

ADDENDA NO. 2

To The

DRAWINGS AND PROJECT MANUAL

For The

Moorpark College Parking Structure & Police Station

7075 Campus Rd.

Moorpark, California 93021

Project No. 10-555

Prepared By:

INTERNATIONAL PARKING DESIGN, INC.

Architects/Engineers/Parking Consultants

14144 Ventura Boulevard, Suite 100

Sherman Oaks, CA 91423

(818) 986-1494

IPD Job No:

Date: 08.21.2012

NOTE: The following clarifications, deletions, additions and supplements have been incorporated into the original Contract Drawings and Project Manual dated 07/18/2012, and shall be included as a part of the Bid / Contract Documents.

In case of conflict between Drawings, Specifications and this Addendum, this Addendum shall supersede all previous Drawings, Specifications, Addenda and instructions pertaining to these items and the work of this Contract.

Addenda shall become a part of Contract awarded. Owner and Architect will not be responsible for any oral or other explanations or interpretations. Receipt of Addenda by the Bidder must be acknowledged on the Proposal (Bid Form) in the space provided. Should this signed and dated addendum not be attached to the proposal, the proposal could be considered non-responsive.

SIGN AND ATTACH A COPY OF THIS ADDENDUM COVER TO YOUR BID

I hereby acknowledge that I have received, read and understand this Addendum and certify that the total price/time bid includes any and all additions/deletions associated with this Addendum.

Company Name

Bidder's Signature

Ventura County Community College District

ADDENDA NO. 2

Moorpark College Parking Structure – VCCCD Project #19125
IPD ARCHITECTURE / ENGINEERING / CONSULTING
STANDARD SPECIFICATIONS

00902-1

I. SUPPLEMENTAL INFORMATION

A. NOTICE TO CONTRACTOR FOR BID DATE CHANGE

Revised Bid Date Notice by Heery International, Inc.

B. SUPPLEMENTAL NOTES & UPDATED SPECIFICATION SECTIOS

Provided by: "GEOTECHNIQUES"

C. SUPPLEMENTAL NOTE

Provided by: "AE Group Mechanical Engineers"

END OF SECTION

A. **NOTICE TO CONTRACTOR FOR BID DATE CHANGE:**

Please make note that the **bid date** has been **revised** to the following:

Thursday, September 6th, 2012 @ 1:00 PM



Orlando De Leon

Project Engineer | LEED AP BD+C

805.797.3005 cell

103 Durley Avenue, Camarillo, CA 93010

ZERO HARM Make Safety Personal

B. SUPPLEMENTAL NOTES & UPDATED SPECIFICATION SECTIONS:

GEOTECHNIQUES
1645 Donlon Street, Ste. 107
Ventura, California 93003
805-658-8952, (805) 456-9585

August 9, 2012

ADDENDUM #2

Subject: Addendum No. 2 to Bid Package for Parking Structure, Moorpark College, Moorpark, California
Supplemental Notes to Plans and Updated Specification Sections

Plan Sheets

Sheet 1: Add General Note No. 29:

CONTRACTOR TO PROVIDE AS-BUILT SURVEY OF 1) BOTTOM OF OVEREXCAVATION ELEVATIONS AND LIMITS AND 2) INVERT ELEVATIONS OF ALL RETAINING AND BELOW-GRADE WALL BACKDRAIN PIPES AT 50-FOOT-HORIZONTAL INTERVALS PRIOR TO BACKFILLING.

Sheet 2: Delete third paragraph under "ESTIMATED EARTHWORK QUANTITIES":

"THE ABOVE QUANTITIES DO NOT INCLUDE THE OVER-EXCAVATION SPECIFIED IN THE GEOTECHNICAL REPORT." (City set sheet 2)

And replace with:

SHRINKAGE OF UP TO 10 PERCENT SHALL BE APPLIED TO COMPENSATE FOR VOLUME LOSSES WHEN COMPACTING ALL NEAR-SURFACE MATERIALS EXCAVATED AND PLACED AS FILL. AT LEAST 3,000 CUBIC YARDS OF GENERAL FILL MATERIALS ARE STOCKPILED ~500 FEET NORTHWEST OF PROJECT SITE.

Plan showing location of stockpile attached as page 3 of this Addendum.

Sheet 4: Remove existing tree in conflict with proposed vegetated swale location.

(City set sheet 4)

Sheet 5: Change first sentence of General Note 4 to:

"BOTTOM OF OVEREXCAVATION SHALL BE 7 FT BELOW BOTTOM OF FOOTINGS OR ENTIRELY THROUGH EXISTING ARTIFICIAL FILL AND OLD BURIED TOPSOIL, WHICHEVER IS DEEPER, PER SECTION 6.1.3 OF THE GEOTECHNICAL STUDY."

And add as last sentence to General Note 4:

BOTTOM OF OVEREXCAVATION SHALL NOT EXCEED A GRADIENT OF 20 PERCENT.

Add as second sentence to General Note 5:

CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY OF BOTTOM OF OVEREXCAVATION PRIOR TO FILL PLACEMENT.

Sheet 5 (continued): Add following General Notes 9 and 10:

9. CONTRACTOR SHALL CLEAN SLOPE EXCAVATION FACES EXPOSING NATIVE MATERIALS AND ACCOMMODATE UP TO 2 DAYS INTERRUPTION IN SCHEDULE FOR OBSERVATION BY THE ENGINEERING GEOLOGIST.
10. FILL MATERIALS SHALL BE MOISTURE-CONDITIONED TO BETWEEN 0 AND +3 PERCENT OVER OPTIMUM MOISTURE CONTENT, PROCESSED AND REDUCED TO PEA-SIZE OR FINER CONSISTENCY, AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY DETERMINED IN ACCORDANCE WITH ASTM D1557. CONTRACTOR SHALL ANTICIPATE SHRINKAGE OF SOILS AFFECTED BY COMPACTION ON THE ORDER OF UP TO ABOUT 10%.

Sheet 6: Add following Construction Note:

CONTRACTOR TO PROVIDE AS-BUILT SURVEY OF BOTTOM OF OVEREXCAVATION ELEVATIONS AND LIMITS AND ALL INVERT ELEVATIONS OF RETAINING AND BELOW-GRADE WALL BACKDRAIN PIPES AT 50-FOOT-HORIZONTAL INTERVALS PRIOR TO BACKFILLING.

Sheets 7 and 17: Add following Note to Plan at Detention and Retention Basin:

PROTECT DETENTION AND RETENTION AREA EXCAVATION BOTTOM FROM INCIDENTAL COMPACTION OF NATIVE SOILS THROUGH SURCHARGE LOADING OR TRAFFICKING BY CONSTRUCTION EQUIPMENT. PLACE GRAVEL FILL IN BOTTOM FROM OUTSIDE OF EXCAVATION TO MINIMIZE EQUIPMENT LOADING.

Sheet 10: Delete sentence: "The above quantities do not include the over-excavation specified in the in the geotechnical report."

Sheet 17: Add following Note to Bottom of Detention/Retention Basin in Sections L-L and M-M:

UNCOMPACTED BOTTOM -- DO NOT DISTURB, COMPACT, OR SURCHARGE WITH EQUIPMENT OR STOCKPILE LOADS

Specifications

Revised sections attached: 02200 Earthwork, 02221 Trenching and Backfilling, 02225 Earthwork for Structures, 02231 Aggregate Base

1.00 GENERAL

1.01 SUMMARY

- A. Section includes: Excavation, Compaction and Fill.

1.02 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Standard Specifications for Public Works Construction (SSPWC), 2009.
- C. CAL/OSHA Construction Safety Order Requirements.
- D. Soil Testing Service
1. The District will engage a soil testing service to include testing soil materials proposed for use in the Work and for quality control testing during grading operations.
 2. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use.
 3. Work of this Section includes smoothing out areas for density tests and otherwise facilitating testing work, as directed.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

1.04 PROJECT CONDITIONS

- A. The Contractor shall visit the site and familiarize himself with existing site conditions.
- B. Additional test borings and other exploratory operations may be made by the Contractor at no cost or liability to the District.
- C. Existing Utilities: Where uncharted or incorrectly charted piping or other utilities are encountered during excavation, contact the District Representative immediately for directions. Cooperate with the District Representative in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the District Representative at no cost to the District.
- D. Protect existing underground utilities and improvements from settlement and lateral movement during and after excavating.
- E. Protection of Subgrade: Do not allow equipment to pump, rut, or disturb subgrade, stripped areas, or other areas prepared for Project.

- F. Contractor shall implement measures to prevent soil erosion, and where possible, sediment shall be retained onsite.
- G. Contractor shall implement all recommendations contained in the Geotechnical Study.

2.00 PRODUCTS (Not Applicable)

3.00 EXECUTION

3.01 SITE PREPARATION

A. General:

1. Remove vegetation including entire root mat within upper several inches and dispose offsite prior to start of excavating. Remove improvements or obstructions interfering with installation of new construction. Transport and legally dispose of off-site. Removal includes stumps and roots. Care shall be taken so as not to scar any area of the tree's bark. Contractor shall utilize the best construction method to minimize the erosive effect from the removal of site vegetation.
2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over one inch in size with tree pruning compound.
3. In order to protect from sediment transfer or contamination from urban run-off during construction, the contractor shall implement all BMPs specified in the SWPPP. In addition, the following grading and erosion control practices shall be observed:
4. If grading occurs during the rainy season (November through April), sediment traps, barriers, covers and other methods specified in the SWPPP shall be used to reduce erosion and sedimentation.
5. Excavated materials shall not be deposited or stored where the material can be washed away by high water or storm run-off.
6. Grading operations on site shall be conducted so as to prevent damaging effects of sediment production and dust on the site and on adjoining properties.
7. When vegetation has to be removed on site, the method shall be one that minimizes the erosive effects from the removal.
8. Exposure of soil to erosion by removing vegetation shall be limited to the area required for construction operations. The construction area shall be fenced to define the project.
9. BMPs identified in the SWPPP regarding temporary mulching, seeding, or other suitable stabilization shall be implemented to protect areas during construction or other land disturbance activities on site.
10. Topsoil, removed from the surface in preparation for grading and construction activities on Campus is to be stored on or near the site and protected from erosion while grading operations are underway, provided that such storage may not be located where it would cause suffocation of root systems of trees to be preserved. After completion of such grading, topsoil is to be restored to exposed cut and fill embankments of building pads so as to provide a suitable base of seeding and planting.

11. Any sediment basins, sediment traps, or similar control measures specified in the SWPPP shall be installed before extensive clearing and grading operations begin for site development.
12. Water or dust palliatives shall be applied to exposed earth services as necessary to control dust emissions.
13. Revegetation or stabilization of exposed earth surfaces shall take place as soon as possible.

B. Removals:

1. Clear the site of trees, shrubs, and other vegetation, which is indicated to be removed.
2. Completely remove stumps, roots, and other debris to avoid problems with future utilities.
3. Clearing and grubbing shall consist of cutting and removing weeds, followed by stripping and wasting root mat, typically between 4 and 6 inches thick. Removal and wasting organic material consists of offsite disposal.
4. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
5. Existing fills, soil containing debris, organics, pavement, or other unsuitable materials shall be excavated and removed prior to commencing grading operations.
6. Demolition areas shall be cleared of old foundations, slabs, abandoned utilities, landscaping, and soils disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill.
7. The limits and depths for removal of existing fill materials shall be evaluated by project soils engineer during grading.
8. Revegetation or stabilization of exposed earth surface shall take place as soon as possible.

C. Removal of Improvements:

1. Remove above-grade and below-grade improvements necessary to permit construction and other work as indicated.
2. Remove from site and legally dispose of off-site, existing fill materials, soil debris, or other unsuitable materials prior to commencing grading operations.

3.02 EXCAVATION

A. Excavation for Pavements:

1. Cut surface under pavements to comply with the Geotechnical Study, cross-sections, elevations and grades as shown, within a tolerance of plus or minus 0.04 foot.

B. Excavation for Planting Areas:

1. Conform to cross-sections, elevations and dimensions shown, within a tolerance of plus or minus 0.10 foot.

3.03 COMPACTION

A. General:

1. Control soil compaction during construction providing minimum of 95 percent of the maximum dry density, as determined by ASTM D1557, and as recommended in the Geotechnical Study.
2. Processing and Placement of Fill Materials: Onsite or imported fill soil shall be placed and compacted between 0 and +3 percent over optimum moisture content, as specified in the Geotechnical Study. Each layer shall be spread evenly and thoroughly blade-mixed during spreading to provide relative uniformity of material within each layer. Blocky or chunky earth materials shall be broken down to pea-size or finer during processing and prior to application of compactive effort. Where imported soils are placed adjacent to onsite fill material, the soil should be mixed to provide relative uniformity of material within the layer being placed. Processing and placement of fill materials shall be observed and approved by the District's Testing Laboratory.
3. Fill shall be spread in loose lifts no thicker than 8 inches prior to being compacted. Fill and backfill materials may need to be placed in thinner lifts to achieve the recommended compaction with the equipment being used. Loose lift thickness shall not exceed 6 inches when using hand-operated compaction equipment.
4. Percentage of Maximum Density Requirements: Compact soil to not less than the percentages of maximum dry density specified in the Geotechnical Study and in accordance with ASTM D1557 method of compaction. However, all fill material shall be compacted to a minimum of 95% relative compaction.

B. Moisture Control:

1. When moisture content of exposed scarified soil and/or fill material is below that sufficient to achieve recommended compaction, water shall be added to the soil and/or fill. While water is being added, soil shall be bladed and mixed to provide relatively uniform moisture content throughout the material.
2. When moisture content of exposed scarified soil and/or fill material is excessive, material shall be aerated by blading or other methods. Fill placed in pavement areas shall be compacted at near optimum moisture content. Jetting is not permitted for compaction.

3.04 FILL

- A. In all excavations, use satisfactory excavated or borrow material meeting the minimum soil properties for general and select fill, as appropriate, sampled and tested by the District's Testing Laboratory.
- B. Select backfill materials for retaining walls and below-grade walls, and placed within the upper 18 inches of floor slab subgrade shall consist of granular material with the following properties:
 1. Sand equivalent of at least 20,
 2. 100 percent passing the 3-inch sieve,
 3. Expansion index less than 10,
 4. 50 to 100 percent of the material passing the No. 4 sieve, and
 5. At least 15 percent of the material passing the No. 30 sieve.
- C. Onsite or imported general fill material shall be free of organics, debris, or rocks larger than 4 inches, and shall have an Expansion Index (EI) less than 20.

- D. Fill excavations as promptly as Work permits, but not until completion of the following:
 - 1. Acceptance by the District Representative of construction below finish grade including, where applicable, waterproofing, damp-proofing, and drainage pipe.
 - 2. Examination, testing, approval and recording locations of underground utilities.
 - 3. Removal of concrete formwork.
 - 4. Removal of shoring, bracing, and backfilling of voids with satisfactory materials.
 - 5. Removal of artificial fill, trash and debris.
 - 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- E. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation
- F. Protect excavations by methods required to prevent movements and/or loosening of soils providing lateral or vertical support to existing improvements.
- G. Deepen bottom of overexcavations in building areas to limit fill thickness/excavation bottom gradient to less than 20 percent.
- H. Materials loosened or disturbed by installation and removal of shoring, or other earthmoving operations, shall be compacted to a minimum of 95 percent of the maximum dry density. Contractor's means and methods shall not compromise completeness and uniformity of fill compaction requirements. Vertical or horizontal zones of fill materials not achieving minimum compaction requirements or native materials disturbed or loosened by their operations shall be mitigated by removal and recompaction, such as trenching and backfilling compromised materials, consistent with these Specifications.
- I. Continual dust control, as required by the SWPPP, and in accordance with County Air Pollution Control District's Standards shall be required for the project construction.

3.05 GRADING

- A. General: To provide support for building floor slabs, all existing fill and unsuitable natural soils shall be excavated and replaced as properly compacted fill.
- B. Compaction: After grading, compact subgrade surfaces to the depth and percentage of compaction for each area classification. All fill material shall be compacted to a minimum 95% relative compaction.

1. Fill placement and grading operations shall be performed only under the observation of the District's Testing Laboratory.
2. A shrinkage factor of about 10 percent shall be used to estimate the amount of additional material necessary to compensate for volume losses when compacting near-surface soils used as fill.
3. The exterior grades around building areas shall be sloped to drain away from the building to prevent ponding of water adjacent to foundations.
4. Grading operation shall be conducted so as to prevent damaging effects of sediment product and dust on the site and adjoining properties.

3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Transport excess excavated material and legally dispose of offsite.

3.07 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction:
 1. The District's Testing Laboratory will observe, test and approve excavation bottoms, subgrades and fill layers before further fill placement and construction Work can be performed. The District's Testing Laboratory will determine the frequency of tests. Subgrade: Allow at least one field density test of subgrade to be made for every 2000 sq. ft. of paved area, but in no case less than 3 tests. Fill Placed During Rough Grading of Slope/Building Pad: Allow at least 1 test for every 500 cubic yards of fill placed.
 2. Contractor shall cut testing surface at locations indicated by Testing Laboratory personnel.
 3. Field examination and testing will be performed by the District's Testing Laboratory. The Contractor shall cooperate with such testing and shall give the District Representative advance notice of grading scheduling.
 4. Frequency of Tests for Trenching: Not-to-exceed 18 inches in depth and not-to-exceed 150 foot intervals or as determined by the District's Testing Laboratory.
 5. If in the opinion of the District's Testing Laboratory, based on soil testing reports and observations, subgrades or fills which have been placed are below specified density, provide corrective work as specified at no additional expense to the District.
- B. As-Built Survey
 1. Contractor shall survey vertical and horizontal Limits of Overexcavation Bottom prior to placing backfill.
 - a. Contractor to clean excavated slope face along northeastern, eastern, and southeastern excavated slopes to facilitate mapping of all exposed native materials by Engineering Geologist.
 - b. Contractor shall accommodate two days of mapping of the exposed cut slopes by the Engineering Geologist after cleaning.
 2. Contractor shall secure as-built elevations of retaining and below-grade wall backdrain pipe invert at no less than 50-foot intervals prior to placement of gravel around pipe and backfilling behind wall.

3.08 .PROTECTION

- A. Contractor to protect stormwater infiltration basin site and subgrades from surcharge loading of heavy equipment traffic and stockpiles or other loads over duration of construction activities.
- B. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- C. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- D. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work as specified, with retesting, prior to further construction.
- E. Earth materials and improvements constructed thereon shall be supported laterally and vertically, as needed, to prevent movements and deflections of same. Remediation and repair of loosened materials or movements of improvements shall be at the Contractor's expense.

END OF SECTION

1.00 GENERAL**1.01 SUMMARY**

- A. Excavating trenches for construction of utilities.
- B. Trench backfill materials.
- C. Backfilling and compacting requirements.

1.02 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Standard Specifications for Public Works Construction (SSPWC), 2009.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

1.04 SUBMITTALS

- A. Materials source.
- B. Sand equivalent test reports per ASTM D2419.
- C. Certificates.
- D. Drawings for shoring, bracing, sloping, or other provisions for worker protection for any excavation shall conform to the requirements of the CAL/OSHA Construction Safety Orders Requirements.

1.05 EXISTING UTILITIES

- A. Drawings show existing major underground utilities from reference drawings. Prior to excavation, the Contractor shall notify the District Representative to obtain any additional information which may be applicable to the Work.
- B. Protect underground utilities and structures to remain in place from settlement and lateral movement during excavation.
- C. Any incident of a utility being inadvertently damaged by the Contractor shall be immediately shut-off and then be immediately repaired by the Contractor at no cost to the District.
- D. Contractor to pothole all utility connections and crossings to field verify exact size, location, depth, and material prior to beginning construction and notify the

District Representative of any discrepancies.

2.00 PRODUCTS

2.01 APPROVALS

- A. Imported material shall be approved by the District Representative prior to being brought to the site. Provide a sample of the material in sufficient quantity for the District's Testing Laboratory's use in evaluating the material.

2.02 TRENCH BEDDING AND BACKFILL MATERIAL

- A. Bedding and pipe zone materials extending 1 foot above top of pipe shall be sand and have a sand equivalent (SE) of 30 or greater.
- B. Crushed aggregate base per Section 02231, Aggregate Base Course, shall be used for HDPE pipe trench bedding and backfill material, to stabilize yielding or wet trench bottom, or as specified by the pipe manufacturer.
- C. Slurry backfill shall conform to the requirements of SSPWC Sections 201-1 and 201-6. Contractor shall take due precautionary measures to prevent misalignment and/or floating of pipe during backfill operations.
- D. Onsite native soil for trench backfill shall conform to Section 02200, Earthwork, Subsections 3.4 Fill, and SSPWC Section 306-1.3.
- E. Topsoil shall be Class B topsoil in accordance with Section 212-1.1.3 of the SSPWC. Topsoil removed from trenches shall be stockpiled at locations approved by the District Representative.

2.03 SOURCE QUALITY CONTROL

- A. Observation and testing shall be performed by the District's Testing Laboratory.

3.00 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.02 TRENCH EXCAVATION

- A. Organics, including entire root mat, shall be stripped from trench alignment and stockpile areas and wasted prior to excavating.
- B. All saw cutting shall be neat, straight cuts and shall conform to SSPWC Section 300-1.3.2. All cuts shall be square unless otherwise specifically noted on plans.
- C. Trench excavation shall conform to the specifications of the Geotechnical Study, SSPWC Section 306-1.1, and the following requirements:
 - 1. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavations shall be made to receive the bell of the pipe and the

- joint shall not bear upon the bottom of the trench. All adjustments to line and grade shall be made by scraping away or filling in with sand under the body of the pipe and not by wedging or blocking.
2. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade, at no additional cost to the District, per Geotechnical Study Section 4.10.
 3. Trench bottom shall be observed by the Geotechnical representative prior to placement of bedding sand. Bedding sand shall have a minimum compacted thickness of 6 inches.
 4. Bedding and pipe zone sand shall be moisture-conditioned to optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
 5. Minimum trench width shall accommodate size of compaction equipment in pipe shading zone.
 6. Place the backfill material over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base.
 7. Trench backfill materials shall be moisture-conditioned to optimum moisture content outside the trench and processed and reduced to to pea-sized consistency. Backfill shall be compacted to a minimum of 95 percent of the maximum dry density.
 8. If shoring is required, the trenches shall be shored and braced in accordance with the Trench Construction Safety Orders of the Division of Industrial Safety.
 9. When subgrade is encountered that in the opinion of the District Representative is unsuitable for pipe support, the District Representative may order the excavation to be carried to an approved depth below the bottom of the pipe and backfilled with sand or aggregate base, to the lines and grades shown on the drawings and specified by the District Representative.
 10. The minimum width of the trench at the top of the pipe zone shall be as necessary to install the pipe and achieve compaction in the shading zone. The utility lines shall be centered in the trench. In the event of (1) actual physical interference between existing crossing subsurface utilities and the proposed utility lines and (2) vertical discrepancy in connecting proposed utility lines to existing utility system, a minimum clearance of 1 foot between the utility line and the crossing, interfering utility shall be provided, unless otherwise indicated on the plans.
 11. Where existing utilities or tree roots are to be protected, trench excavation shall be by hand. No mechanical excavating equipment shall be used within 6 inches of any utility or root.
 12. Trenching machinery may be used for excavations provided the specified trench width can be maintained.

3.03 TRENCH BACKFILL

- A. Pipe bedding and trench backfill materials:
 1. Suitable imported pipe bedding for utilities shall consist of material having a sand equivalent of at least 30.
 2. The sand backfill material shall be placed within the pipe zone that extends from the bottom of the pipe to at least 12 inches above the top of the pipe for the full width of the trench.

3. The horizontal distance between the springline of the pipe and the side walls of the trench shall be such that bedding material can be properly placed and compacted below the haunches of the pipe.
 4. Crushed aggregate base shall be used for HDPE pipe trench bedding and backfill material, or as specified by the pipe manufacturer.
 5. Crushed aggregate base shall be wrapped with Mirafi 140N geotextile fabric.
 6. The horizontal distance between the springline of the HDPE pipe and the side walls of the trench shall be 12 inches minimum.
 7. Mechanical compaction of bedding and pipe zone materials shall be performed and water consolidation (jetting) methods of compaction shall not be permitted.
 8. All fill materials shall be compacted to a minimum 95% relative compaction. Placement, processing, and compaction of bedding and pipe zone materials shall be consistent with Section 02200, Earthwork, Subsections 3.03 Compaction and 3.04 Fill, of these Specifications and SSPWC.
- B. Trench backfill placed above the pipe zone shall consist of suitable onsite or imported soil or cement slurry per plan and trench section. The trench backfill materials shall be compacted to at least 95 percent relative compaction. Mechanical compaction of trench backfill shall be performed and water consolidation (jetting) methods of compaction shall not be permitted. Trench backfill in landscape areas shall be compacted to a minimum of 95 percent relative compaction or per landscape specifications, whichever is more stringent.
- C. Trench backfill shall be moisture conditioned and processed and compacted consistent with Section 02200, Earthwork, Subsections 3.3 Compaction and 3.4 Fill, of these Specifications and SSPWC Section 306-1:
1. During the process of laying pipe in trenches, sufficient material shall be carefully placed and hand tamped about the pipe to hold it firmly to established line and grade. Oversized material, broken rock or shale, if encountered, shall not be used for backfill.
 2. No motor driven mechanical compacting equipment shall be used over pipelines until the backfill has been compacted to 12 inches over the crown of the pipe.
 3. All backfill material shall be deposited in horizontal layers not exceeding the thickness specified in Section 306-1.3.2 of the SSPWC and not exceeding 8 inches in loose thickness. Backfill materials shall be moisture-conditioned to between 0 and 3 percent over optimum moisture content prior to placement in trench. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets, streaks or other imperfections. Backfilling shall be done with earth free from lumps greater than pea-size consistency, hardpan, chunks, paving material, organic matter or other deleterious substances.
 4. Jetting of bedding or backfill material to obtain specific moisture content or for compaction shall not be permitted. If encountered, existing fill in the utility excavation shall be excavated and recompacted or removed and replaced with new fill materials per requirements of this section.
 5. Compaction of all backfill material for trenches, pavements or structures, shall be to a minimum of 95 percent of the maximum dry density

determined by ASTM D1557.

6. Appropriate warning detector tape shall be placed over all utilities. Underground detectable warning tape shall be placed over all non-metallic underground utilities.
7. Prior to final cleanup or resurfacing, the District's Testing Laboratory shall take compaction tests in any backfill area and at any depth, with the Contractor providing equipment and operator to assist in such test. If any such compaction test fails, the Contractor shall correct such failure and pay for any retesting that is required. The District's Testing Laboratory shall take as many tests as he feels is required to receive a satisfactory and acceptable job.

3.04 STOCKPILING

- A. Stockpiling of imported materials or excavated materials shall direct surface water away from approved stockpile site to prevent erosion.
- B. After stockpiles are removed, leave area in a clean and neat condition.

3.05 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use
- C. Work of this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
 - 1. Perform excavation, fill, backfill and compaction required to conform to the requirements of the Construction Documents and Geotechnical Study for the construction of the parking structure and related appurtenances.
 - 2. Subgrade preparation under structural foundations, elevator pits and slab on grade.
 - 3. Maintenance of excavations, including shoring, sheeting and all other necessary lateral support, as required.
 - 4. Obtain permission, cut off, cap and remove or reroute as required, underground utilities which interfere with proposed construction.
 - 5. Disposal of excess debris, unsuitable fill and surplus materials from site.
 - 6. Import soil, if required.
 - 7. Fine grading as necessary to complete the work.
 - 8. Furnish and install vapor barrier under interior floor slabs of the BI Level Storage, Mechanical Room, Electrical Cart Storage Electrical Room, Communications Room Storage Room and Elevator Mechanical Room.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02100: Site Clearing
- B. Section 02200: Earthwork
- C. Section 02221: Trenching and Backfilling
- D. Section 02231: Aggregate Base Course
- E. Section 02720: Site Storm Drainage
- F. Section 02900: Landscape
- G. Section 07122: Fluid Applied Waterproofing
- H. Divisions 2, 15 & 16: Excavation and Backfill for Underground Utilities

1.03 WORK NOT INCLUDED

- A. Observation and testing of required earthwork which is provided by the Geotechnical Engineer and paid by District.
- B. Initial site demolition, grubbing and clearing, refer to Section 02100 - Site Clearing.

1.04 REFERENCE STANDARDS

American Society of Testing and Materials (ASTM) Specifications
ASTM C33 Specification for Concrete Aggregates

ASTM D448 Classification for Sizes of Aggregate for Road and Bridge Construction.
 ASTM D882 Test Methods for Tensile Properties of Thin Plastic Sheeting
 ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
 ASTM D1248 Standard Specification for Polyethylene Plastic
 ASTM D1556 Test Method for Density of Soil in Place by the Sand Cone Method
 ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil
 ASTM D2103 Standard Specification for Polyethylene Film and Sheeting
 ASTM D2167 Test Method for Density and Unit Weight of Soil in Place
 ASTM D2487 Classification of Soils for Engineering Purposes
 ASTM D2922 Test Method for Density of Soil and Soil-Aggregate in Place (Nuclear Method)
 ASTM D3017 Test Method for Water Content of Soil and Rock in Place (Nuclear Method)
 ASTM E96 Test Methods for Vapor Transmission of Materials
 ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs

- B. Standard Specifications for Public Works Construction (SSPWC), latest edition, as adopted by local jurisdiction
- C. Geotechnical Study "Parking Structure Moorpark College", dated February 2011, by Geotechniques.

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Provide field density test reports for existing subgrade and compacted fills in conformance with Sections 01425 – Testing and Inspection.
- C. Sample(s) (at least 50 pounds) of proposed import soil. Refer to requirements hereafter.

1.06 REQUIREMENTS

- A. The scope of work of this section relates to all earthwork operations that are necessary for the construction of the proposed parking structure over a prepared pad in conformance with the Geotechnical Study and all supplemental data. This specification manual also contains Section 02200–Earthwork, which applies to all operations and procedures that are to be complied with for appurtenances outside the lines of the parking structure. Conflicts related to overlapping specified requirements shall be brought to the Owner's attention for direction prior to execution. No allowance will be made to the Contractor for issues that could have been resolved.
- B. Prior to performing any excavation, verify acceptance with Dig Alert (800) 227-2600 or Underground- Service Alert (800) 422-4133.
- C. Perform work in compliance with applicable requirements of laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction over work.

- D. Site and soil coefficient shall conform to the generalized soil characteristics given in the Geotechnical Investigations Report and Chapter 18(A), Section 1803(A) and conforming to Table 18-I-A of the California Building Code. Grading at a minimum shall conform to Chapter 33(A), Section 3301(A).1.
- E. Prevent surface water and subsurface ground water from entering excavations and ponding on prepared subgrades and from flooding the project site and surrounding areas. Provide equipment and procedures to incorporate a dewatering system, as required.
- F. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust to adjacent properties, walkways, roadways or into public way.
- G. Requirements of Section 02220 – Rough Grading and Excavation apply to the work of this section as if contained in full herein.
- H. The Geotechnical Engineer shall be provided with a sample (at least 50 pounds) and notified of the location of any soils proposed for import at least 72 hours in advance. Each proposed import source should be sampled, tested and accepted for use prior to delivery of the soils to the site. Soils imported prior to acceptance may be rejected if not suitable for use as compacted backfill or if previously accepted import materials deviate from specifications upon importing to site.

1.07 PROJECT CONDITIONS

Contractor shall examine site, contract drawings, record of existing utilities and construction, record of test borings and geotechnical report, etc. Records of test borings are for information only and are not guaranteed to represent all conditions that will be encountered. Contractor is required to accept actual conditions at the site and do the work specified without additional compensation for possible variation from grades and conditions shown, whether surface or subsurface.

1.08 QUALITY ASSURANCE

- A. District's Geotechnical Engineer shall perform field compaction density tests on placed fill to verify compliance with Section 01425 -Testing and Inspection.
- B. Test results that indicate that the fill or backfill is in non-compliance with the required moisture and density, the Contractor shall accomplish such remedy as may be directed by the Architect / Engineer. Subsequent testing to show compliance with requirements shall be by the District's testing laboratory and at the Contractor's expense.
- C. Tolerances for excavation and backfill elevation are plus or minus 0.10 foot.

1.09 PROTECTION

- A. Existing Utilities

1. Maintain existing utilities that are to remain in service. Before excavating over or adjacent to existing utilities, notify utility District to ensure protective work shall be coordinated and performed in accordance with utility District's requirements. If existing service lines, utilities and utility structures that are to remain in service are uncovered or encountered during these operations safeguard and protect from damage and support if necessary.
 2. Consult Architect and Utility Owner immediately for directions should uncharted or incorrectly charted piping or other utility be encountered during excavation. Cooperate with District and public or private utility companies in keeping their respective services, utilities and facilities in operation. If damaged, repair utilities to satisfaction of Architect and applicable utility Owner.
- B. Existing Facilities: Protect and maintain in satisfactory manner, existing pavements, curbs, gutters, structures, conduits, fences, walls and other facilities above and below grade. Protect existing improvements from settlement and lateral movement during excavation and through duration of open excavation. Restore facilities damaged by construction operations.

1.10 POLLUTION CONTROL

- A. The Contractor shall take all necessary precautions and measures to control, minimize and remedy the generation of objectionable dust or materials/spoils spillage. Such measures shall include but not be limited to water spraying of aggregate stockpiles, tarpaulin-covered truck beds, minimization of mud tracking by haul vehicle tires, and maintenance/cleaning of access roads, entry areas and connecting roadways.
- B. Clean adjacent structures and improvements of all dust, dirt, debris caused by operations as directed by the Architect / Engineer. Return areas to conditions existing prior to the start of work.
- C. Contractor shall conform to all environmental mitigation control requirements as specified, as if contained in full herein.

2.00 MATERIALS

2.01 FILL AND BACKFILL MATERIAL

- A. Soil placed as engineered fill shall be conditioned 0 to 3 percent over optimum moisture content, processed and reduced to pea-sized or finer consistency, and compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557
- B. Imported soils shall be approved by the Geotechnical Engineer prior to importing and shall be subject to verification testing upon onsite stockpiling.
- C. General fill, whether reconditioned onsite fill or imported fill, shall be clean, granular material/mixture, free from oversized rock greater than 4 inches, organic matter, rubbish, construction debris and other deleterious substances. ..

Geotechnical Engineer shall approve any soils prior to importing. Expansion index of general fill material shall be less than 20.

- D. Select fill material for below slab on grade and for use as backfill behind structural foundation / retaining walls, whether onsite select fill, reconditioned onsite fill or imported fill shall be clean, granular material / mixture free from deleterious substances and rock larger than 4 inches. Properties of select fill shall include:
1. Sand equivalent of at least 20,
 2. 100 percent passing the 3-inch sieve,
 3. Expansion index less than 10,
 4. 50 to 100 percent of the material passing the No. 4 sieve, and
 5. At least 15 percent of the material passing the No. 30 sieve.
- Select fill materials shall be approved by the Geotechnical Engineer prior to importing and verified after placement as fill.
- E. Materials loosened or disturbed and voids created by installation and removal of shoring shall be backfilled, as applicable, and compacted to a minimum of 95 percent of the maximum dry density.
- F. Aggregate Base Course / Drainage Fill Materials:
1. Natural Gravel / Rock: Washed, clean gap-graded mixture of clean angular crushed gravel, ASTM D448 coarse aggregate grading size 4 with particle size ranging from 3/4 inch to 1-1/2 inch.
 2. Reclaimed Rock: Caltrans Standard Specifications Class 2 conforming to Section 26-1.02A crushed miscellaneous base rock material with no asphalt derivatives.
- G. Sand: ASTM C33 consisting of clean, natural sand graded to not more than 8% passing a #100 sieve and not more than 3% passing #200 sieve.

2.02 TEXTILES

- A. Filter fabric: Envelope gravel and rock fill materials with Mirafi 180N or equivalent.
- B. Vapor Barrier: Provide a puncture and tear resistant, high tensile strength, impermeable, chemical resistant, (gasoline/hydrocarbon resistant), 15 mil polyolefin liner / membrane, SocoShield as manufactured by Socopac Co. 714-661-1389, Stego Wrap as manufactured by Stego Industries, Inc. 877-464-7834; Blackline 400 as manufactured by Monarflex; Vapor-Mat as manufactured by W.R. Meadows 909-469-2606, or equal.

3.00 EXECUTION

3.01 VERIFICATION OF EXISTING CONDITIONS

- A. The Contractor shall be held to have ascertained conditions at the site by inspection, the character and extent of work to be performed within the Contract limits or adjacent thereto, as well as other related work performed prior to start of work specified herein.

- B. Recommendations made in the Geotechnical Study shall be part of this specification. Contractor shall coordinate with the findings and recommendations of the Geotechnical Study for conditions that will be encountered by executing the work of this Contract. Refer to a copy of the Geotechnical Study that is bound under a separate cover as provided by the District's representative.

3.02 LAYOUT OF WORK

- A. The Contractor's surveyor shall layout and correctly establish the lines, levels, grades and elevations of the work, and be responsible for their accuracy and proper correlation with documented control lines, monuments and data. Monument markers and control data as may be set shall be carefully preserved. If displaced, contractor shall reset to original layout.
- B. Contractor shall employ the means and methods to preserve the safety, stability, integrity and existing conditions in and around the subject property, including public right of way, access in and out of the site, onsite structures and improvements, signage, landscaping and irrigation, utility lines and connections and adjacent / adjoining property(s).
- C. Comply with all requirements of the State of California and the District having jurisdiction over the work required to complete this Contract.

3.03 LEGAL REQUIREMENTS

- A. Give adequate and required legal notice to the Owner, the utilities and governing authorities prior to commencing work.
- B. Provide such barricades, temporary fences, lights, warnings signs guards, etc., as may be necessary to assure safety and to deter trespassers. Maintain these provisions during entire duration of work. Where required, provide temporary facilities for the protection of pedestrians in the public right of way shall be constructed, painted and maintained in conformance with the governing code requirements and authorities having jurisdiction over the project.
- C. Coordinate operations with all trades, utilities and public agencies to assure continuity of both access and service of all utility, service and distribution lines, in conformance with applicable requirements of these organizations. Services that supply the District's operations on site shall not be impeded. Pay for all permits required for work under this Section.

3.04 DUST PALLIATION

- A. Contractor shall employ mitigating measures and practices to eliminate dust conditions during excavation, fill, compaction, loading and hauling operations under this Section. Comply with required, Federal, State and City pollution requirements and the local mitigation measures issued by the regional air quality management district agency having jurisdiction over the work.

- B. Comply also to all environmental mitigation control requirements, as if specified in full herein

3.05 PROTECTION

- A. Before commencing excavation work, verify and locate all existing underground utility lines on site, above and below grade. Verify that existing active utilities do not interfere with construction. Where site utilities conflict with new construction or where active utilities not indicated by the Contract Documents are encountered, stop work and notify the Architect, prior to proceeding.
- B. Should active, inactive or abandoned sewers, gas, water piping, electrical, telephone or other underground utilities be encountered which interfere with the work, protect, remove and/or relocate, at the direction of the Owner. Remove abandoned, inactive utilities to a point not less than 10 feet outside proposed building lines. Plug or cap remaining ends to industry standards. Protection, removal and/or discontinuance of utility services shall conform to the requirements of the applicable utility company or service agency having jurisdiction. Be responsible for advance notification or immediately upon encountering unrecorded services.
- C. Provide and be responsible for necessary shoring to safeguard work, workers, public and property. Include provisions for cribbing, planking, sheeting, walling or other work that may be necessary to properly retain earth banks and prevent caving-in and displacement of adjoining soil. Conform to the California Construction and General Industrial Safety Orders, OSHA requirements and Construction Safety Act. Obtain and pay for all required permits, including the Industrial Safety Permit and all inspections required by governing agencies. Provide stamped and signed shoring plans with calculations prepared by a California licensed Engineer as required in order to obtain approval / permit for the work.
- D. Fence or barricade changes in plane more than 45 degrees of horizontal and more than 3 feet in height. Cover holes and trenches when work is not in progress.
- E. Differential Settling: Where utilities must cross over or through compacted fill or compacted backfill and enter the building, plan earthwork operations to allow sufficient time for settling to occur or provide either flexible or swing joints to allow for the vertical displacement. Determine extent of consolidation by the use of settlement markers.
- F. Grade all excavated surfaces to provide positive drainage of water. Take remedial measures to control runoff or erosion of freshly graded areas. Avoid damages to adjoining properties or finished work until permanent drainage and erosion control measures are installed.
- G. Protect or immediately replace any reference points, benchmarks or monuments damaged, destroyed or dislocated.

3.06 PREPARATION

- A. Site Preparation: Clean areas within the Contract Limit lines as required after site clearing and demolition work is complete and after the rough grading work has also been executed.
 - 1. Strip topsoil in areas of building and paving construction and from temporary stockpile areas and stockpile onsite where directed. Remove subsoil, rocks, plants, roots and other matter considered debris.
 - 2. Remove any concrete, masonry and rubble where structure is to be supported. Remove abandoned below grade construction that obstructs the new work. Demolish and remove all existing fill material and such obstructions as required to permit placement of engineered fill beneath structural footings and slabs on grade. Remove all unsuitable materials and dispose of legally off site.
- B. Organic material shall not be permitted in fills.

3.07 EARTHWORK

- A. Perform all overexcavation, fill and compaction for building pad and paving to the depth(s) as indicated in the referenced Geotechnical Study. Conform to all requirements for excavation, overexcavation and lateral distance of excavation, removal of deleterious materials and existing artificial fills exposed in the excavation bottom, placement of fill materials, acceptable debris which may be incorporated, maximum dimension of fill particle size, thickness of lifts placed, moisture conditioning and recompaction density. Requirements shall apply to all on-site soils that are acceptable for reuse and for import soils. No general fill shall be imported prior to being evaluated by the Geotechnical Engineer to verify compliance of the maximum expansion index (EI) permitted, and no select fill shall be imported prior to being evaluated for Sand Equivalent, grain size, and EI.
- B. Deepen overexcavations in building area as necessary to limit gradient of exposed native bottom to less than 20 percent.
- C. Subgrade Preparation: After observation of excavation bottoms by the District's Geotechnical Engineer, the subgrade shall be scarified a depth of 1 foot, moisture-conditioned to uniform moisture content of 0 to 3 percent over optimum, and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
 - 1. Scarified soils shall be thoroughly processed by moisture-conditioning between 0 and 3 percent above optimum during blading and reduction of chunks to peas-sized or finer consistency.
- D. Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.
- E. Excavate for the foundation to lines and grades indicated. Allow additional space as required for construction operations and inspection. The Geotechnical Engineer shall observe the bottoms of excavations prior to proceeding or placing fill.

- F. Maintain stockpiled materials in the following manner:
 - 1. Stockpile acceptable soil materials for fill and backfill and base and drainage aggregates without intermixing.
 - 2. Place, grade and shape stockpiles to drain surface water.
 - 3. Cover to prevent wind-blown dust.
 - 4. Stockpiles shall be away from edge of excavations at least a distance equal to the maximum depth of excavation.
 - 5. Do not store within drip line of trees that are to be maintained.
- G. Onsite soils may be used for general fill once they are cleaned of all organic material, debris, and rock greater than 4 inches.
- H. Import soils used to raise site grade shall be equal to, or better than, onsite soils in strength, expansion and compressibility characteristics.
- I. Protect existing soils from elevated moisture contents and pumping resulting from heavy and frequent equipment loading. If unstable soils are encountered, stabilization of the excavated bottom or pumping layer shall be required prior to placing fill. Accomplish drying of the soils by ripping, reducing and aeration, or stabilize subgrade by placement of a minimum 1-foot thick layer of aggregate base or cement treatment of the upper 1 foot using 6 percent cement by weight in accordance with Section 301-3.1 of SSPWC..
- J. Depress / account for finished grade elevations in areas requiring installations of a capillary break or base course / vapor barrier to the depth indicated and for the total section specified. This project has three different areas of subgrade treatment and require different finish subgrade elevations than the general slab on grade sub-grade. Refer to excavation and placement of materials for specifics.

3.08 EXCAVATION

- A. Refer to the Geotechnical Study for soils conditions and excavation recommendations. Recommendations herein are of a general nature and should be verified / coordinated with the Geotechnical Study and Addenda.
- B. Excavated soils that are free of expansive clay, debris, organic matter, and rocks larger than 4 inches in maximum dimension may be stockpiled for use as fill, subject to the approval of the Geotechnical Engineer.
- C. Excavations shall be deepened as needed to remove artificial fill materials and to limit bottom gradient to less than 20 percent. Excavation bottoms shall not be scarified nor receive fill until after observation by Geotechnical Engineer.
- D. Northern and eastern excavation slopes shall be cleaned by Contractor to expose native, undisturbed earth materials along full horizontal and vertical expanse for observation by the Engineering Geologist. Contractor's schedule shall accommodate two days for mapping of the exposed, cleaned slope face prior to resumption of nearby grading activities.
- E. Excavation shall be carried to the lines and grades indicated on the drawings with a tolerance of plus or minus 0.1 foot.

- F. Should soil of inadequate bearing capacity be encountered at the elevations indicated, carry excavation to the greater depth as directed by the Geotechnical Engineer for proper bearing / support. Extend excavation a sufficient distance from the foundation to allow for form installation, observation, backfill and compaction unless the Geotechnical Engineer authorizes concrete deposit directly against excavated earth form surfaces.
- G. To verify the presence of the firm or dense soil at footing design elevations, all footing excavations shall be observed by the Geotechnical Engineer. Trim minor areas by hand to the required final lines and grade. Footing excavation bottoms shall be cleaned of any loose soil before placing concrete.
- H. Backdrain pipe behind retaining and below-grade walls shall be as-built surveyed to verify adequate gravity flow gradient prior to backfilling.
- I. Unauthorized overexcavation made below the elevations indicated shall be filled with slurry concrete performed by the Contractor at his own expense.

3.09 PLACING, SPREADING AND COMPACTING FILL MATERIAL

- A. Materials for fill shall consist of acceptable spoils removed from the required onsite excavation or from borrowed sources (import fill) as approved by the Geotechnical Engineer.
- B. Place moisture-conditioned and processed fill materials in horizontal loose lifts not exceeding 8 inches for the full width of the cross section. Mechanically compact fill to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557. The optimum loose lift thickness will depend on the compaction equipment used and can best be determined in the field. The following uncompacted thickness can be used as a preliminary guideline:

Plate Compactors	4 inches
Small vibratory or static rollers (5-ton+/-) or track equipment	6 inches
Scrapers, heavy loaders or heavy vibratory rollers	8 inches

 The maximum lift thickness should not be greater than 8 inches and each lift should be thoroughly compacted and accepted prior to subsequent lifts.
- C. Spread each layer evenly and thoroughly mix to insure uniformity of material in each layer. Do not place fill materials in areas where there is standing water or on surfaces that have not been approved. Do not damage waterproofing systems if present when placing backfill.
- D. Bring moisture content of fill material to 0 to 3 percent above optimum moisture content. Uniform moisture content is required throughout layers of fill materials. Remove and replace or scarify and air dry soil materials that are too wet to compact to the specified density. Suspend compaction operations when satisfactory results cannot be obtained because of rain or other unsatisfactory conditions. Stockpile or spread and dry removed wet soil materials.
 - 1. Fill materials placed within the upper 4 feet of floor subgrade shall have a moisture content of 2 to 3 percent over optimum, and the EI of those materials shall be less than or equal to 10.

2. Materials likely to satisfy this requirement shall be separated and stockpiled during removal excavations.
- E. Maintain moisture content of loosened scarified material such that first layer of fill will readily bond to surface.
- F. Compaction or consolidation by soaking or jetting with water is not acceptable as an alternative method to utilization of mechanical equipment.
- G. Do not backfill and compact behind walls until support systems have reached design strength. Protect structure below grade at all times during backfilling operations.
 1. Backdrain pipe behind retaining and below-grade walls shall be as-built surveyed at 50-foot horizontal intervals to verify adequate gravity flow gradient of pipe prior to backfilling.
- H. Scarify, aerate or moisten soft areas that develop under construction operations as required and compact to the full depth required to obtain the specified density for each layer. Compact those portions of fill which are too near to adjacent walls, pavements or other fixed objects to permit the use of heavy rolling equipment by tamping in 4 inch layers with mechanical tampers.
- I. Overfill fill slopes such that final slope gradient is achieved by trimming back to a compacted core.
- J. Shrinkage (loss of soil volume) and subsidence (settlement of in-place subgrade) shall be a consideration on project soil export. For earthwork volume estimating purposes an average shrinkage value of about 10 percent and subsidence of 0.1 feet shall be assumed for in-situ soils. These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence shall depend on the types of earthmoving equipment used and may be verified during grading.
- K. Trench/Wall Backfill: In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, sand-slurry may be substituted for compacted backfill. The slurry shall contain two sacks of cement per cubic yard and have a maximum slump of 6 inches.

3.10 GEOTECHNICAL TESTING – FIELD QUALITY CONTROL

- A. Refer to Section 01425 - Testing and Inspection.
- B. The Geotechnical Engineer shall observe and perform field density compaction and moisture tests as required. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface. Testing surfaces shall be cut smooth by the Grading Contractor. Do not spread additional layers of fill until the field density tests indicate that specified moisture and compaction density has been obtained. Do not pour concrete until all recommendations have been met.
- C. Observation and testing by the Geotechnical Engineer shall be provided during all excavation, grading, filling and compacting operations. Give at least 48 hours

notice prior to beginning operations to allow proper scheduling of work. Continuous inspection shall be provided during fill placement and compaction operations.

- D. Geotechnical Engineer shall perform field quality control testing of subgrade prior to subgrade base course preparation.
- E. Contractor to pay all costs for retesting required as the result of the density test failures due to improper placement and all additional costs for inspection required as a result of correcting defective work.
- F. When reports indicate that sugrade fill or backfill materials are below specified density; Contractor is required to scarify and moisten or aerate, or remove and replace unacceptable soils to the depth required, re-spread, level, recompact and retest until required density is obtained.
- G. Engineer shall observe and retest each subgrade and each fill lift or backfill layer being reworked. Do not proceed with subsequent fill or base course placement until test results for previously completed work confirms compliance with specified requirements.
- H. Earthwork performed without the required observation by the Geotechnical Engineer, that is determined does not meet the requirements of these specifications and of the Geotechnical Study, shall be removed and replaced by the Contractor at no additional cost to the District.
- I. Observation by the Geotechnical Engineer does not relieve the Contractor of responsibility for construction of compacted fills to comply with this specification.
- J. Sufficient tests of fill soils shall be made to determine the relative compaction of the fill in accordance with the following minimum guidelines:
 - 1. One test for each 18 inches of fill thickness
 - 2. One test for each 500 cubic yards of material placed

3.11 SUBGRADE PREPARATION

- A. Replace artificial fill with properly compacted engineered fill meeting minimum requirements for general fill or select fill, where required.
- B. Place approved fill materials to the proposed final subgrade elevations for concrete slab support. Using the ASTM D1557 method of compaction, obtain minimum 95 percent of the maximum dry density obtainable.
- C. Bring final subgrades for paving to proper elevation by excavating, filling and compacting. Finish within a 3/8" tolerance when measured along a 10-foot straight edge in any direction.
- D. Gravel Subgrade - Slab OnGrade:
 - 1. Typical slab on grade is to be poured directly onto the approved compacted subgrade. No additional preparation needs to occur unless indicated otherwise.

2. At the B1 Level Storage, Mechanical Room, Electrical Cart Storage Electrical Room, Communications Room Storage Room and Elevator Mechanical Room moisture condition, spread, level, and compact gravel course material for capillary break in layers not exceeding 6 inches in loose thickness. Compact and add additional materials to obtain required cross section, thickness and density. Continue cutting or filling, and rolling until surfaces are hard and true to grade and cross-section. Surface shall be dense and cease to settle or creep in front of roller or tamper.
 3. Vapor Barrier: Install the specified vapor barrier over the prepared gravel layer. Lap joints a minimum of 6 inches and seal exposed joint with a 3-inch-wide moisture resistant tape. Cover vapor barrier membrane with a minimum 2-inch thick layer of clean damp sand. Compact sand layer to tighten surface with a vibroplate. Finished surface shall be free of lumps, voids or sharp protrusions.
- E. Exterior Flatwork: Subgrade soils below flatwork shall be moistened to a moisture content of at least 120 percent of optimum to a depth of 12 inches. Moistening should be accomplished by spraying/flooding dammed subgrade area over a period of a few days just prior to pouring concrete.

3.12 FINAL GRADING

- A. Grading shall be performed to the lines, grades and elevations indicated. All unacceptable materials encountered shall be removed and disposed of. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the progress or condition of the work.
- B. Owner retains the right to make adjustments or revisions in lines or grades if found necessary as the work progresses.
- C. All fill or cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment required. Fill slopes shall be overfilled then cut back to the compacted core to achieve final grades.
- D. No grading is to be done in areas where existing pipelines that may be uncovered and/or damaged are removed or relocated.

3.13 CLEAN-UP

- A. Upon completion of work of this section, remove from the site excess dirt, rubbish, trash and debris.
- B. Store reuseable material neatly in designated areas.
- C. Remove equipment, leaving the entire project area in a neat and acceptable condition.

END OF SECTION

1.00 GENERAL

1.01 SUMMARY

- A. Aggregate base course for concrete walkways, AC paving, trench backfill material for HDPE pipe.

1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02221 – Trenching and Backfilling.
- C. Section 02510 - Asphaltic Concrete Paving.
- D. Section 02620 - Concrete for Curbs and Walkways.

1.03 REFERENCES

- A. State of California Department of Transportation Standard Specifications (SSS), Caltrans, May 2006.
- B. Standard Specifications for Public Works (SSPWC), 2009.
- C. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.
- D. ASTM Standards.

1.04 SUBMITTALS:

- A. Submit material samples and reports in accordance with requirements of The District.
- B. Submit samples in sufficient quantities for material testing.

2.00 PRODUCTS

2.01 MATERIALS

- A. Aggregate Base Material shall be Class 2 Aggregate Base conforming to SSS Section 26-1.02A. Aggregate Base shall have a minimum sand equivalence of 35 and a minimum R-value of 78 and shall be free of organic materials and other deleterious substances.

3.00 EXECUTION

3.01 EXAMINATION

- A. Verify substrate has been inspected; gradients and elevations are correct, and surfaces free of standing water.
- B. Base course shall be dense and unyielding when proof-rolled with a full water truck.

3.02 AGGREGATE BASE PLACEMENT

- A. Aggregate base placement shall conform to the provisions of the SSPWC, Section 301-2.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- D. Where the required aggregate base thickness is 6 inches or less, the watered base may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate base material shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

3.03 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch.
- B. Scheduled Compacted Thickness shall conform to the provisions of the SSPWC Section 301-2.2.

3.04 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory. Compaction testing will be performed in accordance with ASTM D1557, latest edition.
- B. If tests indicate work does not meet specified requirements, remove, replace, and retest work at no additional cost to the District.

END OF SECTION

C. SUPPLEMENTAL NOTE:

1. *Reference Sheet M6.0 and specification section 15940 Instrumentation and Control – Provide Automated Logic Bacnet interface hardware, software programing, & graphics to interface with Mitsubishi City Multi System and Building Electrical Generator shown on Sheets E150 & E410 & specification section 16620.2.7. Include all necessary wire, conduit, and miscellaneous materials. Locate generator interface in parking structure IT room shown on sheet M2.0. Coordinate router installation location with campus IT department. Submit Bacnet points available for display for review by owner and engineer.*

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