor units on the belts if operation without them cannot provide the accuracy, consistency, and quality required by these specifications.

Provide individual silos for bulk cement and Pozzolan with ample size and so constructed that the various materials will remain separate under all working conditions. Separate all compartments containing cement and Pozzolan from each other by a free draining air space. Clearly mark cement and Pozzolan silos with signs to indicate the material contained in each silo.

(3) Cement and Pozzolan Feed

Feed cement and Pozzolan continuously in a manner that can be controlled by adjusting the belt speed or feed rate. Provide special attention to the cement (and Pozzolan) feed equipment so that it consistently and uniformly delivers materials even at low (100 lb./yd³ or less) dosage rates. Metering and feed shall be designed and controlled so that cement is uniformly fed into the mixer or into the stream of aggregate on the feeder belt, all with necessary controls to prevent loss of cement as dust or in any other form. Control of the quantity of cement shall be linked either electronically or mechanically to the other feed systems. An electronic belt-weighing device shall be provided to meter and monitor the individual amount of cement delivered into the mixture.

(4) Water Control Units

Contractor shall provide a water dispenser that is capable of dispensing the mix water within the specified requirements. Contractor shall also provide piping, valves, and other components that are free from leakage for delivering water to the mixer. Water may be weighed or metered by an in-line volumetrically activated flow meter. The metering valve must be capable of gradual adjustment during the mixing process to compensate for varying moisture contents in the aggregates. Contractor shall use valves that are automatically controlled and will close if the cement, Pozzolan, or aggregate stops entering the mixer at the required rate. This control may be bypassed for cleaning operation. When the quantity of water is controlled by metering, provisions shall be made where the quantity of water delivered through the meter can be checked readily by weight. A water storage tank shall be provided to prevent surge drawdown effects.

(5) Mixer

The mixer unit shall be a stationary mixer of the twin-shaft pugmill type capable of producing a uniform homogenous mixture of the required soil cement materials within tolerances specified. Blades shall be adjustable for angular position on shafts and reversible to retard flow of mix. The mixer shall bear a manufacturer's plate indicating net volumetric contents of mixer at several heights inscribed on a permanent gate and the rate of feed of aggregate per minute at plant-operating speed.

(6) Discharge Hopper

A discharge hopper with a minimum capacity of five cubic yards shall be provided wherever the mixed soil cement temporarily accumulated before loading into trucks or conveyors for transport. The hopper shall be equipped with vibrators and dump gates that will permit rapid and complete discharge of soil cement without segregation. Hopper shall be constructed with side slopes, baffles, and gates as necessary to prevent segregation of the soil cement mixture. When discharging soil cement from conveyors into the hopper, the drop height shall not exceed 5 feet. When loading soil cement into trucks, scrapers, or other transport equipment, the maximum drop from the bottom of the discharge hopper to the bed of the transport equipment shall not exceed 5 feet. Telephone or radio communication between the discharge hoppers, the mixing plant, and the placement site shall be provided.

(7) Chutes and Drop Tubes

Unless specifically authorized in writing, chutes or uncontrolled drops exceeding 5 feet will not be permitted.

(8) Conveyors

Contractor shall design and/or provide conveyors and transfer components for low maintenance, continuous operation with clean return belt surfaces and without segregation or excessive loss of material. Fit all belts with covers or shields to prevent drying by the wind and sun, and over-wetting from rain. The maximum free fall drop from conveyors is 5 feet.

(9) Sampling Facilities

Suitable facilities and labor shall be provided for obtaining representative samples of materials as they enter the mixer, are discharged from the mixer, are discharged from the discharge hopper and from the placement after spreading. Contractor shall furnish all necessary platforms and equipment for obtaining samples, which will be used for quality control and quality assurance testing.

(10) Equipment Substitutions

After equipment is demonstrated as suitable for production and placement, as indicated by Contractor submittals, calibration report(s), and the trial placement, no substitution of equipment will be permitted without prior written approval by the Engineer.

310.03.06 SOIL CEMENT TRANSPORTING, PLACING, SPREADING, AND COMPACTING

A. General

The soil cement mass shall be constructed in as nearly a continuous operation as is practical. The spillway face, cut-off wall, and open channel cross section shall rise at essentially the same level across the entire area. As placement of a lift progresses, the exposed edges shall be kept "live" by progressively placing out from them. Whenever a cold joint at any edge of any lift does occur, it shall be prepared as required in the Subsection 310.03.07. The rate and schedule of placement shall minimize the occurrence of cold joints. All surfaces of the concrete outlet conduit against which soil cement is to be placed shall be clean, free of dirt, oil, and grease, and properly prepared prior to placement of soil cement. All dirt, mud, water, and debris shall be removed from the space to be occupied by soil cement; all surfaces encrusted with dried soil cement from previous placement operations shall be cleaned; and the entire installation shall be acceptable to the Engineer.

B. Time Requirements

The time from mixing the soil cement to depositing it shall not exceed 20 minutes and the time from depositing the soil cement to spreading it shall not exceed 10 minutes. The compaction operation shall be started within 45 minutes after the addition of water to the soil cement moisture at the plant, and within 20 minutes after completion of spreading. Final compaction of any volume

of soil cement shall be completed within one hour of the time at which water was introduced into that volume of soil cement mixture at the mixing plant.

C. Subgrade Preparation

Before placing soil cement, the subgrade shall be prepared as described in Section 203. Immediately prior to the placement of the bedding mix, the receiving surfaces shall be in a moist condition. Contractor shall not cover exposed slopes with bedding mix until the area has been approved by the Engineer.

D. Slope Preparation

Before placing soil cement, the embankment slope face shall be uniform, dense and free of loose ravel or otherwise unsuitable materials. Density of the slope face shall be equal to the density specified for embankment construction. Immediately prior to the placement of soil cement, the receiving surfaces shall be in a moist condition.

E. Embedments

All embedments such as weep hole drain conduits shall be accurately positioned and securely anchored in place. Embedment surfaces shall be clean when installed.

F. Transporting

Soil Cement shall be transported from mixer to placement area as rapidly as practicable by methods which minimize segregation, contamination and drying. Trucks, conveyors, or other equipment acceptable to the Engineer may be used to transport soil cement to the placement area.

Soil cement may be hauled using trucks, large front-end loaders, or scrapers to various locations on the placement area. Tracked haul vehicles will not be permitted. Contractor shall use bottom-dump haul vehicles, end dump trucks with special tail gates or drop control methods that demonstrate an ability to handle dumping without excessive segregation, and/or front-end loaders. The haul vehicles must be free of deleterious materials including, but not limited to, oil, grease, loose, deteriorated, or dry soil cement and soil. The maximum free fall drop height from hauling vehicles is 5 feet.

Equipment will not be allowed to track mud or other contamination onto previously placed soil cement. This may require using clean crushed rock on haul roads, washing tires of vehicles prior to driving onto the soil cement prior to placing the next lift, or other special measures. Any segregated soil cement that results from using haul vehicles shall be removed by hand or re-blended. Haul vehicles shall be operated in a manner that precludes tight turns, sudden stops, or other procedures by vehicle operations (oil spills, etc.), it shall be cleaned or the damaged material shall be removed.

G. Conveying

Conveyor belt systems or mobile crane conveyors may be used for final deposition of the soil cement into place for spreading and compaction. The conveyor system and soil cement shall be

designed and manufactured by personnel fully experienced with conveyor belt delivery of low slump mass concrete and shall be designed specifically for continuous operation at speeds that meet production requirements and do not segregate materials.

Conveyors shall be equipped with protection devices as necessary to prevent leakage of lubricants or other foreign materials onto the belts or onto the soil cement surfaces below. Conveying equipment shall be outfitted with suitable hoppers at all transfer points if soil cement is transported to the conveyor by truck or other vehicular equipment. If necessary Contractor shall provide baffles at the end of conveyors and within hoppers to limit free fall heights to 5-feet and at other locations that otherwise cause excessive segregation.

H. Placing and Spreading

(1) General

The Contractor is cautioned to understand and apply applicable fall protection requirements to all work on the site. The Contractor is responsible for all health and safety requirements at the site.

(2) Layout of the Placement Area

It is the intent of this specification to raise the soil cement at essentially the same level across its entire area. As nearly as is practical, expose no more than two lift surfaces at one time. One additional layer may be exposed under special circumstances such as crossing conduits or other features. Maintain lift grade control by using grade stakes and/or laser-guided equipment, or other surveying methods. Whenever a cold joint at any edge of any lift occurs, locate it at least 10 feet horizontally from the location of other cold joints that may have occurred previously. Prepare the joint as required by Subsection 310.03.07 of these specifications for "cold joints" prior to resumption of soil cement placement.

(3) Depositing

Deposit soil cement at the location at which it is to be spread. Where haul vehicle delivery is used, depositing will generally be accomplished with a dump-spread action while the vehicle is moving. When stationary end dumping is necessary, deposit the material on top of the fresh soil cement layer being advanced, not on the previously compacted layer. Do not place material in piles higher than 3 feet. For belt delivery, limit pile heights to 3 feet and discharge from the belts in a manner that does not cause segregation. If trucks are used to deliver soil cement, do not discharge material directly against any formwork. At isolated or confined placement locations, the Engineer may permit pushing the soil cement up to 50 feet with spreading equipment, provided that segregation does not occur. Modify operations if the Engineer determines that excessive segregation is occurring.

(4) Spreading

Within 10 minutes after depositing, the mix shall be spread into an even layer that will, after compaction, be 12-inches thick, unless another lift thickness is satisfactorily demonstrated and approved during the trial placement. (Do not place soil cement in compacted lifts unless they are 4-inches thick.) Where soil cement is spread onto or into a bedding mortar, spreading shall be

accomplished before the bedding has begun to set, but no more than 90 minutes from the time the bedding mix was batched and within 45 minutes of when the bedding mix was first deposited.

Spreading shall be accomplished with low contact pressure equipment, such as a track-type dozer and must be capable of placing the soil cement in uniform lifts and without segregation. The suitability and acceptance of any spreading equipment will be based on the results of the test section. Do not operate tracked spreading equipment on compacted soil cement unless tracks with flat rubber pads are used or rubber mats are placed between the compacted surface and the dozer tracks. Remove any loose material resulting from operation of equipment on compacted surfaces prior to placing the next lift. Have a front-end loader with operator available to assist with depositing and spreading of material in confined areas, at irregular foundation conditions, and at other locations as needed. Accomplish spreading in a manner that does not cause segregation. If large aggregate rolls or segregates to the outside edge of a spread layer of soil cement, reblend it into the soil cement or remove it. Maintain all equipment in good operating condition so that it does not leak or drip oil, grease, or other obvious visible contamination onto the soil cement. Do not place concrete on a previous layer which is suspect and is being considered for testing, retesting, or rejection, or has not been completely compacted.

Soil cement may be placed with an approved tamping paver. Adjust the paver and regulate the speed to prevent segregation. Do not exceed a paver speed of 10 feet per minute unless it can be demonstrated to the satisfaction of the Engineer that higher speeds do not cause problems. Operate the paver with a constant supply of soil cement in the hopper.

I. Compaction

(1) Compaction Procedures

At the start of compaction, the mixture shall be in a uniform, loose condition throughout the full depth, and at the specified optimum moisture content. The specified moisture content shall be maintained uniformly throughout the layer of material being compacted. Concrete lifts shall not be left undisturbed for longer than 30 minutes during compaction operations.

If necessary, moisture shall be added during the compaction operation to maintain the uncompacted mixture at its optimum moisture content.

(2) Compaction

Compact each 12-inch layer of soil cement with a minimum of 4 passes of a self-propelled double drum or 8 passes of a self-propelled, single-drum vibratory compactor. (A round trip is 2 passes). Use the largest size equipment specified below that is capable of physical and practical operation in the area to be compacted. Use small walk-behind vibratory rollers and/or hand-guided power tampers for compaction at the abutments and in any areas that cannot be reached with the drum of a large vibratory roller. Do not operate rollers in the vibratory mode until they are moving. Maintain all compaction equipment in good operating condition at all times and do not allow it to drip or spill oil or other obvious visible contamination onto the soil cement. Break down, trim, and compact the edge of all compacted layers against which adjacent soil cement is not placed within 30 minutes so that the edge is thoroughly compacted and does not contain loose segregated aggregate. Spread and roll so that a flat surface results with minimum roller marks from the edge

of the drum, and so that the drum does not bridge over any of the surface beneath the roller drum after the last pass. Operate rollers at speeds not exceeding 160 feet per minute.

(3) Acceptance

Optimum moisture density will be determined to not exceed 95% by ASTM D1557 for high strength soil cement and ASTM D558 for low strength soil cement. The running average of 5 consecutive in-place density tests shall not be less than 98% of the optimum compaction density value, with no individual test less than 96%. Determine the average wet density from the average of two readings taken with the gauge probe at a full depth. If the two readings vary by more than 2%, repeat the density test. If it is demonstrated early in production that the two readings are consistently within 2%, the two readings can be reduced to one. Also measure densities with the gauge probe at 4 inches and 8 inches; however, these readings will not be used to compute the average density.

(4) Additional Compaction

If, after testing, the soil cement does not meet the required density, it may be compacted with additional roller passes, provided that the time limit in Subsection 310.03.06B has not been exceeded.

(5) Removal of Material

If the time limit specified in Subsection 310.03.06B has been exceeded and the soil cement has not achieved the required density, or if the mixture is wetted by rain so that the average moisture content exceeds the specified moisture requirements before achieving compaction, remove the soil cement full depth and replace it at no cost to the Owner. Clean the underlying surface and treat as a lift surface cold joint prior to replacing the removed soil cement with new material.

(6) Compaction Requirements

The Contractor will determine the optimum compaction density value during the trial placement. The optimum compaction density value is the highest density attainable using the specified soil cement mix proportions and the equipment approved for soil cement construction. Nuclear density readings are taken after two roller passes in the trial placement until there is no increase in density or the increase is less than 0.1 lb./pass. Final evaluation of density results for the determination of the optimum compaction density value will be made only after all major field adjustments have been made and the mix design is considered to represent soil cement that has suitable placement, spreading, and compaction characteristics, and provides the required strength and porosity values. Small field adjustments to the optimum compaction density value may be made throughout construction based upon the running average density value. Such changes may be made based on slight changes or long-term drift of density values resulting from field mix design adjustments.

(7) Compaction Equipment

Large-width, self-propelled vibratory rollers shall be used in open areas; small vibratory rollers shall be used within 3 feet of the cast-in-place concrete and at irregular areas; and hand-guided power tampers shall be used for compaction in any areas that cannot be reached with the drum of

a vibratory roller. Rollers shall not be operated in the vibratory mode until they are moving. All compacting equipment shall be kept in good operating condition at all times and will not be allowed to drip or spill oil or other visible contamination onto the soil cement.

Self-Propelled Rollers: Contractor shall provide single or double drum, self-propelled vibratory rollers that transmit a dynamic impact to the surface through a smooth steel drum by means of revolving weights, eccentric shafts, or other equivalent methods. Use compactors with gross weights of not less than 21,000 lb., minimum dynamic force of at least 475 lb. per inch of drum width at the operating frequency used during construction, vibrating frequency of at least 1500 cpm (cycles per minute), drum diameter between 4 and 6 feet, drum width of 5 to 8 feet, and engine horsepower of at least 125. The roller shall be operated at speeds not exceeding 1.5 miles per hour. Within the range of the operational capability of the equipment, the Engineer may direct or allow variations to the frequency and speed of operation which result in maximum density at the fastest production rate. Any other compaction equipment proposed must demonstrate that it is capable of compacting the soil cement full depth to the specified density prior to soil cement production. Provide at least one fully operable, self-propelled vibratory roller on the placement area at all times during production placement. Standby replacement equipment shall be available within an hour, if needed.

Power Tampers and Small Vibratory Rollers: Contractor shall use small vibratory rollers that can operate within a few inches of a vertical face to compact the soil cement adjacent to formwork, precast panels conventional concrete structures, abutment slopes, and at other areas where the large vibratory rollers specified above cannot maneuver. Contractor shall provide rollers with a dynamic force of at least 150 lb./in of drum width for each drum of a double drum unit and at least 300 lb./in of drum width for a single drum unit. Provide at least one fully operable, small roller at the site during soil cement placement.

Contractor shall provide tampers, plates, and rammers that develop a force per blow of at least 3500 lb. per square foot. Contractor shall maintain at least two tampers, plates, or rammers in good operating condition at the site during soil cement placement.

The amount of rolling and tamping required shall be whatever is necessary for the particular equipment to provide the specified degree of compaction. Contractor shall reduce the lift thickness as required to achieve the specified compaction in locations where power tampers and small vibratory rollers are used. Contractor shall conduct field tests with proposed equipment of rolling and tamping as required to comply with specifications. Standby replacement equipment shall be available as needed.

310.03.07 JOINTS LIFT AND CONSTRUCTION JOINTS

A. General

It is the intent of this specification to place the entire soil cement mass with sufficient continuity so that it hardens and acts as a monolithic block without discontinuous joints or potential planes of separation. The length of time between placement of successive layers of soil cement that can be tolerated is dependent upon temperature. Joint quality is also dependent upon cleanliness, surface moisture and whether a bedding mix is applied. When the limits between successive lifts

of soil cement layers exceed those specified herein, a cold joint will be considered to have occurred, and the procedures described for cold joints in this section.

Routine Lift Surface Treatment: Keep joint surfaces in a clean, uncontaminated, and continuously moist condition until placement of the succeeding soil cement. At a minimum, the Contractor should anticipate blowing every lift surface with compressed air if loose material and contamination are present. Employ a system to continuously maintain lift surfaces in a moist, but not wet, condition. The system may consist of, or be supplemented as necessary by, mists and light sprays from hand-held hoses to reach all areas of each lift. Heavy sprays from water trucks provide too much water and are not acceptable. Water trucks may be used if they can provide a fine spray or mist. Do not apply the mist or spray in a channeled or pressurized manner that may erode the fresh soil cement surface or at a rate that causes ponding on the surface. Have one person on duty during the soil cement placement operation with the sole responsibility of operating the water system to keep the entire surface moist but not over-watered. He may be allowed to perform routine maintenance of nozzles and move hoses only if these activities do not prevent him from keeping the entire exposed surface in a continuously damp condition. During non-placement hours the soil cement shall be maintained in a moist condition either by on-site personnel or by covering the lift with tarps or plastic.

B. Lift Surface Cold Joints

A cold joint on a lift surface will be considered to have occurred when a period of more than 4 hours has elapsed (from May to September), and a period of more than 8 hours has elapsed (from October to April) before placement of the successive lift. Prepare cold joints for the subsequent lift by removing all laitance, loose debris, and contaminants from the entire surface. Expose, but do not undercut the aggregate with the cleaning procedure. At this stage of maturity, use water jetting if air alone does not satisfactorily prepare the surface. After preparation, maintain the surface in a damp condition and place a layer of bedding mix with an average thickness as specified in Subsection 310.02.05.

C. Lift Edge Cold Joints

A cold joint on a lift edge will be considered to have occurred when more than 30 minutes has elapsed since placement of the material at the lift edge. Treat the cold joint prior to resuming soil cement placement by cutting back into the compacted cement providing a vertical full depth joint. The cold joint shall be transverse to the layer direction and located a minimum 6" inside the lift edge. Joints shall be staggered to inhibit cracking. Prior to subsequent lift, clean joint of laitance, loose debris and contaminates from the joint edge.

D. Lining Joints at Structures

The joints between the soil cement lining and concrete structures shall be 1-inch premolded elastomeric joint filler.

310.03.08 FINISH TREATMENTS AND TOLERANCES

The finish treatment and tolerances for soil cement shall be as specified herein.

A. Facing Finish Treatment

- (1) Forming: Construct the exposed face of the soil cement as shown on the drawings and as specified herein. Select a forming system and demonstrate at the soil cement test section that it will provide soil cement surfaces within the specified tolerances and acceptable texture.
- (2) Forms: Form the steps and any other exposed soil cement face to provide the finished surfaces shown on the drawings. Construct all formwork as specified. The Contractor is responsible for the design of the formwork, as well as its construction in Section 502 of the Standard Specifications. Provide and construct forms with sufficient strength to withstand the pressure resulting from placement and compaction of the soil cement and with sufficient rigidity to maintain specified tolerances. Forms need not be mortar tight if bedding mix is not used.
- (3) Repairs: It is the intent of these specifications to require forms and soil cement workmanship be such that soil cement surfaces will require no repairs after form removal. The workability of the soil cement may need to be adjusted such that the concrete can be fully consolidated against the forms. It is anticipated that form work will have to be strengthened to resist lateral forces exerted by compaction equipment. As soon as the forms have been stripped and the formed surfaces exposed, the Engineer will inspect the formed surface to determine if there is adequate consolidation, excessive honeycomb, or other defects. The soil cement test section shall be used as a "Paint Chip" as to what texture and degree of honeycombing is acceptable and what is not. If the defects are excessive, clean the defective areas of loose or unconsolidated material and repair with conventional concrete at no cost to the Owner.
- (4) Compaction: Compact the soil cement as specified in Subsection 310.03.06.
- (5) Tolerances: See Subsection 310.03.08B.

B. Structural Tolerances

- (1) General: Construct within the tolerances specified in Section 502 except as supplemented or modified below.
- (2) Specific Requirements:
 - a. Limit overbuild of the downstream face of the soil cement to 1 inches. Underbuild will not be allowed.
 - b. Do not vary the downstream edge of any soil cement lift by more than 1 inches in 100 feet.
 - c. Construct the thickness of individual compacted layers of soil cement within plus or minus 2 inches of that stipulated.
 - d. Keep the elevation of the surfaces of roller-compacted concrete layers upon which subsequent concrete is placed within 5 inches from the design elevation. Additionally, keep the elevation of the top three lifts within 2 inches of that shown on the drawings.

- e. Do not vary the upstream and downstream edges of the finished top of structure by more than 2 inch in 10 feet. Do not exceed the plan width by more than 2 inches. Place the top lift such that the final elevation of the top soil cement layer is within 2 inches of that shown on the drawings and does not vary more than 1 inch in 10 feet. Underbuild will not be allowed.
- f. Surface irregularities are solely the responsibility of the contractor.

310.03.09 REQUIREMENT AND LIMITATIONS

Contractor may be required to alter soil cement placement operations, or halt placement operations, to minimize the detrimental effects of adverse weather on the soil cement.

A. Hot Weather Soil Cement Placement

The Contractor shall protect the soil cement from moisture loss during hot weather. Soil cement placement shall be suspended if high ambient temperatures and/or wind dry the uncompacted soil cement mixture so that adequate compaction is not possible. The surface of soil cement upon which subsequent soil cement will be placed shall be kept continuously damp. During daylight hours the maximum temperature of the soil cement mixture immediately prior to compaction shall not exceed 85°F. If the Contractor places soil cement during the night between 8:00 p.m. to 8:00 a.m., the maximum temperature of the soil cement mixture immediately prior to compaction shall not exceed 90°F. The temperature will be measured at the point where the soil cement is delivered to the lift surface. Contractor shall take all precautions necessary to control the placement temperature of soil cement including, but not limited to, sprinkling stockpiles, use of chilled water or liquid nitrogen, use of sun screens, or nighttime placement.

B. Cold Weather Soil Cement Placement

Soil cement shall not be placed when ambient air temperatures drop below 32°F. In the event ambient temperatures drop below 32°F and the temperature of the soil cement mixture stays above 35°F, the Engineer may permit placing of soil cement for temporary periods provided the ambient temperature remains above 25°F. If the ambient temperature drops below 32°F or the surface of any soil cement less than 7 days old drops to 35°F, cover the surface with heavy tarps, blankets, straw, or other acceptable temporary protection until the ambient temperature rises above 35°F. Remove all soil cement that is less than 7 days old and is exposed to temperatures less than 32°F.

C. Rainfall

Soil Cement shall not be placed during heavy rain which is more than 0.20 inches per hour, or 0.03 inches in 6 minutes, as defined by the Weather Bureau Glossary of Meteorology. Contractor shall suspend production when free surface water begins to accumulate on the compacted soil cement when excessive pumping, tracking, or other unacceptable damage begins to develop, or when, in the opinion of the Engineer, rain is adversely affecting any aspect of quality. Contractor shall remove any uncompacted soil cement exposed to precipitation that, in the opinion of the Engineer, makes it unsuitable.

310.03.10 CURING AND PROTECTION**A. Cold Weather Protection**

Keep the surface of all soil cement lift layers continuously damp and at a temperature above 35° F until it is covered with the next layer of soil cement. Comply with the temperature restrictions in Subsection 310.03.09B. Measure the soil cement temperature with a digital thermometer equipped with a surface probe. Protect from erosion by heavy rain and damage by water trucks all surfaces of soil cement layers upon which subsequent layers will be placed. Clean any surface damaged by erosion that undercuts coarse aggregates, and cover with bedding mix prior to placing next soil cement layer.

B. Moist Curing Requirements

Moist Curing Requirements: Keep the surface of all soil cement lift layers continuously damp until each is covered by the next layer or for a period of 14 days.

C. Use of Curing Compounds

Curing compounds will not be permitted on the soil cement.

310.03.11 QUALITY CONTROL AND TESTING**A. General**

- (1) Contractor shall establish and maintain an effective, on-site, quality control program in cooperation with the Owner and the Engineer for the soil cement concrete. The soil cement quality control program will be the means for ensuring compliance with contract requirements and for maintaining records of control, including all tests and inspections, their findings, and remedial actions taken when necessary. All testing and inspections described herein will be the responsibility of the Contractor. Density test results shall be made immediately available to the Owner and the Engineer. All lab test results will be provided to the Owner and the Engineer no more than 24 hours after test completion.
- (2) Contractor shall establish and execute the quality control program under the supervision of a Soil Cement Quality Control Manager who will review and approve all activities concerning the production of materials, planning and scheduling of construction activities for placing soil cement, and the execution and evaluation of soil cement tests. Work closely with the Engineer and keep the Engineer advised of planned construction procedures, the placing schedule, the testing schedule, and results obtained from tests. Designate a Soil Cement Quality Control Manager for each shift. Several personnel may be required in the various areas of monitoring, testing, and reporting during the placement period. Make all information and test results available to the Engineer. Permit the Engineer full access to all construction and Contractor quality control activities.
- (3) At a minimum, include the following processes in the soil cement Quality Control Program: Aggregate stockpiling and handling, aggregate testing, mixing requirements and mix proportions at the soil cement mixing plant, mix delivery, compaction, lift joints, material

quality control, and all other tests and inspections required by these specifications. Establish the program as described in the following paragraphs.

B. Aggregate Gradation:

- (1) Testing: At least once during each shift that soil cement is placed, and once during each shift that aggregates are delivered, test gradations and for the combined gradation of all aggregates mixed at the designated proportions. A retest sample is required for any gradation test out of specifications. The location where samples are taken will be selected by the Engineer. Make provisions for accurate sampling of aggregates on feed belts to the soil cement mixing plant.
- (2) Action Required: When a test result is outside of the specification limits, take a retest sample. If the retest sample is outside of the specification limits, suspend soil cement production until the problem is corrected. The Contractor will be responsible for all costs incurred as a result of soil cement placement suspension resulting from out-of specification materials.

C. Aggregate Moisture Determination

- (1) Testing: At least once during each shift of soil cement placement for each aggregate size used, test the moisture in accordance with ASTM C566. The location where the sample is selected may be determined by the Contractor provided that it is typical of materials entering the mixer. The frequency of testing may be increased or decreased depending on moisture uniformity or variability as a project record is developed.
- (2) Action Required: When moisture content determinations indicate a change in water entering the mix with the aggregates, contact the placement foreman to see if a corresponding adjustment in water added at the mixer is necessary to obtain adequate compaction and meet consistency requirements at the placement site.

D. Material Finer than the No. 200 Sieve

- (1) Testing: During the first two weeks of aggregate stockpiling, perform tests every other day in accordance with ASTM C 117 to determine the amount of material passing the No. 200 sieve for the aggregate. After it has been established that a problem does not exist, and if production remains constant, continued testing will be required only once per week.
- (2) Action: When test results for material finer than the No. 200 sieve are outside of the specification limits, take action to correct the deficiency. Suspend soil cement production until the problem is corrected. Materials produced "out of spec" may be blended with materials "in spec" so that the composite as used in soil cement meets specification requirements.

E. Aggregate Quantities

Accurately monitor and record the quantity of each aggregate produced, delivered, stockpiled, and used during each shift. Maintain a cumulative record of the amount of each aggregate produced

or delivered, used in the permanent work, and wasted. Base quantities on saturated surface-dry (SSD) moisture conditions. Also record the moisture content.

F. Cement and Pozzolan Quantities

Accurately monitor and record the quantity of each material delivered and used during each shift and the quantities of materials stored onsite. Maintain a cumulative record of the amount of each material delivered, used in the permanent work, and wasted.

G. Soil Cement Mixing Plant Control

When the soil cement mixing plant is operating, continuously control the amount of all constituent materials including cement, Pozzolan, each size of aggregate, water and admixtures. Adjust the mixture proportions to compensate for free moisture in the aggregates as necessary. Prepare a daily report and submit to the Engineer before the start of the next shift indicating the type and source of cement used during that day, aggregate size groups and percentage used, required mix proportions per cubic yard for each mix design used, the amount of water as free moisture (above SSD) in each size of aggregate, and the aggregate weights per cubic yard of soil cement produced during plant operation. Also include in the report the total amount of each material used per shift. Include in the daily report the proportions for each batch, for batch plants, and for each one hour interval for a continuous plant.

H. Scales for Weight Batching

- (1) Tests and Checking: Check the accuracy of scales with test weights prior to the startup of concreting operations. Retest the scales at least every month of operation thereafter. In addition, retest whenever there are variations in properties of the soil cement that could be the result of proportioning errors. When weight-batching procedures are used, frequently check the accuracy of each batching device during the startup of operations by noting and recording the required weight and the weight actually batched.
- (2) Action Required: When either the weighing accuracy or batching accuracy is found not to comply with specification requirements, do not operate the plant until necessary adjustments or repairs have been made.

I. Volumetric Feed Calibrations

Check the accuracy of volumetric feeds by collecting all material delivered to the mixer during a unit of time. Provide suitable methods and equipment for obtaining and handling samples at the soil cement mixing plant. Determine the weight of material delivered to the mixer during a time interval between 5 to 15 minutes as determined by the Engineer, and calculate the resulting proportions of materials per cubic yard. Determine the accuracy of volumetric feeds at least three times during checkout of the soil cement mixing plant prior to production operations and soil cement placement. Recalibrate plant at least every 30 shifts or 5,000 cubic yards thereafter and whenever there are variations in the properties or control of the soil cement that could be the result of volumetric feed errors. Use samples of sufficient size to give accurate determinations. This may require sample weights in excess of 500 pounds per item checked.

J. Testing Soil Cement Mixers

- (1) General: Sample and test fresh concrete for compliance with the specifications at the placing location. Provide a method of readily obtaining representative soil cement samples from the placement, the plant and gob hopper locations. Approximately 400 pounds of material will be required for each sample.
- (2) Mixer Performance: A mixer performance test is required on a continuous pugmill plant only if the plant has not produced soil cement of similar proportions in the past. The tests may be required if the soil cement shows signs of nonuniformity or inconsistency in test results. In the event the test results show nonconformance with specifications, the Contractor shall adjust mixer to meet specification, or replace with mixer that complies at Contractor's sole cost.

K. Temperature

- (1) Testing: Measure and record the soil cement temperature on an hourly basis at the placement location. Perform additional tests when rapid set time or workability loss is reported by the placing foreman or Engineer, or during periods of hot weather. Record the temperature of the air and the soil cement during the period of cure and cold weather protection when those restrictions are applicable.
- (2) Action Required: When soil cement temperature is outside the specification limits, suspend soil cement placement until the problem is corrected. Include temperatures as standard data in the quality control reports.

L. Moisture Content

- (1) Tests and Checking: Determine the moisture content of the soil cement mix each time a density reading is taken with the nuclear gauge. Determine moisture content at the placement using a nuclear gauge in the backscatter mode immediately after compaction. Drive the probe to the full depth of the lift for each reading. Calibrate the gauge against oven-dry samples of the mix design used. Verify the calibration to oven dry materials at least once per five shifts. Perform at least three tests in different areas of each layer of soil cement placed. Continuously monitor the apparent effectiveness of compaction equipment from a visual standpoint, and notify the mixing plant whenever the soil cement mix becomes too dry or too wet.
- (2) Action Required: When moisture content tests indicate a significant change from what has been established as the optimum mixing and placing moisture, notify the placing foreman who will check the behavior of the mix under conditions at that time. When the placing foreman observes a condition of moisture that begins to consistently allow the vibratory rollers to sink excessively in the mix, cause excessive paste to develop at the surface, or leave an open, unconsolidated appearing surface, make an adjustment to the mix water added at the plant and record the adjustment.

M. Cement and Pozzolan

Visually monitor the cement and Pozzolan feed to the soil cement mix on a continuous basis throughout the operation of the soil cement mixing plant. In addition, directly measure and record the cement and Pozzolan contents of the soil cement, at 30-minute intervals and each time the silos are filled. Use a belt scale to measure the soil cement produced between mixing and loading. A load cell placed under the silos or volumetric measurement of the cement and Pozzolan used since the last silo filling will be acceptable methods of measuring the cement and Pozzolan usage. Report the cement and Pozzolan contents to the Engineer each time measurements are taken.

N. Soil Cement Specimens for Compression Tests

Forms for cylinders will be rigid reusable type with disposable liners. The Contractor shall prepare eight cylinders for testing per ASTM C39 for high strength soil cement and ASTM C42 for low strength soil cement when requested by the Engineer (twice per shift). The Contractor will make, transport, cure, and test all samples (per ASTM C1435 and ASTM D558).

O. Density

- (1) Nuclear gauge must be recently calibrated or during the trial placement, construct a soil cement block for nuclear gauge calibration. Make the block with a newly fabricated 30-inch diameter steel mold. Weigh the mold before, and after, filling with soil cement. Compute the density of the soil cement block and use this computed density to calibrate/check the nuclear density gauges.
- (2) Tests and Checking: At least once every hour during placement, determine the density of the soil cement after compaction with a calibrated nuclear density gauge. Have at least one gauge on the placement area at all times. Test each layer of soil cement with the nuclear gauge every hour or 250 cubic yards, whichever is less, in at least 3 separate locations for wet density. Use the direct transmission mode. The Engineer may perform supplemental density testing with his own gauges.
- (3) Action Required: When the nuclear gauge indicates a wet density less than required, perform a retest. If the retest indicates incomplete compaction, immediately provide additional rolling provided the time limits in Subsection 310.03.06B are met, and determine whether the lower density resulted from insufficient passes of the roller, a change in the mix properties, or segregation at the bottom of the lift. If the mix properties have changed, suspend placement until the problem is corrected. If the problem persists and if the lower density is the result of inadequate rolling, notify the soil cement foreman. The Engineer may require full depth removal of the inadequately compacted material.

P. Compaction Equipment

- (1) Tests and Checking: Before any compactor is used in soil cement construction, check it for correct dimensions, weight, vibratory frequency and amplitude; and cleanliness. At least once per 12 shifts of use, retest the frequency.

- (2) Action Required: Remove compaction equipment not meeting the physical dimensions and weights required from the project. Correct any roller having improper frequency for soil cement compaction. Immediately notify roller operators running at speeds in excess of specification requirements or using improper compaction practices. Correct the problem or, if necessary, replace the operator.

Q. Dumping and Spreading

- (1) Tests and Checking: Continually observe and monitor dumping and spreading operations to ensure that they are done in a manner that minimizes segregation. Routinely check each layer of soil cement in its spread condition for evenness and thickness, so that level, well-compacted layers within the specified thickness tolerance result after compaction. Determine the levelness, thickness, and elevation of each layer.
- (2) Action Required: When thickness checks on uncompacted soil cement indicate an excess or shortage of material, immediately blade off or supplement the layer as needed. Whenever the thickness or elevation exceeds the allowable tolerances, notify the Engineer and he will determine what corrective action, if any, is necessary.

R. Preparation for Soil Cement Placement

Where applicable, inspect foundations, construction joints, forms, and embedded items in sufficient time prior to soil cement placement to assure that the area is ready to receive concrete. Check forms and facing panels for condition, support, alignment, and dimensions. The placing foreman will be the first level of supervision for all placing operations. The soil cement Quality Control Supervisor will determine if the specified mix is placed in the proper location, measure and record concrete temperatures, ambient temperatures, weather conditions, time of placement, yardage placed, and method of placement. Do not permit soil cement placement to begin until an adequate number of vibratory rollers and spreading equipment of the appropriate size, in working order, and with competent operators are available.

S. Curing and Surface Protection

- (1) Continuous Moist Curing: At least every 2 hours, 7 days per week, inspect all areas subject to moist curing and lift surface protection. Record the surface moisture condition at that time. If any area has been allowed to dry, it will be considered as improperly cured.
- (2) Action Required: Clean any area that has been allowed to dry more than 4 hours with a high-pressure water jet (3000 psi). Allow the surface to dry to a saturated surface dry condition and spread bedding mix prior to placing soil cement. If any area was allowed to dry less than 4 hours, clean it using a low-pressure water jet (500 psi) and prepare the surface as described above. The Engineer may require the Contractor to remove improperly cured soil cement.
- (3) Protection: At least every 8 hours around the clock, 7 days per week, inspect all areas subject to cold-weather protection or protection against damage. Record any deficiencies. During removal of cold weather protection, measure concrete and ambient temperature at least every 2 hours. Record and provide temperature measurements to the Engineer on a daily basis.

T. Soil Cement Coring

The Contractor shall obtain 4-inch diameter cores at the locations directed by the Engineer. Obtain cores for the full depth of the soil cement placement and a minimum of 1-foot into the foundation rock (if placed on a rock foundation). Exercise special care to obtain cores in good condition from all holes. Place each core run in core boxes in the correct sequence. Separate the core runs with wooden blocks marked according to the measured depth at the end of each core run. If core loss occurs, place blocks with a similar diameter and a length equal to the core loss in the core box at the location of the core loss. Label the blocks with the amount of the core loss. If the loss area is not known, show the amount of loss on a wooden block with the letters D.O.R., "Distributed Over Run," marked on it and place the block just ahead of the "End of Run" block. Do not place cores from more than one hole in any box. Using a waterproof marker, label the inside of the lid and all four sides of the outside of the box with the hole number, box number, and depth interval. Fasten the covers securely to the core box and deliver the box to the on-site core storage area. All testing of cores will be at the expense of the Contractor.

U. Thickness Testing

The engineer may request a thickness test text at any time to verify the placed thickness of soil cement. If a section of placed soil cement fails to meet the required thickness, additional tests will be done to determine the area that fails to meet these specifications. Areas that do not meet the required thickness as determined by the Engineer shall be subject to replacement:

- V. Acceptance of Soil Cement – Acceptance and penalties for placed concrete shall be determined by the results of the 28 day compressive strength. Soil cement represented by the compressive strength tests which do not meet the minimum strength specified, will be subject to replacement. All soil cement represented by compressive strength test which do not provide at least 75 percent of the specified strength shall be removed and replaced unless allowed to remain in place by the Engineer.

The Contractor, at his own expense, can submit evidence that will indicate to the Engineer that the strength and quality of the soil cement is such that the concrete should be considered acceptable. The owner can perform its own individual testing to verify contractor testing.

If such evidence consists of concrete cores, the Contractor shall obtain three cores from the concrete represented by the failing strength test and deliver them to the Engineer in time to allow complete testing of such cores within 42 days after the placement of the concrete. All cores shall be obtained and tested in accordance with the requirements of AASHTO T-24. The concrete represented by the cores will be considered acceptable if the numerical average of three tests is 75 percent of the required 28-day compressive strength. If the average compressive strength does not meet this requirement, all concrete so represented shall be removed and replaced unless permitted to remain in place by the Engineer.

END OF SECTION 310

SECTION 501 – PORTLAND CEMENT CONCRETE**DESCRIPTION****501.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. All cement used on the work shall be standard brand Portland cement conforming to the "Specifications for Portland Cement" (ASTM C150), Type V, in accordance with requirements contained in Section 701 of the USS.

MATERIALS**501.02.03 ADMIXTURES*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- Q. The use of calcium chloride shall not be permitted.

CONSTRUCTION**501.03.04 CLASSIFICATION AND PROPORTIONS*****ADD THE FOLLOWING PARAGRAPH TO THIS SUBSECTION:***

- F. Concrete shall be composed of cement, admixtures (when approved), aggregates and water. These materials shall be as specified. The exact proportions in which these materials are to be used for different parts of the work shall be determined by the Contractor and submitted to the Engineer for review prior to use in the work. In general, the mix shall be so designed as to produce concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have maximum smoothness of surface. Mix designs where sand represents more than 41 percent of the total weight of fine and coarse aggregate shall not be permitted. The proportions shall be changed whenever necessary or desirable in the opinion of the Engineer. Concrete mixes shall be designed by a Registered Professional Engineer in the State of Nevada representing a qualified independent testing laboratory and approved in advance by the Engineer. Concrete mixing operations shall conform to ASTM C 94. Water shall not be added to concrete after leaving the batch plant unless specifically authorized by the Engineer.

501.03.10 WEATHER LIMITATIONS***ADD THE FOLLOWING PARAGRAPH TO "PART A: GENERAL" OF THIS SUBSECTION:***

4. All exposed concrete surfaces shall be sprayed liberally with an evaporation retarder such as Confilm by Masterbuilders or approved equal, when the ambient air temperature is greater than 100 degrees F.; or when the ambient air temperature is above 90 degrees F. and the wind speed is above 20 mph; or as directed by the

Engineer. Spraying shall be per manufacturer's recommendation and shall occur immediately upon completion of the finish.

ADD THE FOLLOWING PARAGRAPH TO "PART B: COLD WEATHER – GENERAL" OF THIS SUBSECTION:

7. Concrete shall not be placed on frozen ground, nor shall it be placed when atmospheric temperature is below 40 F. and within 24 hours of the time that the concrete is to be placed, except with the written permission of the Engineer and only after such precautionary measures for the protection of the concrete have been taken as the Engineer may direct.

ADD THE FOLLOWING PARAGRAPH TO "PART D: HOT WEATHER" OF THIS SUBSECTION:

9. When the temperature is 90 F. or above, or is likely to rise above 90 F. within the 24-hour period after concrete placement; or when there is any combination of high air temperature, low relative humidity and wind velocity which would impair concrete strength or quality, follow the recommendations of ACI 305R and the following:
 - a. Keep concrete as cool as possible during placement and curing
 - b. Do not allow concrete temperature to exceed 90° F. at placement.
 - c. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
 - d. Dampen subgrade and forms with cool water immediately prior to placement of concrete.
Protect the concrete with temporary wet covering during any appreciable delay between placement and finishing.
 - e. Take appropriate precautions per ACI 305R when the actual or anticipated evaporation rate equals or exceeds 0.2 pounds per square foot per hour as determined from ACI 305R, Figure 2.1.4.

ADD THE FOLLOWING SUBSECTIONS TO THIS SECTION:

501.03.70 CORROSION PROTECTION REQUIREMENT

- A. Pipe, conduit, dowels and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there shall be a minimum of two inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement shall not be permitted.

501.03.71 PREPARATION OF SURFACES FOR CONCRETING

- A. Native material surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud and debris at the time of placing concrete.

- B. Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, in the opinion of the Engineer, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be leveled with a wooded float to provide a reasonably smooth surface. A surface consisting largely of coarse aggregate shall be avoided. The joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material.
- C. No concrete shall be placed until all form work, installation of parts to be embedded, and preparation of surfaces involved in the placing have been approved by the Engineer.

501.03.72 EXCLUSION OF WATER

- A. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited under water without the explicit permission of the Engineer and then only in strict accordance with the Engineer's directions, nor shall the Contractor, without explicit permission from the Engineer, allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as to injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing groundwater, if required, shall be subject to the approval of the Engineer and shall be the responsibility of the Contractor. Said items shall be considered incidental to construction and no additional compensation shall be made.

501.03.73 TAMPING AND VIBRATING

- A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense, homogenous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement.

501.03.74 CARE AND REPAIR OF CONCRETE

- B. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which for any other reason does not conform to the specifications, shall be removed and replaced at the Contractor's expense.

END OF SECTION 501

SECTION 502 – CONCRETE STRUCTURES**DESCRIPTION****502.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. This work shall also include construction of headwalls, wingwalls, u-channels, trapezoidal channels, stilling basins, outlet structures, connection and transition/splitter structures, and pre-cast concrete box culverts. This shall include the construction of temporary head walls necessary to support the travel lanes and/or work adjacent to the excavation for the reinforced concrete box culvert and roadway.

CONSTRUCTION**502.03.09 CONCRETE DEPOSITED UNDER WATER*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- G. Groundwater may be encountered on this project. In such case, the Contractor will dewater the excavated area and subbase for the concrete structures improvements in such a manner that the concrete will not be placed in any standing water.

ADD THE FOLLOWING SUBSECTIONS TO THIS SECTION:**502.03.70 TEMPORARY HEAD WALL**

- A. The Contractor may utilize the temporary head walls for support of the required travel lane(s) and/or work areas adjacent to open excavation. If the Contractor chooses to utilize temporary head walls, the Contractor shall provide the Engineer with design plans and calculations for such head walls and/or supports. The design plans shall be in detail, showing all information as required by the Engineer, and shall bear the seal of a Nevada Registered Engineer.

METHOD OF MEASUREMENT**502.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****502.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 502**

SECTION 505 – REINFORCING STEEL**MATERIALS****505.02.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- F. At selected locations as indicated on the Contract Drawings, reinforcing steel shall be galvanized (zinc coated), in accordance with ASTM A767 or epoxy-coated.
- G. At the expansion joint locations shown on the Contract Drawings or as directed by the Engineer, reinforcing steel shall be sprayed, coating the entire circumference of the bar, with a zinc-rich formulation conforming to ASTM A767.

METHOD OF MEASUREMENT**505.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****505.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 505**

SECTION 601 – PIPE CULVERTS-GENERAL**DESCRIPTION****601.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. This work shall also consist of preparing utility final location information as described on the project drawings and in Section 622 of these Special Provisions.

CONSTRUCTION**601.03.07 VIDEO INSPECTION*****ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION***

- H. The following paragraphs define the requirements for internal video inspection of storm drain facilities after installation.
1. The Contractor shall inspect the storm drain facility interior using a color closed circuit television (CCTV) camera and document the inspection on image with audio location and date information, image title information, and hard copy inspection logs. The CCTV inspection shall be performed after the installation has been completed.
 2. Field operator(s) of inspection equipment must have current National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Certification.
 3. Television Inspection Camera. Equipment shall be operative in 100 percent humidity conditions. Lighting intensity shall be remote controlled and shall be adjusted to minimize reflective glare. Lighting and camera quality shall provide a clear, in-focus picture of the entire inside periphery of the storm drain facility.
 4. Digital Storage Medium. The inspection shall be recorded, stored and submitted on CD's (or DVD's) in high quality MPG format on CD -R/+R disks formatted for use with PC systems. The audio portion of the composite CD shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of the oral report.
 5. Footage Counter. A footage counter device, which measures the distance traveled by the camera in the storm drain facility, shall be accurate to plus or minus 2 feet in 1,000 feet.
 6. Video Tilting. Pan and tilt unit, with adjustable supports specifically designed and constructed for operation in connection with storm drain facility inspection.

7. Flow in Storm Drain Facility. During internal video inspections the Contractor shall provide temporary dry conditions in the storm drain facility unless otherwise agreed upon by the Engineer.

I. Inspection Methods for Internal Video:

1. Verbal Commentary. None required except to note operational problems such as camera failure, or restart of inspection.
2. Access. The Engineer shall have access to observe the monitor and all other operations at all times. The system of cabling employed to transport the camera and transmit its signal shall not obstruct the camera's view.
3. Inspection Rate. The camera shall be pulled through the storm drain facility in either direction, but all inspections at each location shall be in the same direction. Rate of travel shall be such that a comprehensive inspection/analysis may be performed but at no time shall exceed 30 feet per minute when recording.
4. Image Perspective. The camera image shall be down the center axis of the storm drain facility when the camera is in motion. The Contractor is required to provide a 360-degree view of the interior. Points of interest shall also be shown on the video and shall include, but not be limited to, all joints, defects, encrustations, mineral deposits, debris, sediment, any location determined not to be clean or part of a proper installation or defects in the materials.
5. Storm Drain Facility Identification. All inspection documentation shall include the location referenced to the project survey control specifically the pipe stationing.
6. Defect Coding. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) coding system, latest version, shall be used to document all defects visible on the image recordings.
7. Quality Control. The Engineer will review CD's or DVD's and logs to ensure compliance with the requirements listed in this specification and contract documents.
8. The Contractor shall be responsible for modifications to his equipment and/or inspection procedures to achieve report material of acceptable quality. No work shall commence prior to approval of the material by the Engineer. Once accepted, the report material shall serve as a standard for the remaining work.
9. Contractor shall maintain a copy of all inspection documentation (CDs, databases, and logs) for the duration of the work and warranty period.

ADD THE FOLLOWING SUBSECTION:

601.03.70 MARKER BALLS

- A. Marker balls shall be installed per local entity requirements.

METHOD OF MEASUREMENT

601.04.01 MEASUREMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

METHOD OF PAYMENT

601.05.01 PAYMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

END OF SECTION 601

SECTION 603 – REINFORCED CONCRETE PIPE**DESCRIPTION****603.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. This work shall also consist of providing storm drain connections for the storm drain and laterals as directed by the Engineer.

CONSTRUCTION**603.03.07 INSPECTION*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- E. Internal Video Inspection. Internal video inspection shall be performed by the Contractor a minimum of 30 days after final backfill has been placed and prior to final acceptance by the Contracting Agency. This inspection includes 360 degree taping of all storm drain lateral joints. The line shall be cleaned and inspected per Subsection 601.03.07 "Video Inspection."

METHOD OF MEASUREMENT**603.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****603.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 603**

SECTION 609 – CATCH BASINS, MANHOLES AND INLETS**DESCRIPTION****609.01.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- B. This work shall also consist of preparing utility final location information as described on the project drawings and in Section 622 of these Special Provisions.

MATERIALS**609.02.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- F. Grout shall conform to ASTM C476 and shall have a minimum strength of 2000 psi. Fine grout shall be proportioned by volume of one part Portland cement and 2-1/4 to 3 parts sand. Coarse grout shall consist of one part Portland cement, 2-1/2 to 3 parts sand, and 1 to 2 parts coarse aggregate.
- G. Laboratory design mixes for grout, approved by a Licensed Professional Engineer in the State of Nevada, are acceptable in lieu of the above proportions and are required if the maximum strength is more than 2000 psi. Grout shall be of a fluid consistency with proper proportions of sand to gravel for pouring and pumping.
- H. All exposed steel shall be hot-dipped galvanized per section 715.

METHOD OF MEASUREMENT**609.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****609.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 609**

SECTION 611 – CONCRETE SLOPE PAVING**MATERIALS****611.02.01 GENERAL*****DELETE PARAGRAPH “C” AND REPLACE WITH THE FOLLOWING:***

- C. Reinforcing for the slope paving and cutoff walls shall be reinforcing steel in accordance with the Contract Drawings and Section 505.

ADD THE FOLLOWING TO THIS SUBSECTION:

- F. Concrete for the concrete slope paving and cutoff walls shall be modified Class A or AA using Type V cement (6.0 sack minimum, 0.53 water/cement ratio), having a minimum twenty-eight (28) day compressive strength of 3000 psi having a slump not to exceed 4-inches.

METHOD OF MEASUREMENT**611.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****611.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 611**

**SECTION 613 – CONCRETE CURB, WALK, GUTTERS, DRIVEWAYS AND ALLEY
INTERSECTIONS****MATERIALS****613.02.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- B. This work shall also consist of concrete access road and concrete cutoff walls.
- C. The cement to be used for all concrete shall be Type V Portland Cement.
- D. The reinforcing steel shall be Grade 60.

CONSTRUCTION**613.03.06 SLIP FORMS*****ADD THE FOLLOWING TO PARAGRAPH "H" OF THIS SUBSECTION:***

- 1. The adhesive shall be applied, per the manufacturers recommended application rate.
- 2. Cover 100 percent of the contact area between the underlying surfaces and new concrete.

METHOD OF MEASUREMENT**613.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****613.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 613**

SECTION 621 – MONUMENTS

621.01.01 GENERAL

DELETE PARAGRAPH "B" OF THIS SUBSECTION AND REPLACE WITH THE FOLLOWING:

- B. All monuments destroyed and/or damaged shall be installed by the Contractor in accordance with the Uniform Standard Drawings, and under the direct supervision of the Engineer. The Contractor shall coordinate his work with the Engineer.

METHOD OF MEASUREMENT

621.04.01 MEASUREMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

BASIS OF PAYMENT

621.05.01 PAYMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

END OF SECTION 621

ADD THE FOLLOWING SECTION TO DIVISION II – CONSTRUCTION DETAILS**SECTION 622 – CONSTRUCTION SURVEYING BY THE CONTRACTOR****DESCRIPTION****622.01.01 GENERAL**

- A. The Contractor shall, under supervision of a Professional Land Surveyor, registered in the state of Nevada, furnish and set construction stakes establishing locations, lines, and slope stakes for roadway, storm drain, drainage structures, sewer, laterals, and for all other improvements for project necessary to ensure conformance of work to lines, elevations, locations, and grades as shown on the Plans and in these Special Provisions. Any horizontal or vertical discrepancies shall be reported to Engineer prior to commencement of construction. Any revisions or changes approved by Engineer that affect lines, grades, elevations or locations of any improvement shall be indicated on As-Built (Record) Drawings.
- B. If necessary, the Contractor shall also perform and provide to the Engineer those items described in subsection 203.04.01 of the USS. Any revisions or changes approved by the Engineer that affect the lines, grades, elevations or locations of any improvement shall be indicated on the As-Built (Record) Drawings.
- C. Contractor shall preserve property line and corner survey points. If their destruction is determined by Engineer to be unavoidable, and their replacement is not called for on the plans, Owner shall replace or pay for their replacement under this contract as determined by Engineer. Markers that are disturbed or destroyed by Contractor's operations without prior approval by the Engineer shall be replaced by Contractor at no additional cost to the Owner. Replacement shall be done only by a Nevada Professional Land Surveyor and in accordance with the USS. A monument tie sheet for replacement of permanent survey monuments shall be submitted to Engineer for approval.
- D. When a permanent survey marker and/or monument is located within the construction area of any roadway, storm drain, drainage structures, sewer line or channel improvement, the Contractor shall adjust the cover or replace the monument as noted on the plans. The cost of replacement or adjustment of said monuments shall be included in the lump sum bid for Construction Survey. If monuments are to be installed as part of the work, they shall be placed in accordance with the USD numbers 239 through 243 and Section 621 of the USS.
- E. The Contractor shall, under the supervision of a Professional Land Surveyor, prepare and provide GPS location and mapping of as-built conditions for all proposed sanitary sewer and storm drainage facilities as described on the Project Drawings and in this Section.

MATERIALS**622.02.01 BLANK****CONSTRUCTION****622.03.01 GENERAL**

- A. Prior to all work in this section, the Contractor shall carefully inspect all installed work and verify that all such work is complete to a point where this installation may properly commence.
- B. The Contractor shall verify that all work can be installed in accordance with all pertinent codes and regulations, Contract Drawings and referenced standards.
- C. The Contractor shall verify that there are no conflicts with existing utilities prior to the start of work.
- D. In event of a discrepancy, the Contractor shall immediately notify the Engineer in writing.
- E. Installation of work in areas of discrepancy shall not proceed until all such discrepancies have been fully resolved.
- F. After stakes and marks have been set, it shall be the responsibility of the Contractor to protect the stakes and marks. Should any of the stakes or marks be destroyed or disturbed by the Contractor's operations or otherwise, the costs of replacing said stakes or marks shall be paid by the Contractor.
- G. The Engineer, at his discretion, may periodically have survey work performed to verify conformance to the construction plans. Any nonconformity found to be the fault of the Contractor, or the Professional Land Surveyor, shall be corrected at no additional cost to the Owner.
- H. Upon completion of the project and as a condition for final payment authorization, the Contractor shall furnish to the Engineer a Record of Survey/monument tie map and a certification attested to by the Professional Land Surveyor that the work performed for this contract has been constructed to the lines and grades as described in the As-built (Record) Drawings. When requested, the Contractor shall also provide the Engineer with copies of all field notes, computations, and other related work performed by the Professional Land Surveyor.

622.03.02 FINAL ACCURACY

- A. Surface Drainage Structures (including all concrete or asphalt gutters and drains) shall be installed within 0.05 feet horizontally and 0.05 feet vertically from the location taken from the project plans, and shall not vary more than 10 percent of the gradient shown on the plans.

- B. Monument Cases and Brass Caps shall be centered to within 0.01 feet horizontally of the position as called for on the plans, and the ties to that monument.
- C. Sanitary and Storm Drainage Sewer Systems shall be installed within 0.05 feet horizontally and 0.05 feet vertically of the exact location taken from the project plans. In addition, the gradient of any 10-foot section of pipe shall not vary by more than 10 percent of the gradient shown the project plans

622.03.03 INSTALLED/EXPOSED UTILITY SURVEYING

- A. All measurements are to be made by the Surveyor who will be certifying the project as constructed.
- B. The contractor is responsible for coordinating with the Surveyor during construction and shall provide access to all utilities prior to being buried; allowing accurate horizontal and vertical measurements to be acquired by the Surveyor. In the event of any discrepancies identified by CLV and at no cost to CLV, the Contractor shall verify the location and measurements of any buried utilities.
- C. After construction of the approved plans and before backfilling, survey shall be conducted indicating the size, horizontal and vertical location, and configuration of any utility constructed with this project or utility exposed during construction, and utility encasement if applicable. Utility final location information shall be described by coordinates which shall be based on the official horizontal and vertical control networks of the City of Las Vegas and be certified by a Nevada professional land surveyor to have positional certainties within +/- 0.3-ft.
- D. Survey measurements for utilities constructed or exposed during the course of construction including but not limited to pipes, manholes, drop inlets, conduits, cables, encasements, boxes, vaults and appurtenances shall be located to the extent possible within the excavation area. Measurements shall be taken at a minimum of 100-ft intervals, at all exposed angle points, deflections of the utility exceeding +/- 0.5-ft, at all exposed points that enter/exit the excavation or the public right-of-way, and sufficient measurements to accurately define curving layout.
- E. Potholes performed by the contractor prior to or during construction shall be surveyed indicating the size, location, burial depth, and configuration of the utility. Pothole location information shall be tied to the official horizontal and vertical control networks of the City of Las Vegas and be certified by a Nevada professional land surveyor.
- F. Utility final location information shall be submitted on paper and in electronic form, on a form specified by the City Surveyor. Submittal requirements and examples are included in Appendix E.
- G. Interim and final survey progress reports shall be submitted to the Engineer certifying sufficient survey measurements have been performed prior to backfilling as required by this section on a weekly basis or as directed.

END OF SECTION 622

SECTION 624 - ACCOMMODATIONS FOR PUBLIC TRAFFIC**DESCRIPTION****624.01.01 GENERAL*****DELETE THIS SUBSECTION IN ITS ENTIRETY AND REPLACE WITH FOLLOWING:***

- A. The work shall consist of providing safe and effective work areas and to warn, control, protect and expedite vehicular and pedestrian traffic through the construction zone. It shall be the sole responsibility of the Contractor to provide for the safety of the traveling public within the limits of the project.
- B. The work shall be performed in accordance with the MUTCD Latest Edition and as specified in these Special Provisions.

ADD THE FOLLOWING SUBSECTIONS:**624.01.70 SPECIAL TRAFFIC CONTROL, LANE RESTRICTIONS OR ACCESS ISSUES:**

- A. Refer to section 107.07 for traffic and access requirements and section 108.04 for limitations of operations.

CONSTRUCTION**624.03.01 SPECIAL DETOURS*****DELETE PARAGRAPH "A" AND REPLACE WITH THE FOLLOWING:***

- A. Special detours shall be constructed as shown on the Traffic Control Plan prepared by the Contractor. Detour locations indicated on the Traffic Control Plan may be approximate only; the exact location shall be staked by the Contractor's surveyor.

ADD THE FOLLOWING PARAGRAPHS TO THIS SUBSECTION:

- G. It is the City of Las Vegas's policy that under no circumstances will travel on a temporary gravel surface be permitted for longer than fifteen (15) calendar days. Temporary gravel surfaces shall be graded, watered and maintained at all times to provide a smooth dust free traveled surface.
- H. All temporary detours and/or bypasses that are expected to be in service for more than fifteen (15) calendar days shall be hard surfaced with a minimum of 1-1/2 inches of AC pavement and maintained in a smooth and usable condition at all times for the duration of the detour and/or bypass.

624.03.02 FLAGGERS***ADD THE FOLLOWING TO THIS SUBSECTION:***

- D. Proper advance warning signs shall be in place when flaggers are working and removed when work requiring flaggers is completed.
- E. Flaggers shall be used to assist trucks for safe ingress and egress whenever truck movements may interfere with safe passage through the work zone. The flaggers' first priority shall be to maintain the safe and efficient movement of the public traffic. In the event that a flagger is to flag at an intersection controlled by a stop sign they must bag the sign(s) prior to taking control of traffic. If a flagger is to flag at an intersection controlled by a traffic signal the traffic signal must be turned off prior to taking control of traffic. Any changes to regulatory signs or changes to a traffic signal shall be reversed at the end of every workday, unless approved by the traffic engineer. Failure to do so could result in an order to stop work.
- F. The "Flagger Method" as outlined in Part VI of the MUTCD shall be used for all one lane, two-way traffic control.

ADD THE FOLLOWING SUBSECTIONS TO THIS SUBSECTION

624.03.70 TEMPORARY STRIPING

- A. The temporary traffic striping tape material shall conform to subsection 635.02.01 of the NDOT Standards. Placement of temporary pavement striping shall be by pilot line method and its use limited to fourteen (14) calendar days. The tape shall be four (4) inches wide and four (4) feet long and spaced every forty- (40) feet. The color of the tape shall match the color of the existing line. The double yellow line shall have two pieces of tape side by side with a four (4) inch space between, and spaced to the above increments.
- B. Painted temporary striping shall be 4-inches wide and shall be continuous or intermittent in accordance with the MUTCD. Painted temporary striping shall not be used on the final wearing course of the pavement.
- C. Existing pavement markings, either painted or raised pavement markers, which are not applicable and are within the transverse limits of the temporary travel lanes shall be removed to the satisfaction of the Engineer. Painting over existing markings will not be allowed.

624.03.71 TEMPORARY BRIDGES FOR VEHICULAR ACCESS

- A. Where necessary or required for the convenience of the traveling public or individual residents, businesses or schools, The Contractor shall provide temporary bridges over all unfilled excavations at all street, driveway and alleyway, crossings unless otherwise directed by the Engineer. The bridges shall remain in place until the excavations have been properly backfilled to the satisfaction of the Engineer.
- B. Temporary bridges for street crossings shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by said authority for such bridges or shall submit designs for approval by said authority as may be required. If plates are used, they must be capable of carrying the heaviest anticipated loads

using the roadway, be properly anchored so as to prevent any transverse and/or any longitudinal shifting of the plate and must be certified by a structural engineer registered in the State of Nevada. Refer to the City of Las Vegas Trench Plate Requirements detail in Appendix "B".

624.03.72 PIPE LAYING OPERATIONS

- A. Pipe stored in the street rights of way within a barricaded work zone, with the approval of or at the direction of the Engineer, which is to remain one night or more shall be protected by Barrier Rail. Type B high intensity warning lights will be installed on the barrier rail at intervals not exceeding 25 feet.
- B. During working hours, the Contractor shall have no more than three hundred (300) feet of open trench and/or structure excavation nor more than one half (1/2) of an intersection closed to vehicular traffic, except with specific written permission by the Engineer. During non-working hours, the Contractor shall have no more than one hundred (100) feet of open trench and/or structure excavation barricaded in accordance with these supplemental specifications. Pedestrian access crossings suitably equipped with handrails shall be provided as directed by the Engineer. The cost of such crossings shall be included as a part of the traffic control bid item.

624.03.73 TRAFFIC CONTROL DEVICES

- A. Trained and knowledgeable traffic control personnel shall be utilized to insure proper set-up and maintenance of traffic control devices and to assist in the safe movement of vehicles through the traffic control zone.
- B. The Contractor from the public right-of-way shall remove all traffic control devices that are not in use or will not be used for a period greater than 24 hours. All traffic control devices that are determined by the Engineer to be unnecessary, confusing, or causing an unsafe condition, shall be removed by the Contractor from the public right-of-way immediately upon written notification by the Engineer. The Contractor shall not, at any time, use the sidewalk area to store unused barricades unless the sidewalk is closed and an approved barricade plan is provided for rerouting the pedestrians.
- C. The Contractor shall maintain all barricades and other traffic control devices in clean and effective condition. The Contractor shall replace poorly maintained devices immediately upon notification by the Engineer.
- D. The Contractor shall begin placing the barricades in the direction of traffic. The Contractor shall remove the barricades in a direction opposing traffic.
- E. **Temporary Stop Signs:** All temporary stop signs shall be installed in a semi-permanent manner in the ground or pavement surface in accordance with Standard Drawing Number 249 of the USD.

624.03.74 TRAFFIC CONTROL SUPERVISOR

- A. The Contractor shall designate a Traffic Control Supervisor who shall be responsible for initiating, installing and maintaining all traffic control devices as shown on the traffic and plans, as specified in the MUTCD, and revisions thereto, the USS, these supplemental specifications or as directed by the Engineer. When traffic control devices are on the project site the designated Traffic Control Supervisor shall be available to the Engineer twenty-four (24) hours a day for the duration of the contract. The Traffic Control Supervisor shall be an employee of the Contractor and under the supervision of the Superintendent. The person so designated shall be certified as a worksite traffic control supervisor by the ATSSA. The name and qualifications of this person shall be submitted to the Engineer in accordance with subsection 100.02.02 "Contractor Submittals" of these Special Provisions.
- B. The Traffic Control Supervisor shall be capable of being on-site within thirty- (30) minutes of notification.
- C. The traffic control supervisor shall make at least four (4) inspections of all traffic control devices each calendar day as follows:
 - 1. Before beginning work
 - 2. At mid shift
 - 3. Half an hour after the end of the shift
 - 4. Once during the period of non working hours
- D. The Traffic Control Supervisor shall make a daily record of traffic control activities including a reference to the barricading in effect that day. The Project superintendent shall sign the daily record each day attesting to its accuracy. The Contractor shall submit these records to the Engineer on a weekly basis.

624.03.75 REQUIRED PROTECTION FOR OPEN EXCAVATION DURING WORKING AND NON-WORKING HOURS

- A. The following requirements apply to any open excavations where the difference in elevation between the pavement and the excavated area is greater than 6":
 - 1. Any open excavations, in the roadway or within eighteen (18) feet of the roadway, which does not provide a 4:1 (horizontal: vertical) slope between the edge of pavement and the bottom of the excavation, shall be protected with portable precast concrete traffic barrier rails and six (6) feet high non-climb fence. All portable precast concrete traffic barrier rails shall be butted tight and pinned in accordance with the requirements of the Nevada Department of Transportation's Standard Drawing R-8.3.3, entitled "Portable Precast Concrete Barrier Rail", which is hereby incorporated into the plans.
 - 2. Any open excavation further than eighteen (18) feet and less than three hundred (300) feet from any building or roadway, shall be, as a minimum, completely fenced with a six (6) foot high non-climb fence.
 - 3. Any open excavation beyond three hundred (300) feet of any building or roadway shall be protected with a three (3) foot high earth berm completely around the excavation. Type II Barricades with Type B high intensity warning lights shall be spotted around the top of the berm after daylight hours.
 - 4. Barrier rails and fencing may be required, during working hours, when determined by the Engineer, to be in the interest of public safety.

- B. The following requirements apply to any open excavations adjacent to a sidewalk where the difference in elevation between the back of the sidewalk and the excavated area is greater than 6 inches:
1. The open excavation shall be protected, as a minimum, with a six (6) foot high non-climb fence.

METHOD OF MEASUREMENT

624.04.01 MEASUREMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

BASIS OF PAYMENT

624.05.01 PAYMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

END OF SECTION 624

SECTION 625 – CONSTRUCTION SIGNS**MATERIALS****625.02.01 GENERAL*****ADD THE FOLLOWING TO THIS SUBSECTION:***

- C. Reflective sheeting shall be used on all work zone signs and channelizing devices.

CONSTRUCTION***ADD THE FOLLOWING SUBSECTIONS TO THIS SECTION:*****625.03.05 PORTABLE CHANGEABLE MESSAGE SIGNS**

- A. Portable Changeable Message Signs (PCMS) conforming to the MUTCD, Part 6, Section 6F.60 shall be used to advise the driver of road closures on streets with an 80-foot or greater right-of-way.
- B. The PCMS shall be placed far enough in advance of the closed street to allow traffic ample opportunity to detour around the disrupted area.
- C. The location and number of PCMS will be determined by the Engineer.
- D. Solar powered panels shall be used in residential areas.

625.03.06 ARROW DISPLAYS

- A. Arrow Displays conforming to the MUTCD, Part 6, Section 6F.61, Type B, shall be used to advise the driver of lane closures when so directed by the Engineer.
- B. The Arrow Displays shall be required at the beginning of the taper and placed behind the barricades in the closed lanes, as required by the approved traffic control plan and as directed by the Engineer.
- C. Solar powered panels shall be used in residential areas.

METHOD OF MEASUREMENT**625.04.01 MEASUREMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****BASIS OF PAYMENT****625.05.01 PAYMENT*****DELETE THIS SUBSECTION IN ITS ENTIRETY:*****END OF SECTION 625**

SECTION 637 - POLLUTION CONTROL

DESCRIPTION

637.01.01 GENERAL

ADD THE FOLLOWING TO THIS SUBSECTION

- D. Dust control work includes creating a Dust Control Mitigation Plan (DCMP), obtaining all necessary approvals for the DCMP, obtaining a Dust Control Permit for Construction Activities, payment of all fees associated with the project dust control, all work necessary to comply with the DCMP, Dust Control Permit, and the requirements of Section 94 of the Clark County Department of Air Quality Regulations, most recently adopted.
- E. Any fines or penalties levied by the Clark County Department of Air Quality and Environmental Management due to violations of the project Dust Control Permit requirements are the sole responsibility of the Contractor and shall be paid by the Contractor.
- F. The Contractor shall use all necessary Stormwater Runoff Best Management Practices (BMPs) performing the Work so as to not discharge stormwater runoff containing pollutants or sediment into the waters of the United States, including municipal separate storm sewer systems (MS4s) in violation of federal and state laws, rules, and regulations and the City's water pollution requirements.
- G. The Contractor shall:
 - 1. Comply with the provisions of Nevada Revised Statutes, Chapter 445A: Water Pollution Control and City of Las Vegas Municipal Code 14.18; and
 - 2. Adhere to all Federal regulations under 40 CFR 122.26(b)(14).
 - 3. Submit SWPPP Submittal Checklist found in Appendix A of these Special Provisions to the Owner's Representative. This checklist must be on file prior to the issuance of the Notice to Proceed for construction.
- H. All information and forms pertaining to Nevada's Stormwater NPDES Permitting Program can be found on the following website:
<http://ndep.nv.gov/bwpc/storm01.htm>.
- I. The City, state and federal regulations identified above are hereby incorporated by reference as preconditions of this Contract. The Contractor shall familiarize itself with these regulations and practices, and is advised that prior to engaging in any construction activities, the Contractor shall submit a Notice Of Intent (NOI) to the Nevada Division of Environmental Protection. A Storm Water Pollution Prevention Plan (SWPPP) must be completed prior to submission of the NOI and must remain on the project site and be updated as necessary for the duration of the project. As applicant, the Contractor is responsible for insuring that all persons on the project site, including contractor and subcontractor personnel, abide by the conditions of the permit. As the applicant, the Contractor is responsible for supplying complete copies of the NOI and SWPPP to all project subcontractors.

- J. Upon completion of the project, the Contractor will need to permanently stabilize the construction area and file a Notice Of Termination (NOT) with NDEP to terminate the permit. The Contractor shall provide a copy of the approval letter of termination from NDEP to the Owner. Receipt of this letter will be required prior to acceptance of Contractor's final payment request.
- K. Contractor shall apply for, pay for, and gain approval of the required permit from NDEP in a timely manner so as not to affect the project schedule. Contractor shall comply with the requirements of the permit and shall bear all associated costs. If the Owner suffers damages including but not limited to delays and fines as a result of the Contractor's failure to obtain a required permit or for non-compliance with the requirements of the permit, the Contractor shall reimburse the Owner for such damages and the Owner may withhold amounts equal to the damages from the Contractor's payments. Failure of the Contractor to obtain required permits in a timely manner shall not be justification for delay of the issuance of the Notice to Proceed by the Owner.
- L. Any fines or penalties levied by the City of Las Vegas, Nevada Division of Environmental Protection, U.S. EPA, or any local, state, or federal agency to violations of the project Stormwater Runoff Management requirements are the sole responsibility of the Contractor and shall be paid by the Contractor.

CONSTRUCTION

ADD THE FOLLOWING SUBSECTION TO THIS SECTION:

637.03.70 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) PERMIT FOR CONTRACTOR'S STAGING AREAS

- A. The following applies to the Contractor's staging areas:

NDEP, Bureau of Water Pollution Control, has issued general permit NVR100000 that covers construction activities within the state of Nevada. The Contractor shall comply with the requirements of the general permit at no extra cost to the Owner. In order to be covered by the permit, the Contractor shall submit, at no extra cost to Owner, a Notice of Intent (NOI) and the required filing fee on the Internet at http://www.ndep.nv.gov/bwpc/storm_cont03.htm.
- B. Upon the completion of the construction, Contractor is responsible for permanently stabilizing the staging area, filing Notice of Termination (NOT), and obtaining approval of NOT with NDEP to terminate the permit.

637.03.71 ROCK MULCH

- A. Rock mulch, granite based non-organic ground cover, shall be placed 4 inches thick on all disturbed areas [outside of the detention basin] as required by NDEP final stabilization requirements for the purpose of dust control. Unless otherwise specified, rock mulch shall be one inch (1") minus from a local quarry. The Contractor shall

provide with a sample of the proposed rock mulch a minimum of forty-eight (48) hours prior to start of work with any relative manufacturer's comprehensive product description, including specifications and installation instructions.

- B. Final approval of product samples shall be made by the Owner and Engineer. No work shall proceed until Contractor has coordinated and received approval of the material from NDEP and provided a copy of the written approval to the Owner. Contractor shall then receive written approval from the Owner prior to proceeding with work.
- C. All areas to receive rock mulch [outside of the detention basin] shall be treated with pre-emergent herbicide in accordance with the manufacturer's recommendations and approved by the Engineer.

METHOD OF MEASUREMENT

637.04.01 MEASUREMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

BASIS OF PAYMENT

637.05.01 PAYMENT

DELETE THIS SUBSECTION IN ITS ENTIRETY:

END OF SECTION 637

APPENDIX A – SWPPP CHECKLIST

**LAS VEGAS VALLEY STORMWATER QUALITY MANAGEMENT PROGRAM
CONSTRUCTION PERMIT SUBMITTAL CHECKLIST**

(Applies to all Grading, Site Development, Building, and Encroachment Permits and plans including Final, Parcel, Subdivision, Site Drainage and Erosion and Sediment Control Plans)

Owner / Operator (applicant) Information

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____ Phone: _____

Project Name: _____

Project Address/Location: _____

Signature: _____ Date: _____

Total area of land disturbance = _____ acres, _____ square feet (must match permit application).

If the area of land disturbance is one acre or more, the applicant must submit a copy of their Notice of Intent (NOI) to Nevada Division of Environmental Protection (NDEP) to be regulated under Stormwater General Permit NVR100000 and submit a copy of the receipt for payment of the annual fee or the letter of authorization from NDEP (address attached). Once payment has been received by NDEP, the applicant is immediately covered under the State's permit.

- ☐ 1. Copy of NOI attached
☐ 2. Copy of receipt or letter of authorization attached

By submitting a copy of the NOI and the receipt or authorization from NDEP, the applicant acknowledges that they are aware of the requirements set forth in the State's General Permit and have developed and will implement a site specific Stormwater Pollution Prevention Plan (SWPPP). The applicant further acknowledges that they are aware of the Las Vegas Valley Construction Site BMP Guidance Manual and the required performance standards set forth in Section 3.2 of the manual. To ensure compliance with these performance standards, the applicant shall submit a completed Performance Standards Compliance Checklist, indicating the BMPs that implement standards 1 – 12. It is recommended that the applicant also attach a copy of the checklist to their SWPPP.

- ☐ Copy of Performance Standards Compliance Checklist completed (see reverse side)

Yes No Were calculations required for sizing of diversion channels and/or sediment retention basins? If the answer is yes, pursuant to NRS 625.565, a Nevada Registered Professional Engineer must review and stamp plans, such as grading plans and reports that require engineering calculations.

☐ ☐

In addition to the submittal requirements specified above and in the ordinances, the following shall be included as a set of standard notes to be depicted on all site plans that disturb one acre or larger:

- ☐ Standard notes from Section 3.5 of the Las Vegas Valley Construction Site BMP Guidance Manual on design plans

To submit a Notice of Intent (NOI), contact:

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
901 South Stewart Street
Suite 4001
Carson City, NV 89701-5249
Phone: (775) 687-9429
Fax: (775) 687-4684
Web: <http://ndep.nv.gov/bwpc/index.htm>

LAS VEGAS VALLEY STORMWATER QUALITY MANAGEMENT PROGRAM CONSTRUCTION PERMIT SUBMITTAL CHECKLIST

The checklist that follows identifies the BMPs that can be used at construction sites to meet each of the Performance Standards of the Las Vegas Valley Construction Site BMP Guidance Manual (BMP Guidance Manual). You must select at least one BMP for each performance standard to meet the minimum requirements. Please refer to the BMP Guidance Manual to assist you in selecting BMPs for your site. It is the responsibility of the person who fills out this checklist to ensure that the BMPs selected are included in the contract bid documents and implemented at the site. If your project or site has characteristics that make meeting a performance standard infeasible or inapplicable (e.g. size of site, slope of site), please explain these characteristics at the bottom of the form.

Performance Standard	Check if Selected	BMPs	Comments
1. Schedule construction and minimize clearing and grading	☐ PL-1 Site Design ☐ PL-2 Scheduling ☐ PL-3 Phased Construction ☐ PL-4 Topsoil Reuse ☐ EC-3 Protect Trees/Vegetation ☐ Other or N/A (explain)		
2. Stabilize disturbed areas	☐ EC-1 Erosion Control Mats ☐ EC-2 Mulching ☐ EC-7 Dust Control ☐ EC-12 Surface Roughening ☐ SPC-6 Revegetation ☐ Other or N/A (explain)		
3. Protect slopes	☐ EC-8 Diversion Dikes ☐ EC-4 Pipe Slope Drains ☐ EC-12 Surface Roughening ☐ EC-7 Dust Control ☐ EC-1 Erosion Control Mats ☐ SPC-6 Revegetation ☐ SPC-1 Organic Filler Barriers ☐ SPC-2 Sand Bag Barrier ☐ SPC-3 Gravel Filler Berms ☐ Other or N/A (explain)		
4. Design conveyance for non-erosive velocities	☐ EC-9 Diversion Dikes ☐ SPC-4 Check Dams ☐ EC-11 Outlet Protection ☐ Other or N/A (explain)		
5. Protect waterways, natural drainages and storm drains	☐ PL-1 Site Design ☐ EC-9 Diversion Dikes ☐ EC-3 Protect Trees/Vegetation ☐ SPC-1 Organic Filler Barriers ☐ SPC-2 Sand Bag Barriers ☐ SPC-3 Gravel Filler Berms ☐ SPC-5 Silt Fence ☐ SPC-8 Temporary Stream Crossing ☐ EC-11 Outlet Protection ☐ SPC-7 Storm Drain Inlet Protection ☐ Other or N/A (explain)		

Performance Standard	Check if Selected	BMPs	Comments
6. Install sediment traps / retain eroded sediments on-site	☐ SPC-4 Check Dams ☐ SPC-1 Organic Filler Barrier ☐ SPC-2 Sand Bag Barrier ☐ SPC-3 Gravel Filler Berm ☐ SPC-5 Silt Fence ☐ SPC-9 Temporary Sediment Traps ☐ SPC-8 Temporary Sediment Basins ☐ Other or N/A (explain)		
7. Remove accumulated sediment	☐ Use Standard Note No. 5 ☐ Other or N/A (explain)		
8. Control site entrances and exits	☐ EC-5 Stabilized Site Entrance ☐ EC-6 Construction Road Stabilization ☐ SPC-11 Entrance/Exit Tire Wash ☐ GH-6 Road Sweeping/Trackout Cleaning ☐ Other or N/A (explain)		
9. Manage materials and wastes	☐ GH-2 Solid Waste Management ☐ GH-5 Spill Containment Plan ☐ Other or N/A (explain)		
10. Manage equipment and vehicles	☐ GH-3 Equipment Maintenance Procedures ☐ GH-4 Designated Washdown Area ☐ Other or N/A (explain)		
11. Stabilization of inactive disturbed areas	☐ PL-4 Topsoil Reuse ☐ EC-2 Mulching ☐ EC-7 Dust Control ☐ SPC-6 Revegetation ☐ Other or N/A (explain)		
Explanation why performance standard(s) cannot be met:			

APPENDIX E – SURVEY SUBMITTALS

Surveyor's Certificate

I, Alan R. Riecki, a Professional Land Surveyor licensed in the State of Nevada certify that:

1. The Utility Final Location Survey Progress Submittal dated 5/14/15 File name _____ last modified _____ and indicated in whole or in part on CLV drawing number 307V-1074 Sheets C-4 thru C-6, represents the result of a survey conducted under my direct supervision at the instance of ABC Construction.
2. The survey was completed on 5/12/15.
3. This survey complies with the City of Las Vegas Special Provisions section 622 and applicable state statutes in effect on the date that that the survey was completed.
4. The survey is based upon the City of Las Vegas Horizontal and Vertical control as indicated on the approved plans, and positional accuracies meet or exceed +/- 0.3' horizontally and vertically.

Alan R. Riecki, PLS
Nevada Certificate #12469