MESQUITE
TEXAS
Real. Texas. Service.

December 1, 2017

ADDENDUM NO. 2

Camp Rorie Galloway Improvements

BID NO. 2018-022

Bidders are directed to revise and incorporate into their bid the following change(s) in bid specifications:

1. Replace **Schedule of Proposed Items**, pages 26-28 with following, as they have been revised accordingly with page 26r-28r.
   U.P. 5 Modular Office Cabin – has been added
   Alt 3 Delete all work associated with Speakers – has been added

2. Refer to revised **Technical Specifications**, attachment 2.1, as they have been reissued in their entirety.
   2.1 SECTION 01580- Project Sign: has been deleted
   2.2 SECTION 02760- Paving Markings: has been deleted
   2.3 SECTION 09998- Log Cabin: requirements have been corrected
   2.4 SECTION 09999- Pavilion: other acceptable vendors have been provided and requirements have been corrected
   2.5 SECTION 09930- Painting: has been added
   2.6 SECTION 16050- Electrical: has been added
   2.7 SECTION 16121- Electrical: has been added
   2.8 SECTION 16163- Electrical: has been added

3. Refer to revised **Plans,** attachment 2.2, as they have been reissued in their entirety.
   3.1 Cover sheet- C12, E5, S7 have been added
   3.2 Sheet A1- note has been corrected
   3.3 Sheet A2- floor plan has been replaced
   3.4 Sheet A3- sign and lights on poles has been modified and requirement for corner fence post added
   3.5 Sheet C2- dimension for sidewalk demolition provided
   3.6 Sheet C3- limits of Alternate #3 provided
   3.7 Sheet C5- location of pavilion electrical service changed
   3.8 Sheet C9- reference for retaining wall section provided
   3.9 Sheet C10- stone curb added to edge of fireplace terrace, mantle changed to 12" x

12", roof cricket added behind chimney and stone for fireplace should be Ozark Brown chopped stone in an ashlar pattern

3.10 Sheet C11- Paint existing flag pole, replace wood deck on existing platform
3.11 Sheet C12- Added in its entirety
3.12 Sheet E1- relocate pavilion electrical service and corrected speaker locations
3.13 Sheet E2- corrected speaker locations and miscellaneous notes
3.14 Sheet E4- corrected diagram
3.15 Sheet E5- added in its entirety
3.16 Sheet S4- add stone curb
3.17 Sheet S7- added in its entirety

4. Refer to **GEOTECHNICAL EXPLORATION,** attachment 2.3, for construction area prepared by Alpha Testing dated June 14, 2017: has been added.

5. Refer **Pricing for Office Cabin**, attachment 2.4, from Ulrich Log Cabins dated 11-30-2017: has been added.

If you should have any other questions, do not hesitate to contact the Purchasing Office at 972-216-6201.

Ryan Williams
Manager of Purchasing

ACCEPTANCE:

We, the undersigned, do hereby acknowledge receipt of this Addendum No. 2, to Bid No. 2018-088; Camp Rorie Galloway Improvements and agree to the instructions herein written.

Company Name

Authorized Signature

Date

Scheduled of Proposed Items
26r – 28r

SCHEDULE OF PROPOSED ITEMS

CAMP RORIE GALLOWAY, PAVILION AND OFFICE

PLEASE PROVIDE A PRICE QUOTE FOR THE FOLLOWING:

For acquisition, delivery, installation, materials, labor, cleanup, incidentals and all appurtenances, and guarantee, all per plans, specifications, complete and in place. In the event of additions/deletions to the contract items, the price per unit shall be used to determine change order amounts.

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
1	1	LS	For **all items shown** on the plans and described in the specifications herein. Scope of work to include, but not limited to; all demolition, site preparation, grading, erosion control, boardwalk, decomposed granite walks, flagstone walks and stairs, railing and fencing, foundations and piers, stone clad reinforced concrete retaining walls, utilities and utility connections, drainage, irrigation, signs, pre-engineered metal pavilion shelter, stone fireplace, modular log cabin building, installation coordination, project management and final cleaning.	$	$

Total Base Bid Proposal of Item "1 " complete and in place, for the sum of: _____ Dollars and _____ Cents **(written) LUMP SUM**	$_____ **(figures)** **LUMP SUM**

UNIT PRICES

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
U.P 1		LF	**Drilled Piers** Work fully performed, complete and in place	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
U.P 2		SF	**Concrete Sidewalk** Work fully performed, complete and in place	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
U.P 3		SF	**Decomposed Granite Walkway** Work fully performed, complete and in place	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
U.P 4		SF	**Flagstone Walkway** Work fully performed, complete and in place	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
U.P 5		LS	**Modular Office Cabin** Work fully performed, delivered to site and placed on foundation	$_____	$_____

ALTERNATES

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
Alt 1	1	LS	**Delete the work associated with the entry area; railing modifications, signage, and lighting.**	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
Alt 2	1	LS	**Delete work associated with path from pavilion to sports courts and over to boardwalk.**	$_____	$_____

ITEM NO.	EST. QTY.	UNIT	DESCRIPTION WITH UNIT PRICES WRITTEN IN WORDS	UNIT PRICE (IN FIGURES)	TOTAL (IN FIGURES)
Alt 3	1	LS	**Delete all work associated with Speakers' area from the pavilion except the addition of a paved stone ring around the fire pit and the stone step ring on the north end of pavilion. Delete modifications to the rail, new flagpole, the addition of the boardwalk, the decomposed granite and the bench work.**	$_____	$_____

All substitutions as an "OR EQUAL" must be approved in writing by the City at least three (3) business days prior to proposal opening.

It is understood that the quantities of work shown in the schedule of bid proposal items are approximate only and are subject to increase or decrease and the undersigned proposer offers to do the work at the unit price as stated in the schedule of proposal items.

Attachment 2.1

Technical Specifications

SECTION TS TECHNICAL SPECIFICATIONS

Drawings:

Prepared by Metropolitan Infrastructure, Dallas Texas
Issued October 31, 2017 and reissued November 27, 2017 for Bid
Sheet Index:

COVER SHEET
A1 - PAVILION BUILDING PLANS & ELEVATIONS
A2 - LOG CABIN FLOOR PLAN & ELEVATIONS
A3 - ENTRANCE RAILING AND SIGN POLE DETAILS
C1 - GENERAL NOTES
C2 - DEMOLITION PLAN
C3 - SITE PLAN
C4 - PAVING DETAILS
C5 - UTILITY & DRAINAGE PLAN
C6 - GRADING PLAN
C7 - EROSION CONTROL PLAN
C8 - EROSION CONTROL DETAILS
C9 - PAVILION PLAN & DETAILS
C10 - FIRE PLACE PLAN & DETAILS
C11 - SPEAKER STAND AREA PLAN
C12 - SWPPP
C13 - CITY STANDARD DETAILS
C14 - CITY STANDARD DETAILS
C15 - CITY STANDARD DETAILS
C16 - CITY STANDARD DETAILS
C17 - CITY STANDARD DETAILS
C18 - CITY STANDARD DETAILS
C19 - CITY STANDARD DETAIL
E1 - ELECTRICAL SITE PLAN
E2 - PAVILION ELECTRICAL PLAN
E3 - ELECTRICAL DETAILS
E4 - ELECTRICAL SCHEDULES & RISER DIAGRAM
E5 - ELECTRICAL SPECIFICATIONS
S1 - PAVILION FOUNDATION PLAN
S2 - PAVILION FOUNDATION SECTION
S3 - PAVILION FOUNDATION DETAILS
S4 - RETAINING WALL & RC STAIR DETAIL
S5 - HANDICAP RAMP, RAILING & FENCE DETAILS
S6 - OFFICE FOUNDATION PLAN & SECTION
S7 - MISCELLANEOUS STRUCTURAL DETAILS

Specifications:

Prepared by Metropolitan Infrastructure, Dallas Texas
Issued October 31, 2017 and reissued November 27, 2017 for Bid

DIVISION 01 – GENERAL REQUIREMENTS

01010 – SUMMARY OF WORK
01051 – GRADES, LINES, AND LEVELS

01077 – ABBREVIATIONS, SYMBOLS, TRADE NAMES AND
01295 – SCHEDULE OF VALUES
01314 – PROJECT MEETINGS
01320 – CONSTRUCTION PROGRESS DOCUMENTATION
01410 – TESTING LABORATORY SERVICES
01420 – REFERENCES
01450 – QUALITY CONTROL
01500 – TEMPORARY FACILITIES AND CONTROLS
01560 – TREE PROTECTION
01600 – PRODUCT REQUIREMENTS
01700 – PROJECT EXECUTION REQUIREMENTS
01710 – CLEANING AND ADJUSTING
01732 – CUTTING AND PATCHING
01770 – CONTRACT CLOSEOUT

DIVISION 02 – OWNER'S SITE CONSTRUCTION SPECIFICATIONS

02010 – SITE AND SUBSURFACE INVESTIGATION
02050 – DEMOLITION
02115 – CLEARING AND GRUBBING
02200 – SITE PREPARATION
02300 – EARTHWORK
02465 – DRILL PIERS
02520 – PORTLAND CEMENT CONCRETE WALKWAYS
02620 – SOIL EROSION AND SEDIMENT CONTROL

DIVISION 03 – CONCRETE SPECIFICATIONS

03100 – FORMS AND ACCESSORIES
03200 – CONCRETE REINFORCEMENT
03300 – CAST-IN-PLACE CONCRETE
03920 – JOINT SEALANTS
03350 – REINFORCED CONCRETE RETAINING WALL W/ MILSAP STONE

DIVISION 05 – METAL PRODUCTS

055000 – METAL FABRICATIONS

DIVISION 26 – MECHANICAL AND ELECTRICAL

260529 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533 – BOXES FOR ELECTRICAL SYSTEMS
265100 – LIGHTING
260520 – CABLE CONNCECTIONS

DIVISION 99 – PREMANUFACTURED BUILDINGS

09998 – PREMANUFACTURED LOG CABIN SPECIFICATIONS
09999 – PREMANUFACTURED PAVILION SPECIFICATIONS

DIVISION MISCELLANEOUS – PAINTING

09900 – PAINTING AND COATING
09930 – STAIN WOOD INTERIOR AND EXTERIOR

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

P

1.1 SUMMARY

A. Section includes:

1. Work under this contract
2. Work by others
3. Contractor use of site and premises
4. Documents provided

1.2 RELATED WORK SPECIFIED ELSEWHERE

Not used.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Work under this contract calls for:

1. Site Preparation and Demolition: to include removal of existing site items and installation of soil erosion control.
2. Topsoil Stripping, stockpiling and finish grading
3. Site excavation, grading, drainage, embankment stabilization, and erosion control
4. Site Landscaping and Irrigation
5. Cast-in-place concrete walks
6. Wooden boardwalk and decking
7. Building (pavilion and log cabin)
8. Building foundation, utilities, and connections
9. Stone Fireplace
10. Flagstone decks and walkways
11. Parking lot striping for handicap spaces
12. Railing
13. Metal sign for entry gate
14. Signs
15. Relocation of power poles and electrical service

B. Contractor's Duties

1. Except as specifically noted, provide and pay for:

a. Labor, materials, and equipment
b. Tools, construction equipment, and machinery

c. Water, heat, and utilities required for construction

d. Other facilities and services necessary or proper execution and completion of work.

1.4 DOCUMENTS

A. Documents listed below are furnished by the Architect and are part of the Contract Documents.

1. Drawings: Refer to Index of Drawings on the drawings coversheet.

2. Project Manual with all addenda.

B. Contract may include Owner furnished documents not herein listed.

1.5 TIME OF COMPLETION

A. Stated on bid form.

1.6 PROJECT ACCEPTANCE / OWNER'S USE OF PREMISES

The project will be accepted when all work is completed in accordance with the Contract Documents and accepted by the Owner. The Owner will, however, reserve the right to commence work in areas where the Contractor's work is substantially complete without invalidating terms of this contract and without interruption of, and in full coordination with the Contractor's schedule.

1.7 SPECIAL REQUIREMENTS

Contractor shall assume responsibility for the protection of all areas of work and shall protect existing property and trees as required during the construction period. Existing surfaces that are damaged due to construction shall be patched or replaced to original condition as approved by the Owner.

END OF SECTION

SECTION 01051 - GRADES, LINES, AND LEVELS

PART 1 - GENERAL

1.1 DESCRIPTION AND RESPONSIBILITY

A. All Work in this Contract shall be constructed in compliance with the alignments indicated on the Drawings or determined in the field by OWNER personnel.

B. The Contractor shall be responsible for the following:

1. Layout and control of all grades, lines and levels.

C. The Contractor shall safeguard all points, grade marks and bench marks established by the OWNER. The Contractor shall bear the cost of reestablishing any surveying work that was provided by the OWNER due to his work operations. Contractor shall bear the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established points and marks.

D. Staking

1. No direct compensation will be paid to the Contractor for the construction staking of the facilities included in this project. It is understood that the cost of the construction staking is included in the prices bid for the items in the Proposal.

2. The Contractor shall give the Engineer three (3) days (excluding weekends and holidays) minimum notice of the time and place where survey services are required. Such notice shall be in writing.

3. The Contractor shall make an allowance in his work schedule and the amount bid to perform the work for the time required for the Owner to complete the required surveying as specified in this section and elsewhere in the Contract Documents. Neither the Owner, the Engineer, nor AIE will be charged for downtime due to surveys.

END OF SECTION

SECTION 01077 - ABBREVIATIONS, SYMBOLS, TRADE NAMES AND MATERIALS

PART 1- GENERAL

1.1 DESCRIPTION

This Section of the Specifications lists many of the trade associations and general standards which are referenced repeatedly in the Specifications, along with the abbreviations commonly used for these references. This Section also specifies certain general requirements for the Work, in relation with standards, and with trade associations and their published recommendations. Refer to individual Specifications Sections for names and abbreviations of other trade associations and standards which are referenced less repeatedly.

1.2 ABBREVIATIONS AND NAMES

The following abbreviations as may be referenced in the Contract Documents are defined to mean the associated names. Abbreviations for words are listed on the Drawings.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute (previously A.S.A. American Standards Association)
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CIPRA	Cast Iron Pipe Research Association
CSRI	Concrete Reinforcing Steel Institute
Fed. Spec.	Federal Specification
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NCTCOG	North Central Texas Council of Governments
OSHA	Occupational Safety and Health Administration
PCI	Precast/Prestressed Concrete Institute
TCEQ	Texas Commission of Environmental Quality
TxDOT	Texas Department of Transportation
UL	Underwriters Laboratories, Inc.

1.3 QUALITY ASSURANCE

A. General Applicability of Standards

Except where more explicit or more stringent requirements are specified or are required by governing regulations, applicable standards of the construction industry have the same force and effect for the Work; and are made a part of the

Contract Documents by reference as if copied directly into the Contract Documents, or as if published copies were bound herewith.

B. Referenced Standards

Referenced standards shall have precedence over non-referenced. Standards, which are intended by the manufacturer for application to work similar to that required on the Project.

C. Non-Referenced Standards

Industry standards not specifically referenced for applicability to the Work, including standards listed in this Section but not referenced elsewhere, have the following general applicability to the Work:

1 No particular applicability is intended, except as a general measurement of whether the performed work complies with standards of the construction industry.

D. Comply with the standards which were in effect at the date of bidding except where specifically indicated to comply with a publication of another date.

E. Copies of Standards

In general, copies of applicable standards have not been bound with the Contract Documents. Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

PART 2- PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

Unless otherwise specified, all material shall be new, and both workmanship and materials shall be of first class quality, proper and sufficient for the intended purpose.

If so required, the Contractor, shall furnish at his own expense, samples or other satisfactory evidence as to kind and quality of materials and workmanship, for approval.

END OF SECTION

SECTION 01295 – SCHEDULE OF VALUES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED:

A. Procedures for preparation and submittal of Schedule of Values.

1.2 RELATED REQUIREMENTS:

A. General Conditions Paragraph 9.2.

1.3 FORM OF SUBMITTAL:

A. Submit typewritten Schedule of Values on AIA Form G703, “Continuation Sheet” of Application and Certificate of Payment.

B. Use Table of Contents of this Project Manual as basis for format for listing costs of work for sections under Divisions 2 – 16.

C. Identify each line item with number and title of respective major section of Specifications.

1.4 PREPARING SCHEDULE OF VALVUES:

A. Schedule shall list component part of Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

B. Itemize separate line item cost for Work required by each section, or groups of sections, of this Project Manual.

C. For each major subcontract, list products and operations of that subcontract as separate line items.

D. In addition to line item costs of Section in Divisions 2 – 16, furnish line item costs for each of the following general cost items:

1. Bonds and insurance.
2. Field supervision and layout.
3. Temporary facilities and controls.
4. Testing.
5. Other General Conditions or General Requirements items.

E. List allowances in specified amount for each allowance.

F. Each line item in the Schedule of Values shall include its proper share of overhead and profit.

G.

H. List quantities of materials specified under unit price allowance.

I. Sum of all values listed in schedule shall equal total Contact Sum.

1.5 SUBMITTAL:

A. Submit three copies of Schedule of Values at least 20 days prior to submitting first Application for Payment.

B. Upon request by Architect, support values given with such data that will substantiate their correctness.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01314 – PROJECT MEETINGS

PART 1 – GENERAL

1.1 DESCRIPTION:

A. Contractor shall schedule and administer periodic progress meetings, precontract closeout conference and specially called meetings throughout.

1. Prepare agenda for meetings.
2. Distribute written notice of each meeting four days in advance of meeting date.
3. Make physical arrangement for meetings.
4. Preside at meetings.
5. Record the minutes; include significant proceedings and decisions.
6. Reproduce and distribute copies of minutes within three days after each meeting.
    a. To participants in meeting.
    b. To parties affected by decisions made at meeting.
    c. Furnish two copies of minutes to Architect.

B. Representatives of subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of entity each represents.

C. Architect may attend progress meetings to ascertain that Work is expedited consistent with Contract Documents and the construction schedules.

1.2 PRE-CONSTRUCTION CONFERENCE:

A. A pre-construction conference will be held at the site at a time to be designated by the Architect and Owner.

B. Representatives of the Owner and Architect will be present.

C. Representatives of the Contractor, including project superintendent and major subcontractors, shall be present.

D. As a minimum, the following items will be on meeting agenda:

1. Review of proposed subcontractors.
2. Designation of key personnel.
3. Communications.
4. Schedule of Values.
5. Construction Schedule.
6. Critical work sequencing, including alterations work sequencing.
7. Existing facilities maintenance of operation.

8. Access, security parking and designated storage areas.
9. Submittals.
10. Procedures for maintaining Project Record Documents.
11. Review of and processing of Pay Applications.
12. Processing Field and Change Orders.

1.3 PROGRESS MEETINGS:

A. During progress of construction, periodic progress meetings.

B. The project superintendent and representatives of each major subcontractor shall attend progress meetings.

C. As a minimum, the following items will be on meeting agendas:

1. Review work progress since last meeting.
2. Note field observations, problems and decisions.
3. Review off-site fabrication problems.
4. Revise construction schedule as required.
5. Review submittal schedules and effect on construction schedule.
6. Review proposed changes and effect on construction schedule.
7. Coordination between elements of work.
8. Clarification decisions required of Architect or Owner.
9. Review of subcontractor's forces on project.
10. Review status and content of Project Record Documents.

1.4 PRE-CONTRACT CLOSEOUT CONFERENCE:

A. A pre-contract closeout conference will be held at the site at least 60 days prior to date of Substantial Completion.

B. Representatives of the Owner and Architect will be present.

C. Representatives of the Contractor, including project superintendent and mechanical and electrical subcontractors, shall be present.

D. As a minimum, the following items will be on meeting agenda:

1. Substantial Completion procedures, including punch list procedures.
2. Review of Contract Closeout submittal requirements, including:
    a. Project record documents.
    b. Subcontractors and suppliers list.
    c. Operating and maintenance manuals.
    d. Instructions to Owner's personnel.
    e. Warranties and certificates.
    f. Keys and keying schedule.
    g. Evidence of payment and release of liens.

h. Certificate of insurance for products and completed operations.

i. Certificates of compliance with requirements of governing authorities.

3. Final Inspection procedures.

4. Final Inspection for payment procedures.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01320 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED:

A. Procedures for preparation and submittal of construction progress schedules for entire Work and periodic updating.

1.2 RELATED REQUIREMENTS:

A. General Conditions – Paragraph 3.10

1.3 PROGRESS SCHEDULE:

A. Submit a Progress Schedule within 15 days after date of Notice to Proceed.

B. Submit a computer generated horizontal bar or critical path chart:

1. Include a separate line for each major section of Work or operation for, identifying first work day of each week.
2. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
3. Indicate estimated percentage of completion for each item of Work at each submittal date.
4. Indicate submittal dates required for Shop Drawings, Product Data, and Samples, and product delivery dates, including those furnished by Owner and under Allowance.

C. Submit an updated Schedule along with each Application for Payment:

1. Identify changes occurring since previous submission.
2. Indicate progress of each activity to date of submittal and projected completion date of each activity.
3. When appropriate, provide narrative report, including discussion of problem areas, corrective action taken, description of revisions, and other items affecting progress of Work.

1.4 PROGRESS REPORTS:

A. Each Subcontractor prepare comprehensive Daily Log and maintain it during entire project period.

B. Each Subcontractor submit copy of Daily Log to Contractor for compilation into monthly Progress Reports.

C. Contractor submit copies of Progress Reports and photos with each Application for Payment.

D. Progress report to include following Summary narrative for entire month:

1. Current total percent complete.
2. Current percent complete of major work activities.
3. Percent of work completed during past month.
4. Main work activities completed during prior month.
5. Main work activities in process and scheduled for next month, including major equipment deliveries, system tie-ins and system start-ups.
6. Overall status of project compared with project schedule.
7. Delays or potential delays, if any.

E. Daily logs to include following data for each day of prior month.

1. Manpower, by trade.
2. Work performed, with location.
3. Weather.
4. Situations or circumstances which could delay work or give cause for claims for extension of time or added cost.
5. List of visitors names, to include officials, Owner's representatives, and other authorities.

G. Submit five (5) copies along with each Application for Payment:

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01410 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Selection and payment.
2. Laboratory duties.
3. Contractor's responsibilities

B. Related Sections: Individual specifications sections contain specific tests and inspections to be performed.

1.2 REFERENCES

A. American Council of Independent Laboratories (ACIL) – Recommended Requirements for Independent Laboratory Qualification.

B. American Society for Testing and Materials (ASTM) E 329 – Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as used in Construction.

1.3 QUALITY ASSURANCE

A. Owner will employ and pay for services of an independent testing laboratory to perform specified testing and inspection.

B. Contractor shall cooperate with the Testing Laboratory to facilitate performance of its work.

C. Refer to the Conditions of the Contract for provisions related to special inspections and testing.

D. Qualifications of Laboratory:
1. Meet ACIL requirements referred.
2. Meet basic requirements of ASTM E 329.
3. Authorized to operate in State in which project is located.

1.4 AUTHORITY AND DUTIES OF LABORATORY

A. Cooperate with Architect and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.

C. Promptly notify Architect and Contractor of observed irregularities or deficiencies of work or products.

D. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

E. Promptly submit written report of each test and inspection; 1 copy each to Architect, Owner, Engineer, and Contractor. Each report shall include:

1. Date issued.
2. Project title and number.
3. Testing laboratory name, address and telephone number.
4. Name and signature of laboratory inspector.
5. Date and time of sampling and inspection.
6. Record of temperature and weather conditions.
7. Date of test.
8. Identification of product and specification Section.
9. Location of sample or test in the Project.
10. Type of inspection or test.
11. Results of tests and conformance or nonconformance with Contract Documents.
12. Interpretation of test results that indicate unsatisfactory conditions.

1.5 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel and provide access to Work or to manufacturer's operations.

B. When materials require testing prior to being incorporated in the Work, secure and deliver to laboratory adequate quantities of representative samples of materials proposed for use and which require testing.

C. Provide to laboratory preliminary design mix proposed to be used for concrete, and other material mixes which require control by testing laboratory.

D. Notify laboratory sufficiently in advance of operations (minimum of 2 days) to allow for laboratory assignment of personnel and scheduling of tests.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at Project site or at source of product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience.

G. Employ and pay for services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents.

PART 2 – MATERIALS

Not used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Tests and Inspections: Refer to specific technical sections of the specifications for detail requirements for testing and inspection. Failure to reference a technical specification section below, does not waive the testing and inspection requirement of that section.

1. Section 02300 – Earthwork
2. Section 02373 – Helical Piers
3. Section 02520 – Portland Cement Concrete Paving & Walks
4. Section 03200 – Concrete Reinforcement
5. Section 03300 – Cast-In-Place Concrete

END OF SECTION

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings, specifications and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section. It is the responsibility of the Contractor and all subcontractors to locate information pertaining to required items of work specified or indicated elsewhere in the Contract Documents.

1.2 DEFINITIONS:

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.

D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, who performs a particular construction activity including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

2. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-division format and "Master Format" numbering system.

B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS:

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different but apparently equal to the Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Following is a partial list of construction industry standards organizations. Reference standards of these organizations are listed in respective specification sections using abbreviations contained below.

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturer's Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boilers Manufacturer's Association
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ADC	Air Diffusion Council
AGA	American Gas Association
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society of Testing and Materials
AWI	The Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWPB	American Wood-Preservers Bureau
AWWA	American Water Works Association
AWS	American Welding Society
BIHMA	Builders' Hardware Manufacturers Association
BIA	Brick Institute of America
CISPI	Cast Iron Soil Pipe Institute
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard of NBC (U.S. Dept. of Commerce)
FCC	Federal Communications Commission
FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association
FM	Factory Mutual System
FS	Federal Specification (General Services Admin.)

HI	Hydronics Institute
IEEE	Institute of Electrical and Electronic Engineers, Inc.
MBMA	Metal Building Manufacturers Association
MIL	Military Standardization Documents (U.S. Dept. of Defense)
MIL	Military Specification
NAAMM	National Association of Architectural Metal Manufacturers
NCMA	National Concrete Masonry Association
NCTCOG	North Central Texas Council of Governments
NEC	National Electrical Code (by NFPA)
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
PCA	Portland Cement Association
PDI	Plumbing and Drainage Institute
PS	US. Product Standard
SDI	Steel Deck Institute
S.D.I.	Steel Door Institute
SFPA	Southern Forest Products Association
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPIB	Southern Pine Inspection Bureau
SSPC	Steel Structures Painting Council
TCA	Title Council of America
TxDOT	Texas Department of Transportation
UBC	Uniform Building Code (International Conference of Building Officials)
UL	Underwriters Laboratories
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules)
WHI	Warnock Hersey International
WWPA	Western Wood Products Association (Grading Rules)

PART 2 – PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

SECTION 01450 – QUALITY CONTROL

PART 1 – GENERAL

1.1 SUMMARY:

A. Section includes:

1. Quality assurance and control of installation.
2. Mockups
3. Manufacturer's field services and reports.
4. Design data and calculations.
5. Test reports and certifications.
6. Manufacturer's installation instructions.

1.2 QUALITY ASSURANCE AND CONTROL OF INSTALLATION:

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Landscape Architect before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 MOCKUPS:

A. Definition:

1. Mockups are field samples constructed, applied, or assembled at the project site for review by the Owner's Representative that illustrate materials, equipment, or workmanship.
2. Approved mockups establish the standard of quality by which the Work will be judged.

B. Construct, apply, or assemble specified items, with related attachment and anchorage devices, flashings, seals, and finishes.

C. Perform work in accordance with applicable specifications sections.

D. Erect at project site at location acceptable to Owner Representative. Protect from damage.

E. Removal:

1. Mockups may remain as part of the Work only when so designated in individual specification sections.
2. Do not remove mockups until removal is approved by Landscape Architect or upon Final Completion.
3. Where mockup is not permitted to remain as part of the Work, clear area after removal of mockup has been approved by Owner's Representative.

1.4 MANUFACTURERS' FIELD SERVICES AND REPORTS:

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, or startup of equipment, as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report to Owner's Representative for review in duplicate within 30 days of observation.

1.5 TEST REPORTS AND CERTIFICATIONS:

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide test reports and manufacturers' certifications.

B. Indicate that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Submittals may be recent or previous test results on material or Product, but must be acceptable to Owner's representative.

D. Submit two copies of each report.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section includes:

1. Temporary utilities: Electricity, lighting, heat, ventilation, telephone and facsimile services, water, sanitary sewer, and sanitary facilities.
2. Field offices and sheds.
3. Temporary controls: Barriers, exterior closures, and temporary partitions.
4. Protection of installed Work, security, progress cleaning, use of site, and dust control.
5. Removal.

1.2 RELATED SECTIONS:

A. Tree protection – Section 01560.

B. Cleaning and adjusting – Section 01710.

1.3 TEMPORARY ELECTRICITY:

A. Provide temporary electrical service of capacity and characteristics required for construction or construct permanent system. Arrange with utility companies, meter separately, and pay costs for installation and for service used during construction.

B. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

C. Maintain distribution system and provide routine repairs.

1.4 TEMPORARY LIGHTING:

A. Provide temporary lighting for construction and security purposes.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lamps and provide routine repairs.

1.5 TEMPORARY HEAT:

A. Provide temporary heating devices required to maintain specified ambient temperatures for construction.

B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless otherwise indicated in individual specification sections.

1.6 TEMPORARY VENTILATION:

A. Ventilate enclosed areas to facilitate curing of materials, disperse humidity, and prevent accumulations of dust, fumes, vapors, or gases.

1.7 TEMPORARY WATER:

A. Provide temporary water service of capacity and characteristics required for construction of the Project or construct permanent system. Arrange with utility companies, meter separately, and pay costs for installation and for service used during construction.

B. Protect from freezing.

C. Maintain distribution system and provide routine repairs.

1.8 TEMPORARY SANITARY FACILITIES:

A. Provide chemical toilets for use during construction.

B. Maintain facilities in clean and sanitary condition.

1.9 TEMPORARY FIRE PROTECTION:

A. Provide and maintain temporary fire protection during construction in accordance with requirements of the local Fire Protection Code.

1.10 FIELD OFFICES AND SHEDS:

A. Provide temporary field offices and storage sheds required for construction; coordinate location with Owner.

B. Do not unreasonably encumber site or premises with excess materials or equipment.

C. Temporary Structures:

1. Portable or mobile buildings, structurally sound, weathertight, with floors raised above ground.
2. Temperature transmission resistance: Compatible with occupancy and storage requirements.
3. Provide connections for utility services when required.
4. Provide steps and landings at entrances.

D. Contractor's Field Office:

1. Size required for Contractor's use and to provide space for project meetings.
2. Adequate electrical power, lighting, heating, and cooling to maintain human comfort.
3. Provide facilities for storage of Project Record Documents.
4. Provide thermometer mounted at convenient outside location, not in direct sunlight.
5. Temporary telephone and facsimile services:
   a. Provide temporary telephone service required during construction.
   b. Provide one alphabetical and one classified telephone service company directory for each instrument.
   c. Provide facsimile machine.

1.11 BARRIERS:

A. Provide barriers to prevent unauthorized entry to construction areas, to allow Owner's use of site and premises, and to protect adjacent facilities and surfaces from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public access to existing facilities.

C. Fencing:

1. Provide temporary fencing for construction operations.
2. Construction: Commercial grade chain link.
3. Height: 6 feet.
4. Locate to protect the public, construction operations, material, and equipment.
5. Provide access gates with locks.

D. Tree and Plant Protection: As specified.

1.12 PROTECTION OF INSTALLED WORK:

A. Protect installed work from construction operations; provide special protection when required in individual specification sections.

B. Minimize traffic, storage, and construction activities on waterproofed and roofed surfaces. If traffic, storage, or activity is necessary, obtain recommendations for protection from waterproofing or roofing manufacturer.

C. Prohibit traffic from landscaped areas.

1.13 SECURITY:

A. Provide a project security program, to:

1. Protect the Work, stored products, and construction equipment from theft and vandalism.
2. Prevent entry by unauthorized persons.
3. Protect Owner's operations from theft, vandalism, and damage.

1.14 PROGRESS CLEANING:

A. Maintain areas free from waste materials, debris, and rubbish. Maintain each site in clean and orderly condition.

B. Provide containers for collection of waste materials, debris, and rubbish; remove and dispose of off-site as required by construction activities.

C. Periodically clean interior areas to provide suitable conditions for finish work.

1.15 CONTRACTOR'S USE OF SITE:

A. Limit use of site to allow for:

1. Existing public facilities and roadways surrounding each site must be kept open at all times.
2. Use of each site for parking, storage and stockpile areas shall be determined during Pre-bid Conference and as directed by Owner.

1.16 ENVIRONMENTAL CONTROLS:

A. As specified.

B. Water Control:

1. Grade site to drain.

2. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
3. Provide barriers to protect site from erosion.

C. Dust Control:

1. Provide dust control materials and methods to minimize dust from construction operations.
2. Prevent dust from dispersing into atmosphere.

D. Erosion and Sediment Control

1. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas; prevent erosion and sedimentation.
2. Minimize amount of bare soil exposed at one time.
3. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
4. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
5. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.17 REMOVAL:

A. Remove temporary utilities, equipment, facilities, and services when construction needs can be met by use of permanent construction or upon completion of Project.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing and permanent facilities used during construction to original or to specified condition.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01560 - TREE PROTECTION

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide protection of existing trees scheduled to remain and furnish all supplementary items necessary to complete the protection barricade installation and root pruning.

1.2 SITE CONDITIONS:

A. Most of the existing trees are located on the drawings. Protect these trees and all other trees outside of the building footprint and roadway/parking area in a manner approved by the Owner unless they are scheduled to be removed.

1.3 TREE TAGGING:

A. Identify trees to be preserved with permanent flagging tape.

1.4 PROTECTION/ROOT PRUNING:

A. Protect trees by barricading each tree or group of trees outlined on the drawings.

B. Do not cut or fill within the line of the barricade or within the drip line of the trees.

C. Complete root pruning prior to beginning parking area and building construction.

1.5 GUARANTEE:

A. Guarantee existing trees against damage until final acceptance of the project. Repair any damage which, in the opinion of the landscape architect, can be satisfactorily corrected.

1.6 DEFINITIONS

A. Disturbance/Damage: Physical or visual change to the trees which, in the opinion of the landscape architect, is detrimental to the trees being protected. Such disturbance may be caused by equipment, material, or personnel.

B. Violation: Damage to trees caused by any construction or delivery vehicle, construction material storage, or disposal of solid or liquid debris shall be considered a violation.

PART 2 - PRODUCTS

2.1 BARRICADES:

A. Fence Material: 12½ ga. galv. stock fence, 4'-0" tall.

B. Post: Steel T post, 6'-0" long.

2.2 EQUIPMENT:

A. Complete root pruning with a "Ditch Witch" type trenching machine.

PART 3 - EXECUTION

3.1 TREE PROTECTION:

A. Install prior to any mobilization on the site.

B. Barricade: Install barricades around trees at their drip line unless construction is scheduled to encroach closer to the trunk. In this event, relocate the fence to within 4' of the trunk. Where construction comes closer than 4', protect the trunk by planking as detailed.

3.2 ROOT PRUNING:

A. If construction encroaches within the dripline, provide root pruning as described.

1. Cut trenches 2'-6" deep, 1'-0" behind the proposed back of curb or building perimeter line.
2. After trenching, carefully inspect exposed roots and saw cut any flared ends smooth.
3. After trenches are cut and reviewed by landscape architect, backfill with soil to the original grade and water backfill thoroughly.
4. Do not proceed with backfill until trenches are reviewed.

3.3 MAINTENANCE:

A. Maintain tree protection barricades in a newly installed condition through final acceptance or until construction has been completed in the area of the tree(s).

B. Deep-water protected trees weekly during dry periods, and spray tree crowns periodically to reduce dust accumulation on the leaves.

3.4 PENALTY:

A. If any tree is damaged and, in the opinion of the landscape architect, cannot be satisfactorily repaired, then a fine of $100 per caliper inch will be assessed against the contractor. Caliper measurements will be taken as follows: up to and including 4" caliper, 6" above ground level; over 4", 4'-0" above ground level.

B. If the landscape architect agrees that the damage can be satisfactorily repaired, then complete this work by a qualified arborist to the satisfaction of the owner/landscape architect.

END OF SECTION

SECTION 01600 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Products.
   2. Transportation and handling.
   3. Storage and protection.
   4. Product options.
   5. Substitutions.

B. Related Sections:
   1. Summary of work – Section 01010.
   2. Shop Drawings, product data and samples – Section 01340.
   3. Contract Closeout – Section 01770.

1.3 REUSE OF EXISTING MATERIAL

A. Except as specifically indicated or specified, materials and equipment removed from existing site shall not be used in completed Work.

B. For material and equipment specifically indicated or specified to be reused in Work:

   1. Use special care in removal, handling, storage and reinstallation, to assure proper function in completed Work.
   2. Arrange for transportation, storage and handling of products which require off-site storage, restoration or renovation. Pay costs for such work.

1.4 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in installation, including two copies to Architect.

   1. Maintain one set of complete instructions at jobsite during installation and until completion.
   2. Submit Architect's copies with appropriate Product Data submittal.

B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Architect for further instructions.
2. Do not proceed with work without clear instructions.

C. Perform work in accord with manufacturer's instructions. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

1.5 DESIGN DATA AND CALCULATIONS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide design data and calculations.

B. Accuracy of design data and calculations is the responsibility of the Contractor.

C. When so specified, prepare design data and calculations under the direction of a professional engineer licensed in the state in which the Project is located.

1.6 PRODUCTS

A. Provide interchangeable components by the same manufacturer for identical items.

1.7 TRANSPORTATION AND HANDLING

A. Coordinate delivery of Products to prevent conflict with Work and adverse conditions at site.

B. Transport and handle Products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that Products comply with requirements of Contract Documents, are undamaged, and quantities are correct.

D. Provide equipment and personnel to handle products by methods to prevent damage.

1.8 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturer's instructions with manufacturer's seals and labels intact and legible.

B. Store Products on site unless prior written approval to store off site has been obtained from Owner.

C. Store Products subject to damage by elements in weathertight enclosures. Maintain temperature and humidity within ranges required by manufacturer's instructions.

D. Exterior Storage:
1. Store fabricated Products above ground; prevent soiling and staining.
2. Cover products subject to deterioration with impervious sheet coverings; provide ventilation to prevent condensation.
3. Store loose granular materials in well drained area on solid surfaces in well drained area; prevent mixing with foreign matter.

E. Arrange storage areas to permit access for inspection. Periodically inspect stored products to verify that products are undamaged and in acceptable condition.

1.9 PRODUCT OPTIONS

A. Products specified by reference standard only:
1. Select any Product meeting specified standard.
2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.

B. Products specified by naming several Products or manufacturers:
1. Select any named product.

C. Products specified by stating that Contract Documents are based on a Product by a single manufacturer followed by the statement “Equivalent products by the following manufacturers are acceptable”:
1. Select specified Product or a Product by a named manufacturer having equivalent or superior characteristics to the specified Product and meeting requirements of the Contract Documents.
2. If specified Product is not selected, submit Product Data to substantiate compliance of proposed Product with specified requirements.
3. Specified Product establishes the required standard of quality.

D. Products specified by naming a single Product or manufacturer, followed by "or accepted substitute":
1. Submit a Substitution Request Form for Products not named.
2. Specified Product establishes the required standard of quality.

E. Products specified by naming one or more Products or manufacturers followed by the statement “Substitutions: Under provisions of Section 01300”:
1. Submit a Substitution Request Form for Products not named.
2. Specified Product establishes the required standard of quality.

F. Products specified by naming only one Product and manufacturer followed by statement “Substitutions not permitted”: Substitutions will not be allowed.

G. Products specified by required performance or attributes, without naming a manufacturer or Product:

1. Select any Product meeting specified requirements.
2. Submit data to substantiate compliance of proposed Product with specified requirements.

1.10 SUBSTITUTIONS:

A. Substitutions during Bidding: Refer to Instructions to Bidders.

B. Architect will consider requests for Substitution within 30 days after award of Contract. After initial 30-day period, requests for Substitutions will be considered only due to non-availability of specified Product.

C. In case of non-availability of specified Product, notify Architect in writing as soon as non-availability becomes apparent.

D. Submit Substitution Requests using a copy of Substitution Request Form following this Section. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents, including:

1. Product identification, including name and address of manufacturer.
2. Product description, performance and test data, and reference standards.
3. Sample, if requested.
4. Description of any anticipated effect that acceptance of proposed Substitution will have on Progress Schedule, construction methods, or other items of Work.
5. Description of any differences between specified product and proposed Substitution.

E. Submit the number of copies required by the Contractor, plus 2 copies which will be retained by the Architect, and 2 copies for the Owner.

F. A request constitutes a representation that the Contractor:

1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified Product.
2. Will provide the same warranty for the Substitution as for the specified Product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner for design services associated with re-approval by authorities or revisions to Contract Documents to accommodate the Substitution.

G. Substitutions will not be considered if:

1. They are not accompanied by a properly completed Substitution Request Form.
2. They are indicated or implied on Shop Drawings or other submittals without formal request.
3. Acceptance will require substantial revision of Contract Documents without additional compensation to Architect.

H. Architect will notify Contractor in writing of decision to accept or reject Substitution request.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01700 – PROJECT EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED:

A. Field Engineering.

B. Protection.

C. Unknown utilities procedures.

1.2 RELATED REQUIREMENTS:

A. General conditions – Article 3.14.

B. Cutting and patching – Section 01732.

1.3 FIELD ENGINEERING:

A. Provide field engineering services; establishing grades, lines, levels, building location and utility locations by use of recognized engineering survey practices.

B. Control datum for survey is that established by Owner-provided survey and shown on Drawings. Locate and protect control and reference points.

1.4 PROTECTION:

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

B. Protect existing adjacent streets, paving, curbs, and buildings.

C. Protect existing on-site facilities, including utility lines, grading, paving and landscaping.

D. After materials, equipment and machinery are installed properly protect Work to prevent damage from subsequent operations. Remove protections when no longer needed, prior to completion of Work.

E. Provide coverings to protect finished surfaces from damage.

1. Cover projections, wall corners, and jambs, sills and soffits of openings subject to damage by subsequent work.

2. Protect finished floors and stairs from dirt and damage.

F. Prohibit use of waterproofed and roofed surfaces for construction traffic and storage of materials.

G. Keep building entirely waterproof at all times after roof is completed.

H. Damage to existing work resulting from construction operations shall be repaired by Contractor without cost to Owner.

1.5 UNKNOWN UTILITIES PROCEDURES:

A. If unknown and uncharted utilities are encountered during excavation, promptly notify Architect.

B. If it is determined that such utility line has been abandoned, properly cap line at a depth approved by Architect or remove line if directed by Architect.

C. If such unknown utilities are encountered and work is continued so as to damage discovered utilities, Contractor shall repair damage at no cost to Owner.

D. Changes required in Work due to discovery of unknown, underground utilities or obstructions will be compensated for in accordance with provisions of the General Conditions.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01710 - CLEANING AND ADJUSTING

PART 1 - GENERAL

1.1 RESPONSIBILITY

A. The Contractor is responsible for cleaning and adjusting the work. If the Contractor fails to clean and adjust the work, the Owner may do so and charge the resulting costs to the Contractor.

B. Detailed cleaning and adjusting requirements for specific trades or work are specified in Sections pertaining to that trade or work.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. Fire Protection. Volatile waste shall be stored in covered metal containers and removed from the premises daily.

B. Pollution Control. Cleaning and disposal operations shall be conducted in compliance with local ordinances and antipollution laws.

1. Burying of rubbish and materials on the Project site is not permitted.

2. Disposal of volatile fluid wastes and other chemical wastes in storm or sanitary sewer systems or into streams or waterways is not permitted.

C. Safety Standards. The Project shall be maintained in accordance with insurance and safety standards.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

A. The premises shall be maintained free from accumulations of waste material and rubbish. Waste materials, rubbish and debris shall not be allowed to accumulate and become unsightly or create a hazard. Containers shall be provided and located on site for collection of waste material, rubbish and debris.

B. At reasonable intervals during progress of the work, waste material, rubbish and debris shall be collected and disposed of. Waste shall be handled in a controlled manner.

C. Waste materials, rubbish and debris shall be removed from the site and legally disposed of at public or private dumping areas off the Project site.

D. Public and private streets, pavement and parking lots shall be kept free of debris and sediment throughout the duration of the project.

3.2 FINAL CLEANING AND ADJUSTING

A. All waste material and rubbish shall be removed from the Project Area, as well as all tools, construction equipment, machinery, surplus materials and temporary facilities. All parts of the work shall be left in a neat and presentable condition deemed satisfactory by the Owner.

B. The premises shall be maintained in a clean condition until they are occupied by the Owner.

C. All disturbed areas of the lake shoreline, lake banks, street rights-of-way, and lake slopes shall be seeded at the end of the project. No separate payment for the seeding of these areas will be made by the Owner except for seeding of the disposal site.

3.3 ADJACENT AREAS

Adjacent areas affected by the construction shall be cleaned or repaired to the adjacent property owner's, Engineer's and Owner's satisfaction.

END OF SECTION

SECTION 01732 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Requirements and limitations for cutting and patching of new work.

B. Execute cutting to include excavating, fitting, and patching of Work required to:

1. Make several parts fit properly.
2. Uncover work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
6. Interface new and existing work.

1.2 SUBMITTALS:

A. Submit written request in advance of executing cutting or alteration which affects:

1. Work of Owner or separate contractor.
2. Structural integrity of project.
3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
4. Efficiency, operational life, maintenance, or safety of operational elements.
5. Visual qualities of sight exposed elements.

B. Include in Request:

1. Identification of project.
2. Description of work affected.
3. Necessity for cutting or patching.
4. Effect of cutting or patching on work of Owner or separate contractor, or on structural, weatherproof, or visual integrity of project.
5. Description of proposed work:
    a. Scope of cutting and patching.
    b. Contractor and trades to execute work.
    c. Products proposed to be used.
    d. Extent of refinishing.

6. Alternate to cutting and patching.
7. Cost proposal, if applicable.
8. Written permission of any separate contractor whose work will be affected.

C. If conditions of work or schedule necessitate a change of material from that originally installed, submit written request in accordance with Section 01600.

D. Submit written notice to Architect designating time work will be uncovered, to allow for observation.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. For replacement of work removed, comply with Specifications for each specific product involved.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine existing conditions of Work, including elements subject to movement or damage during cutting and patching and during excavation and backfilling.

B. After uncovering work, examine conditions affecting installation of new products, or performance of work.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Examine existing conditions of work, including elements subject to movement or damage during cutting and patching.

B. After uncovering work, examine conditions affecting installation of new products or performance of work.

C. Provide protection for other portions of project.

D. Provide protection from elements.

3.3 CUTTING AND PATCHING:

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, and finishes.

B. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.

C. Execute excavating and backfilling by methods which will prevent damage to other Work, and will prevent settlement.

D. Employ original installer or fabricator to perform cutting and patching for:

1. Weather exposed or moisture resistant elements.
2. Sight exposed finished surfaces.

E. Restore work which has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

F. Refinish entire surfaces as necessary to provide an even finish:

1. Continuous surfaces: To nearest intersections.
2. Assembly: Refinish entirely.

3.4 CLEAN UP:

A. Remove debris, rubbish, and materials resulting from cutting and patching operations.

B. Transport materials and legally dispose of offsite.

END OF SECTION

SECTION 01770 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY:

A. Section includes:

1. Closeout procedures.
2. Final cleaning.
3. Adjusting.
4. Project record documents.
5. Operation and maintenance data.
6. Warranties.
7. Demonstration and instructions.

B. Related Sections:

1. Section 01500 - Temporary facilities and controls.

1.2 CLOSEOUT PROCEDURES:

A. Final Inspection:

1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for Architect's inspection.
2. Include written Punch List of incomplete items.
3. If Architect performs reinspection due to failure of Work to comply with claims of status of completion made by Contractor, Owner will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to Contractor.

B. Submit final Application for Payment showing original Contract Sum, adjustments, previous payments, retainage withheld from previous payments, and sum remaining due.

C. Closeout Submittals:

1. Evidence of compliance with requirements of governing authorities.
2. Project Record Documents.
3. Operation and Maintenance Data.
4. Warranties.
5. Keys and keying Schedule.
6. Spare parts and maintenance materials.

7. Evidence of payment of Subcontractors and suppliers.
8. Final lien waiver.
9. Certificate of insurance for products and completed operations.

1.3 FINAL CLEANING:

A. Execute final cleaning prior to final inspection.

B. Clean surfaces exposed to view:

C. Clean equipment and fixtures to a sanitary condition.

D. Clean or replace filters of operating equipment.

E. Clean debris from roofs and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 ADJUSTING:

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.5 PROJECT RECORD DOCUMENTS:

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Project Manual.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish first main floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

F. Just prior to Substantial Completion, obtain and pay cost of 1 set of reproducible Mylar prints of Drawings. Transfer marks made during construction to this set.

G. Final As-recorded Drawings of entire Civil Construction Plans and Filed Plat to consist of three computer diskettes of CD-ROMs each containing AutoCAD 2000 format files of construction Drawings.

H. Affidavits from all Contractors and Subcontractors that all bills, liens, subcontractors, suppliers, etc. have been paid (Individual signing affidavit must be an officer in the company).

I. Submit documents to Architect with claim for final Application for Payment.

1.6 OPERATION AND MAINTENANCE DATA:

A. Submit two copies prior to final inspection, 8-1/2 x 11 inch text pages, bound in 3 ring binders with durable plastic covers.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

4. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Architect's comments. Revise content of documents as required prior to final submittal.

5. Submit final volumes revised, within 10 days after final inspection.

1.7 WARRANTIES:

A. Provide duplicate notarized copies.

B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in 3 ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.8 SPARE PARTS AND MAINTENANCE MATERIALS:

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver to Project site in location as directed; obtain receipt prior to final payment.

1.9 DEMONSTRATION AND INSTRUCTIONS:

A. Demonstrate operation and maintenance of Products to Owner's personnel 2 weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize Operation and Maintenance Manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon times, at equipment location.

E. Prepare and insert additional data in Operation and Maintenance Manuals when need for additional data becomes apparent during instruction.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 02010 – SITE AND SUBSURFACE INVESTIGATION BY CONTRACTOR

PART 1— GENERAL

1.1 SECTION INCLUDES

A. Surface reconnaissance and evaluation of existing site conditions.

B. Sub-surface evaluation by contractor's chosen method of investigation.

1.2 RELATED SECTIONS

A. City of Dallas General Conditions.

B. Appendix A - Geotechnical Report.

PART 2 — EXECUTION

2.1 EXECUTION

A. Contractor is responsible for having a thorough knowledge of all Drawings, Specifications, General and Supplementary Conditions, and other Contract Documents. Failure to acquaint himself with this knowledge does not relieve him of the responsibility for performing the work in a manner acceptable to Owner. No additional compensation will be allowed because of conditions that occur due to failure by Contractor to familiarize himself and all workers with this knowledge.

B. Contractor is responsible for determining existing conditions of the site, and shall thoroughly examine all factors reasonably available to him, including but not limited to the Drawings, Specifications, geotechnical report, site boundary and topography, site conditions, site history, local information, and seasonal weather conditions. Geotechnical report data is not considered all conclusive and it is
Contractor's responsibility to further investigate site conditions as he determines necessary. Contractor shall be totally responsible for acceptance of the site and

preparation of the site to the proper grade and compaction requirements as indicated by the

Contract Documents. Any construction performed by Contractor on the project will constitute acceptance of the site.

END OF SECTION

SECTION 02050 – DEMOLITION

PART I - GENERAL

1.1 SECTION INCLUDES

A. Demolition of designated site structures, retaining walls, and foundations and removal of materials from site.

B. Demolition and removal of pavements, curbs and gutters, drainage structures, utilities, signage, or landscaping.

C. Disconnecting and capping or removal of identified utilities.

D. Filling or removal of underground tanks, piping, and appurtenances.

E. Filling voids in subgrade created as a result of removals or demolition.

F. Hazardous material compliance.

1.2 RELATED SECTIONS

A. Section 02100 - Site Preparation

B. Section 02200 — Earthwork

C. Section 02270 - Soil Erosion and Sediment Control

D. Storm Water Pollution Prevention Plan

E. City of Dallas Fire Code

F. Section 01560 — Tree Protection

G. Construction Drawings

H. Section 02160 Support of Excavation

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable local codes for demolition of structures, safety of adjacent structures, dust control, and runoff control.

B. Obtain required permits and licenses from appropriate authorities. Pay associated fees including disposal charges.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Do not close or obstruct roadways, sidewalks, or fire hydrants without appropriate permits.

E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

F. Before any tree removal, Contractor must notify City Forester for a walk thru of project.

1.4 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of capped utilities and subsurface obstructions that will remain after demolition.

1.5 PROJECT CONDITIONS

A. Structures to be demolished will be discontinued in use and vacated prior to start of work.

B. Neither Owner nor Engineer assumes responsibility for condition of structures to be demolished.

C. In the event existing site conditions have changed after contractor has performed his site evaluation described in section 02010, Engineer shall be consulted prior to start of work.

D. Unless otherwise indicated in Contract Documents, items of salvageable value to Contractor shall be removed from site and structures. Storage or sale of removed items on site will not be permitted and shall not interfere with other work specified in Contract Documents.

E. Explosives shall not be brought to site or used without written consent of authorities having jurisdiction. Such written consent will not relieve Contractor of total responsibility for injury to persons or for damage to property due to blasting operations. Performance of required blasting shall comply with governing regulations.

PART 2 - PRODUCTS

2.1 FILL MATERIAL

A. Aggregate material as specific in section 02227.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations indicated on Construction Drawings.

B. Protect existing plant growth, landscaping materials, appurtenances, and structures which are not to be demolished. Replace or repair damage caused by demolition operations at no cost to Owner.

C. Prevent movement or settlement of remaining adjacent structures and provide bracing and shoring as needed.

D. Mark location of existing utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities that are acceptable to governing authorities and utility owners.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition operations in a manner that will minimize interference with adjacent structures or pavements.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed.

C. Conduct operations with minimum of interference to public or private access. Maintain ingress and egress at all times.

D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property. This does not apply as long as Contractor's operations are confined to the site and to temporary construction easements provided by Owner.

E. Sprinkle disturbed areas with water to minimize dust. Provide hoses and water connections for this purpose.

F. Comply with governing regulations pertaining to environmental protection.

G. Clean adjacent roads, streets, highways, structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.3 DEMOLITION

A. Remove existing pavement sections as shown on the Drawings by saw cutting in a neat straight line.

B. Demolish concrete and masonry in small sections. Break up concrete slabs-on-grade that are 3 feet or more below proposed subgrade and remove if adequate compaction cannot be obtained. Remove slabs-on-grade and below grade construction within the upper 3 feet of proposed subgrade.

C. Provide a wood chipper onsite and mulch trees designated to be removed.

D. Removed trees shall be chipped onsite. Chipped material to be spread around existing trees and along the edge of existing trails where present.

3.4 FILLING BASEMENTS AND VOIDS

A. Completely fill below grade areas and voids resulting from demolition or removal of structures, underground fuel storage tanks, wells, cisterns, etc., using approved select fill materials consisting of stone, gravel, and sand free from debris, trash, frozen materials, roots, and other organic matter.

B. Ensure that areas to be filled are free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.

C. Place fill materials in accordance with Section 02200 unless subsequent excavation for new work is required.

D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site debris, rubbish, and other materials resulting from demolition operations.

B. No burning of any material, debris, or trash on-site or off-site will be allowed, except when allowed by appropriate governing authority and Owner. If allowed as stated above, burning shall be performed in manner prescribed by governing authority. Attend burning materials until fires have completely burned out or have been completely extinguished.

C. Transport materials removed from demolished structures with appropriate vehicles and dispose off-site to areas which are approved for disposal by governing authorities and appropriate property owners.

D. Spread mulch, made of existing trees to be removed, in areas as designated by City Forester.

End of Section

SECTION 02115 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 DESCRIPTION

This section shall include all work necessary for and incidental to the execution and completion of clearing, grubbing, removing and disposing of trees and other vegetation designated for removal, dust alleviation and control, and protection of all trees not specifically designated for removal.

1.2 PROTECTION

A. Protect all reference points, bench marks and monuments from damage or dislocation.

B. Protect and maintain all conduits, drains, inlets, sewers, pipes, electrical and communications systems that are to remain in service.

C. Protect adjacent lawn or surface areas outside clearing and grubbing limits from damage.

D. Protect trees not designated to be removed from damage to bark and limbs. Trees are to be trimmed only to the extent necessary to perform the work. Obtain approval of the Owner prior to trimming or removal of trees.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 CLEARING

Clearing shall consist of the removal of ground cover (grass, weeds, and other vegetation), and felling, trimming and cutting of designated trees into sections, and the satisfactory disposal of felled trees and other vegetation designated for removal, including down timber, snags, brush and rubbish occurring within the areas to be cleared. Designated trees, stumps, roots, brush and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface. Trees and vegetation to be left standing shall be protected from damage incident specified fence or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon or otherwise obstruct the work.

3.2 GRUBBING OF DISPOSAL SITE

Grubbing shall consist of the removal and disposal of stumps, roots larger than three inches in diameter, and matted roots from areas on which any fill or structures will be placed. This material, together with logs and other organic or metallic debris not suitable for foundation or subgrade purposes, shall be excavated and removed to a depth of not less than eighteen inches below the original surface level of the ground in areas to be filled under this contract. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground. Compaction of the material shall be as specified elsewhere in these specifications.

3.3 GRUBBING OF AREAS TO BE DREDGED

Grubbing shall consist of the removal and disposal of stumps, roots, and matted roots from areas to be dredged. This material, together with logs and other organic or metallic debris, shall be excavated and disposed of off-site.

3.4 DISPOSAL OF MATERIALS

Disposal Off-site: All spoil material resulting from clearing, grubbing and removal of existing concrete, structures, fences and other items shall be disposed off-site by the Contractor. Material to be disposed of off-site shall become the property of the Contractor and shall be disposed of at the Contractor's expense. Arrangements for offsite disposal shall be the sole responsibility of the Contractor, and disposal shall be done in a lawful matter.

END OF SECTION

SECTION 02200 - SITE PREPARATION

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS:

A. Comply with Conditions of the Contract, Division 1 - General Requirements, and referenced documents.

1.2 SUMMARY:

A. This Section relates to the following:

1. Section 01560 – Tree Protection.
2. Removal of trees and other vegetation.
3. Topsoil stripping.
4. Section 02115 – Clearing and grubbing.
5. Removing above-grade improvements.
6. Removing below-grade improvements.

1.3 PROJECT CONDITIONS:

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.
2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

2. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ a licensed arborist to repair damages to trees and shrubs.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.1 SITE CLEARING:

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Topsoil: Topsoil is defined as friable clay surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
    a. Remove heavy growths of grass from areas before stripping.
    b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
3. Dispose of unsuitable or excess topsoil same as specified for disposal of waste material.

C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.
2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
4. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

1. Abandonment or removal of certain underground pipe or conduits may be indicated.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

B. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Provide complete excavation, filling, grading, backfilling, and finish grading.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01410 - Testing laboratory services

B. Section 01560 - Tree protection

C. Section 02200 - Site Preparation

D. Section 03300 - Cast-in-place concrete

1.3 SUBMITTALS:

A. Samples: Submit adequate samples of proposed backfill to the site for Architect's review.

B. Test Reports:

1. Materials and Compaction: Refer to Section 01410.

C. Safety Plan:

1. When trench excavation exceeds a depth of five feet (5'), submit detailed plans and specifications for trench safety systems to meet the OSHA requirements necessary to satisfy federal and state laws and regulations. The trench safety plan shall be designed by a Registered Professional Engineer, licensed in the State of Texas. Trench safety plans shall be signed and sealed by the Engineer.

1.4 JOB CONDITIONS:

A. Protections:

1. Protect reference points, bench marks, and monuments from damage or dislocation. Replace or repair immediately points damaged, destroyed or dislocated.
2. Protect and maintain conduits, drains, inlets, sewers, pipes and wires that remain on property.

3. Cover holes and trenches when work is not in progress. Fence or barricade changes of plane more than 45 degrees horizontally and more than 3 feet vertically.

4. Provide dewatering and drainage to keep excavations free of water.

5. Protect adjacent lawn and other surfaces and improvements outside grading limits. Repair any damage immediately.

6. Protect areas from erosion. Provide approved temporary silt control barriers as per plans during construction and remove barriers prior to job completion.

B. Coordination:

1. Coordinate backfill operations with installation of drainage systems.

C. Soil Classification:

1. Excavated materials are not classified as to type. Excavation includes all material encountered at site including rock, rubble and debris.

PART 2 - MATERIALS

2.1 SAND CUSHION (LEVELING COURSE):

A. Sand shall consist of clean, hard durable, uncoated grains, free from lumps and organic material. All particles must pass a No. 8 sieve.

2.2 SELECT FILL:

A. Naturally-occurring earth materials with a plasticity index of 4 to 12 and liquid limit of no greater than 30 percent. It should have no less than 95 percent passing the #40 sieve and no less than 70 percent fines (silt and clay). It should also be free from organic matter and clay balls greater than 1.5 inches in diameter.

2.3 SITE TOPSOIL:

A. Suitable topsoil material as stockpiled on site.

B. Suitable soil is defined as dark brown sandy clay loam or dark brown blackland topsoil free of rocks greater than 1" in diameter, caliche subsoils, weeds, roots and other objectionable materials.

2.4 SUBSOIL MATERIAL:

A. Soil excavated from construction areas free of rocks (larger than 3") and construction debris.

2.5 STOCKPILES:

A. Topsoil and excess subsoil material cut from construction areas, which is suitable for backfilling as defined above, will be stockpiled in separate piles on site.

2.6 SURPLUS MATERIALS:

A. Remove from site any materials unsuitable for use as fill and backfill or materials containing rubbish or debris shall be removed from site as directed by Owner or Architect.

B. All suitable materials will be used on the site.

2.7 IMPORTED TOPSOIL:

A. Friable, dark loamy soil, fertile, free from rubble, stones, clay lumps, extraneous material, plant roots and reasonably free of weeds. Topsoil containing Nut grass or Dallis grass shall be rejected.

B. Physical properties as follows:
Clay - Between 7-27 percent Silt - Between 28-50 percent
Sand - Less than 52 percent

PART 3 - EXECUTION

3.1 PREPARATION:

A. Contact utility companies to verify and locate on-site utilities.

B. Remove any abandoned or inactive utilities to point not less than two feet (2') below finish grade. Plug or cap remaining lines in a manner acceptable to utility company.

C. Report encounter of active utilities not indicated by the drawings to Architect. Disposition shall be as directed with adjustment in Contract amount. Extra payment will not be authorized for work that could have been foreseen by careful examination of site, review of drawings or by notification of the appropriate utility company.

D. Notify respective utility companies of damage caused to active utilities and protect active utilities pending instruction for disposition.

E. Verify that drainage systems are complete.

3.2 GRADING:

A. Excavate and rough-grade to lines and grades shown.

B. Maintain excavations to drain and keep free of excess water. Ponding of water on site will not be permitted.

C. Remove unsuitable materials from site when excavated.

3.3 EXCAVATION FOR STRUCTURES:

A. Provide excavation for structures and footings, as required for construction, bracing and removal of forms.

B. Bottom of excavation shall be a reasonably uniform plane.

C. Maintain excavations in as near their natural moisture conditions as possible.

3.4 FILLING/BACKFILL:

A. General:

1. Before filling, clean area of debris, large rocks, formwork and loose material.
Area to be filled shall be approved by Architect before filling is started.
2. Before placing any fill materials, scarify the top 6 inches of subgrade and compact to not less than 95 percent of the maximum dry density as determined by D698 with moisture content being within -1 to +4 percent of the optimum moisture value.
3. Maintain moisture content of the fill soils within -1 to +4 percent points of the optimum moisture content determined from the Proctor density test.
4. Prior to filling under pavements, proof-roll subgrade with a rubber-tired roller of sufficient weight. Weak areas or areas where excessive pumping is noted shall be removed and replaced with select fill material. Once the subgrade is uniformly stable, compact the areas as noted herein.

B. Fill beneath Hike & Bike Trail and Walks

1. Paved Areas: Place fill in loose lifts of eight inches (8”) maximum thickness and compact to 95 percent (95%) density at (optimum to +4%) optimum moisture content as determined by ASTM D698.

C. Fill beneath Landscape Areas

1. Landscape Areas: Place in 8" maximum lifts and compact to approximately 85% of Standard Proctor Density, ASTM D698.

3.5 FINISH GRADING:

A. Grade uniformly with rounded surfaces at tops and bottoms of abrupt changes in plane. DO NOT cut or fill around trees unless approved by the Owner.

B. Protect graded areas from undue erosion. Repair and regrade as required. Refill and compact where settlement occurs.

C. Grade areas to elevations and slopes indicated or as noted on the drawings, without depressions that cause pocketing of surface water or humps which produce localized runoff and gullies. Ponding of water on site is not allowed. Finish surfaces to be nor more than 0.10 feet above or below established grades.

D. Refer to Section 02930, Lawns and Grass, for finish grading requirements.

E. Topsoil Depths

1. Provide a minimum of 6" of site topsoil over the regraded areas. During grading, if rock is encountered, over-excavate to a depth of 12" and backfill with topsoil.
2. In planting bed areas where fill will exceed 6" depth, place topsoil to a minimum depth of 2'-0". If more than 2'-0" of fill is required, Subsoil Material may be used to within 2'-0" of finish grade.
3. Leave plant bed areas 6" low to receive backfill as specified in Section 02900.

F. Provide imported topsoil as defined if stockpiled soil is insufficient.

3.6 CLEANUP:

A. Remove unusable materials from site promptly to prevent large accumulations. Stockpile reusable material neatly in designated locations.

END OF SECTION

SECTION 02465 - DRILLED PIERS

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Furnish all labor, materials, services, equipment, and appliances required in conjunction with drilling piers complete, including, but not limited to the following:

1. Drilling and cleaning pier holes, pumping water if required and removing spoil.
2. Casing pier holes if required.
3. Placing concrete and reinforcing steel, including accessories.
4. Laboratory control.

1.2. RELATED WORK SPECIFIED ELSEWHERE:

A. Concrete Reinforcement – Section 03200

1.3. TESTING LABORATORY SERVICES:

A. An independent testing laboratory shall be employed by the Owner for services providing inspection of pier drilling operations. Refer to Section 01451.

B. The Contractor shall allow for a minimum of 2 days' notice to be given the Laboratory for the inspection work.

1.4 BASIS FOR BIDS:

A. Contract price shall be based on the number of piers and with a base length as shown on the Drawings. In addition, the Contractor shall quote unit prices for the following:

1. Unit price per lineal foot for piers longer or shorter than base lengths.
2. Unit prices per lineal foot for casing.
3. Unit prices shall include all labor, materials, equipment, overhead and fee for drilled piers complete including removal of spoil.
4. Adjustments to the contract shall be based on the total linear feet of each pier size greater than or less than the sum of the base lengths of each size. No payment will be made for extra length due to overdrilling by the Contractor.

B. The cost of providing casings is not to be included in the base bid for drilled piers.

C. If casings are required the cost will be added to the contract based on the unit price.

QUALITY ASSURANCE:

A. Pier Drilling Subcontractor shall have a minimum of 3 years' experience in similar applications. Experience shall be relevant to anticipated subsurface materials, water conditions, shaft sizes, bell sizes, depths, and special techniques required.

B. Codes and Standards:

1. Specifications of the Association of Drilled Shaft Contractors.

2. American Concrete Institute ACI 336.1 "Standard Specification for Construction of End Bearing Drilled Piers" and ACI 336.3 "Suggested Design and Construction Procedures for Pier Foundations".

1.6 JOB CONDITIONS:

A. Subsurface Conditions:

1. Any site information provided is not intended as representations or warranties of continuity of such conditions. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn there from by the Contractor. Data is made available for the convenience of the Contractor and is not guaranteed to represent conditions that may be encountered. Additional test borings and other exploratory operations may be conducted by the Contractor at no additional cost to the Owner.

B. Existing Utilities:

1. Locate existing underground utilities by hand excavation prior to start of drilling. Provide protection from damage during drilling operations.

2. If uncharted or incorrectly charted utilities be encountered, consult with the Architect immediately. Cooperate with the Owner and utility companies to keep utility services and facilities operational. Repair all damaged utilities to the satisfaction of the utility owner.

3. Do not interrupt existing utility service except as shown on the Drawings or as permitted in writing by the Architect. Interrupt services only after temporary or new utility services have been provided.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Reinforcing Steel: Refer to Section 03200

B. Concrete: Refer to Section 03300

2.2 ACCESSORIES:

A. Manufacturer:

1. Piersearch, Arlington, Texas
2. Foundation Technologies, Inc., Tucker, Georgia

B. Products:

1. Highjackers: Four inches diameter, three inches tall bolsters. Provide a minimum of 2 for piers less than 30” diameter and 4 for piers 30” and larger in diameter.

2. Centraligner/Shaftspacer: Of proper dimension to provide specified cover on pier cage. Provide 6 for piers to 24 feet deep. Provide 9 for piers over 24 feet long. Centraligners shall be used in equally spaced rows of 3 around the perimeter of the cage.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Prior to beginning installation, inspect the areas and conditions under which pier work is to be performed. Locate all underground and overhead utilities. Notify the Architect of any unsatisfactory conditions.

3.2 DRILLING:

A. Drill pier holes of specified diameters to the bearing strata shown on the Drawings and as confirmed by the laboratory representative at the site.

B. Penetrate the bearing strata as specified on the Drawings.

C. If flowing water or caving soil is encountered, Contractor shall provide and place steel casings to seal off the flowing water or caving soil. Install casing sufficient distance into bearing strata to insure watertight seal.

D. Casing shall be steel and of sufficient strength to withstand earth pressures and withdrawal stresses and to maintain shaft diameter. Casing shall be watertight.

E. Drilling of bearing strata shall be done in the dry. All water shall be removed from the hole prior to and during drilling of the scheduled penetration.

F. Belled bottom piers shall penetrate the bearing strata and shall be belled to the diameters shown on the Drawings. Provide casing to the top of belled portion of the pier if required.

G. Tolerances:

1. Maximum lateral variation off centerlines: one twenty forth of shaft diameter or 2", whichever is smaller.
2. Plumbness of vertical piers: one percent of length.
3. Shaft diameter: plus 2", minus 0".
4. Top of pier elevation: plus 1", minus 3".
5. Axis of battered piers: one percent of length.

3.3 DRAINAGE AND PUMPING:

A. Furnish necessary pumps, power and attendance required to keep the holes free from standing water at all times, whether from surface or underground water at no extra cost to the Owner. No more than 2" of water shall be allowed in the bottom of the pier at the time of concrete placement.

3.4 CLEANING PIER EXCAVATION:

A. Clean bottom of completed pier excavation of all loose material and water prior to placing concrete.

3.5 REINFORCING STEEL:

A. Place reinforcing steel cages accurately in place and hold in position to maintain specified concrete cover during placement of concrete.

B. Place dowels and/or anchor bolts as detailed accurately in position and maintain in exact location with templates.

3.6 CONCRETE PLACEMENT:

A. Fill drilled pier excavations with concrete immediately after inspection and approval and within the time limit stated on the Drawings.

B. Place concrete continuously and in a smooth flow without segregation of concrete materials. Direct concrete down the center of the shaft so that the concrete does not contact the reinforcing cage or sides of the shaft.

C. Place concrete through a tremie to within ten (10) feet of the bottom of the hole and for a maximum ten (10) foot fall as the work progresses.

D. Maintain sufficient head of concrete to prevent reduction in diameter of pier shaft by earth pressure and to prevent extraneous material from mixing with fresh concrete.

E. Stop concrete placement at top of pier elevation shown on Drawings. Screed level and apply a scour, rough finish. Where top of pier is above ground elevation, form top section above grade and extend shaft to required elevation. Forms shall be the same diameter as the pier shaft below grade.

F. Remove excess concrete at the top of piers that extends beyond the limits of the shaft diameter below.

3.7 REMOVAL OF CASING:

A. Prior to breaking seal between temporary casing and underlying strata, static head of plastic concrete shall be sufficiently above the ground water head to prevent water and caving soil from entering hole during removal of casing.

B. Once seal has been broken, temporary casing may be slowly removed in a vertical direction while additional concrete is placed to top of casing. Rotation of casing during removal shall not be permitted.

3.8 CLEAN UP:

A. Disposal of spoil from pier excavations is the responsibility of the Contractor.

END OF SECTION

SECTION 02520 – PORTLAND CEMENT CONCRETE WALKWAYS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforced cast-in-place concrete walkways.
2. Finishing.

A. Related Sections:
1. Section 01410 - Testing laboratory services
2. Section 02300 - Earthwork
3. Section 03300 - Cast-in-place concrete
4. Section 03920 - Joint Sealants

1.2 ALTERNATES

A. Work in this section is affected by various alternates.

1.3 REFERENCES

A. American Concrete Institute (ACI):
1. ACI 211.1-7 Recommended practice for Selecting Properties for Normal and Heavyweight Concrete.
2. ACI 305.77 Recommended Practice for Hot Weather Concreting.
3. ACI 306.77 Recommended Practice for Cold Weather Concreting.

B. American Society for Testing and Materials (ASTM):
1. A 185 – Welded Steel Wire Fabric for Concrete Reinforcement.
2. A 615 Deformed and Plain Bullet Steel Barr for Concrete Reinforcement.
3. C 33 – Concrete Aggregates.
4. C 94 – Ready-Mixed Concrete.
5. C 150 – Portland Cement.
6. C 260 – Air-Entraining Admixtures for Concrete.
7. C 309 – Liquid Membrane-Forming Compounds for Curing Concrete.
8. C 494 – Chemical Admixtures for Concrete.
9. D 1752 – Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

C. Concrete Reinforcing Steel Institute (CRSI) – Manual of Practice.

1.4 SUBMITTALS

A. Concrete Mix Design:

1. Provide concrete mix design for review. Design of mix shall be by concrete supplier. Design method shall be in accordance with ACI 211.

B. Product Data: Submit manufacturer's product data literature and installation instructions for specified products as follows:
   1. Curing Compound
   2. Expansion joint filler
   3. Admixtures (if applicable)

1.5 DELIVERY, STORAGE AND HANDLING

A. Mix and deliver concrete to protect in accordance with ASTM C 94.

B. Schedule delivery so that continuity of any pour will not be interrupted for over 15 minutes.

C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Forms:
   1. Metal: Free of deformities, furnished in maximum practical lengths.
   2. Wood: Good grade lumber, sound and free of warp, minimum 2" nominal thickness except where short radius of curve requires thinner forms.

B. Reinforcement:
   1. Dowels: ASTM A 615, smooth.
   2. Reinforcing Steel: ASTM A 615 Grade 40.
   3. Accessories: Include devices necessary for placing, spacing, supporting, and fastening reinforcement.
   4. Tie wire: Black annealed steel, 16 gage minimum.

C. Portland Cement: ASTM C 150, Type I.

D. Aggregates: ASTM C 33 clean, hard, durable, and uncoated.
   1. Fine: Natural sand free from silt, loam and clay.
   2. Coarse: Crushed, stone, maximum size 1-1/2 in.

E. Admixtures:
   1. Water reducing or water reducing/set retarding: ASTM C 494.
   2. Air entraining: ASTM C260.

3. Color admixture: CHROMIX (C-25 Sombrero Buff) manufactured by L.M. Scofield Company, local Representative Jim Orella (214.495.0177).

F. Expansion Joint Filler: Non asphaltic type, ASTM D 1752, Type 1. Ceramar by W.R. Grace or Sonoflex F by Sonneborn, plus tack strip; or construction heart redwood, nominal 3/4 in. (11/16 in. to 3/4 in. net thickness) with no knot holes or sapwood, plus tack strip.

G. Joint Sealant: Specified in Section 03920.

H. Curing Materials:
1. Curing compound: ASTM C309, Type 1, clear.
2. Curing paper: ASTM C 171, waterproof paper.

I. Sand Cushion: As specified in Section 02300.

J. Water: Clean and potable.

2.2 MIXES

A. Proportion cement, aggregate, and water to attain required plasticity and compressive strength in accordance with ACI 301.

B. Design concrete to yield the following characteristics:
1. Minimum 28 day compressive strength: 3500 PSI. 2.
Five sacks of cement per cubic yard
3. Slump: 3 to 5 inches.
4. Air entrainment: 4 to 6 percent.
5. Admixture: Introduce in quantities and according to methods recommended by admixture manufacturer.

PART 3 – EXECUTION

3.1 PLACEMENT OF SAND CUSHION

A. Place 2 inch sand cushion under walks.

B. Screed off to required line and grade.

C. Lightly wet just prior to concrete placement.

3.2 CONSTRUCTION OF FORMWORK

A. Set forms accurately to required grades and alignment.

B. Brace forms to withstand loads applied during concrete placement.

C. Clean contact and screed surfaces of forms of hardened concrete and foreign materials.

D. Leave forms in place minimum 12 hours after completion of finishing operation.

E. Provide expansion joints where walks abut existing and other construction, and at maximum 30 feet on center unless otherwise indicated.

1. Shape joint filler to concrete cross section and fasten in place. Provide holes for dowel bars maximum 1/8 inch larger than bar diameter.
2. Use removable strips to provide recess for sealant.

3.3 INSTALLATION OF REINFORCEMENT

A. Install in accordance with ACI 301 and CRSI Manual.

B. Before placing, clean reinforcing of loose rust, mill scale, dirt, oil, and other materials that could reduce bonding.

C. Unless otherwise detailed, install reinforcing in middle third of flatwork.

D. Provide dowels at maximum 18 inches on center at expansion joints perpendicular to joint and level. Stop reinforcement on both sides of joint.

3.4 CONCRETE PLACEMENT

A. Install integral colored concrete in areas as shown on plans.

B. Place concrete in accordance with requirements of ACI 301.

C. Avoid segregation due to rehandling or flowing.

D. Do not place partially hardened, contaminated, or retempered concrete.

E. Consolidate concrete with mechanical vibrating equipment.

F. Stop concrete placement only at expansion or construction joint.

G. Strike off concrete with transverse screed, shaped to provide slope where required, guided by screeds or side forms. Follow screeding operation with longitudinal float.

H. Installation Tolerances: Surfaces true to plane, in longitudinal direction to required grade, within plus or minus ¼ inch in 10 feet, noncumulative.

3.5 FINISHES

A. Broom finish exposed surfaces:

1. Float surfaces to required lines and grades.
2. Screed surfaces to smooth surface.
3. Apply medium broom or brush finish from side to side.

3.6 JOINTS

A. Tool expansion joint edges and other exposed edges to smooth, dense surface with 1/8 inch radius unless otherwise indicated.

B. Control Joints:

4. Provide control joints at maximum 10 feet on center unless otherwise indicated.
5. Form joints straight and of uniform depth, using 3/8 inch deep round edge tool.

C. Seal expansion joints as specified in Section 03920.

3.7 CURING AND PROTECTION

A. Protect concrete from premature drying, excessively hot or cold temperatures and mechanical damage. Begin immediately after placement.

B. Preservation of Moisture: protect surfaces from moisture loss with one of the following methods immediately after finishing and continuing for a period of at least 7 days:

1. Ponding or continuous sprinkling.
2. Application of absorptive mats or fabric kept continuously wet.
3. Application of waterproof curing paper.
4. Application of curing compound in conformance with ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

C. Apply curing compounds in accordance with manufacturer's recommendations. Do not use curing compound on any surface against which additional concrete is to be placed or other material is to be bonded unless it is proven that the compound will not inhibit bonding, or positive measures are taken to completely remove the compound from areas to received bonded materials.

3.8 FIELD QUALITY CONTROL

A. Test Cylinders:

1. Make three (3) test specimens for each concrete placement of 50 cubic yards or fraction thereof of each different mix design placed in any one day.
2. Secure samples in accordance with ASTM C172.
3. Make and cure four compression test cylinders from each sample in accordance with ASTM C31.
4. Test cylinders in accordance with ASTM C39: One at 7 days and two at 28 days.

B. Slump Tests:

1. For each set of cylinders and whenever consistency of concrete appears to vary, perform slump tests in accordance with ASTM C143.

C. Air Content:

1. For each set of cylinders, test air content of fresh concrete in accordance with ASTM C231.

D. Contractor's Responsibilities:

1. Furnish necessary labor to assist testing agency in obtaining and handling samples at job-site.
2. Advise testing agency in advance of operations to allow for assignment of testing personnel and testing.
3. Provide and maintain for use of testing agency adequate facilities for proper curing of concrete test specimens on project site in accordance with ASTM C31.

END OF SECTION

SECTION 02620 - SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Furnish all labor, materials, tools, equipment, and services for all soil erosion and sediment control, as indicated, in accordance with provisions of Contract Documents.

B. Completely coordinate with work of all other trades.

C. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation in order to meet the United States Environmental Protection Agency, State of Texas (i.e. TCEQ) and City requirements.

1.1 QUALITY ASSURANCE

A. Erosion Control Standards:

1. Texas State Department of Highways and Public Transportation, "Standard Specifications for Construction of Highways, Streets, and Bridges", 2008, as amended to date.
2. United States Environmental Protection Agency, National Pollutant Discharge
Elimination System - (NPDES) - Storm Water Management for Construction Activities.
3. North Central Texas Council of Governments, Standard Specifications

1.3 EROSION CONTROL PRINCIPLES:

A. Perform demolition, construction and other soil disturbances in a manner which minimizes soil erosion.

B. Retain and protect existing vegetation as much as is feasible.

C. Keep area which is exposed and free of vegetative cover to a minimum, within practical limits.

D. Protect exposed critical areas during prolonged construction or other land disturbance by temporary seeding, mulching or other suitable stabilization measures.

1.4 JOB CONDITIONS:

A. Comply with all requirements of the EPA for implementation of the storm water pollution prevention plan, under the NPDES General Permits for Storm Water Discharges from Construction Sites.

1.5 SUBMITTALS

A. Project Information:

1. Contractor shall have a Storm Water Pollution Prevention Plan (SWPPP) prepared by a licensed engineer. The contractor shall file the Notice of Intent (NOI) with the T.C.E.Q. and obtain a permit. Upon completion of the project, the contractor shall file the Notice of Termination (NOT).

PART 2 - PRODUCTS

2.1 MATERIALS:

Crushed stone.

Metal clips or ties.

Steel fence posts.

Filter Sock with compost filler: Filtrex or approved equal.

Grass Seed: annual ryegrass or Bermuda depending on the season.

Concrete block.

Wire screen.

PART 3 - EXECUTION

3.1 BEGINNING CONSTRUCTION

A. Prior to general construction:
1. Install temporary silt fences, filter socks and stabilized construction entrances as indicated on the erosion control/storm water pollution prevention plan or where directed by Owner.

B. Construct erosion control devices in accordance with the erosion control or storm water pollution prevention plan and as directed by the Owner during construction and as construction progresses.

C. Temporarily seed disturbed areas where construction activities temporarily cease for more than 21 days at rate necessary to achieve a full stand of grass.

1. Reseed as required until good stand of grass is achieved.

3.2 DURING CONSTRUCTION

A. Maintain temporary silt fences, filter socks, etc. to make sure they function adequately, and as intended. If trapped sediment becomes excessive, remove device and trapped sediment and reinstall device. If ponding becomes excessive, install device capable of handling higher flows.

B. Inspect regularly, especially after rainstorms.

C. Repair or replace damaged or missing items.

D. Sow temporary grass cover over disturbed areas where construction activities temporarily cease for more than 21 days and as required by NPDES permit.

E. Install inlet protection as indicated by the erosion control or storm water pollution prevention plan at each inlet.

F. Provide swales and dikes as necessary to direct all water towards a protected device.

G. Do not disturb existing vegetation (grass and trees) outside limits of demolition.

H. Remove sediment from behind temporary silt fences when it reaches a depth of 6 in.

3.3 COMPLETION OF CONSTRUCTION AND STABILIZATION OF THE SITE

Remove from site all erosion control devices.

END OF SECTION

SECTION 03100 – FORMS AND ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Provide required formwork and related accessories for proper construction of cast-in place structural concrete work.

B. Work, items and requirements specified elsewhere that apply and/or relate to this Section include:

1. Reinforcement and related accessories - Section 03200.
2. Cast-in-place concrete - Section 03300.

1.2 WORK INSTALLED BUT FURNISHED IN OTHER SECTIONS:

A. Built-in-anchors, inserts and bolts for connection of other materials.

B. Built-in-sleeves.

1.3 QUALITY ASSURANCE:

A. Design criteria: Conform to ACI 347-(Latest Edition), Chapter

1. The design and engineering of formwork, as well as its construction, shall be the responsibility of the contractor.

B. Allowable Tolerances: Conform to ACI 347-(Latest Edition), 3.3.1.

1.4 STORAGE OF MATERIALS:

A. Store form materials and accessories on dunnage and under cover of protective sheeting.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Forms:

1. Framing: Kiln dried softwood lumber, PS 20-70.
2. Plyform: B-B plyform, sanded, Class I, EXT-DEPA, grade trademarked of APA, PSI-66. Fiber or metal forms may be used in lieu of plywood, subject to Architect's approval.

3. Void Forms: Moisture resistant treated corrugated cardboard; biodegradable; structurally sufficient to support weight of wet concrete mix until initial set; sizes as indicated on drawings.

B. Rustications, Bevels, Chamfers: Mill from Northern White Pine, smooth and free of irregularities.

C. Shores: Patented shores of adequate strength and bracing to safely support imposed loads.

D. Form Oil: Non-staining, paraffin-base oil having a specific gravity of between 0.8 and 0.9.

E. Form Ties: Bolts, rods, or patented devices having a minimum tensile strength of 3,000 lbs., adjustable in length, free of lugs which would leave a hole larger than 5/8" in diameter and having a full one-inch depth of break-back.

PART 3 - EXECUTION

3.1 CONSTRUCTION AND ERECTION:

A. Construct forms in accordance with ACI 347.

B. Build forms to conform to shapes, lines and dimensions of detailed member of concrete construction. Set to line and grade, and brace and secure so as to withstand placing of concrete and maintain their shape and position.

C. Construct forms with care to produce concrete surfaces without unsightly or objectionable form marking exposed concrete surfaces. Provide temporary inspection and clean out openings in bottom of wall and column forms and elsewhere as required by Architect. Seal joints after closing.

D. Thoroughly clean surfaces of form material and remove nails before reuse. Do not reuse damaged or worn forms. Coat contact surfaces of forms with non-staining form oil prior to placing metal reinforcement.

E. Install void forms. Protect from moisture before concrete placement. Protect from crushing during concrete placement.

F. Immediately before placing concrete, clean forms of chips, sawdust, and other debris. Immediately after removal of forms, remove form ties, wires and other defects and patch.

3.2 INSERTS AND ACCESSORIES:

A. Make provisions for required installation of accessories, bolts, hangers, sleeves, anchor slots and inserts cast in concrete, as required by Drawings and other

trades. Obtain suitable templates or instructions for installation of items. Place expansion joints where detailed and required.

3.03 REMOVAL OF FORMS AND SHORING:

A. Removal of forms and shores shall be in accordance with ACI 347.

B. Do not remove shoring until members have acquired specified design strength required to support their own weight and loads.

END OF SECTION

SECTION 03200 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1. WORK INCLUDED:

A. Furnish all labor, materials, services, equipment, and appliances required in conjunction with fabrication, delivery, and placement of reinforcement and embedded metal assemblies in cast-in-place concrete complete, including, but not limited to the following:

1. Prepare shop drawings of reinforcing steel.
2. Furnish and place reinforcing steel.
3. Furnish reinforcing for drilled piers.

B. Related Work Specified Elsewhere:

1. Testing laboratory services - Section 01410
2. Concrete formwork - Section 03100
3. Cast-in-place concrete - Section 03300

1.2. TESTING LABORATORY SERVICES:

A. An independent testing laboratory shall be employed by the Owner for inspection of reinforcing steel and embedded metal assemblies. Refer to Section 01410. Inspection by the Owner's laboratory shall not relieve the Contractor of responsibility for quality control.

B. The Contractor shall allow for a minimum of 2 days' notice to be given the Laboratory for inspection of the work.

1.3. QUALITY ASSURANCE:

A. Fabricator shall have a minimum of 3 years' experience in similar applications. Experience shall be relevant to the anticipated fabrication and placing methods and techniques required. B. Codes and Standards:

1. Concrete Reinforcing Steel Institute: "Manual of Standard Practice"
2. American Concrete Institute, ACI 318: "Building Code Requirements for Structural Concrete".
3. American Concrete Institute, ACI 117: "Standard Specifications for Tolerances for Concrete Construction and Materials".
4. American Institute for Steel Construction, AISC "Specification for Structural Steel Buildings" including the "Commentary" and all supplements.
5. American Welding Society, AWS D1.1: "Structural Steel Welding Code".
6. American Concrete Institute, ACI 315: "Details and Detailing of Concrete Reinforcing".

1.4. SUBMITTALS:

A. Shop Drawings:

1. Submit shop and installation drawings of metal reinforcement for review of the Architect in accordance with Section 01340. Comply with ACI 315, “Details and Detailing of Concrete Reinforcement.” Show bar schedules, stirrup spacing, diagrams of bent bars, arrangements, and assemblies as required for fabrication and placement of concrete reinforcement.

B. Mill Test Reports: Certified copies, evidencing compliance with all requirements of these Specifications, shall be delivered to the Contractor with all deliveries of reinforcing steel. Contractor will forward copies to the Architect for the project files.

1.5. DELIVERY AND STORAGE:

A. Stack reinforcing steel in tiers and mark so that each length, size, shape, and location can be readily determined. Exercise care to maintain reinforcing free of dirt, mud, paint, and rust.

PART 2 - PRODUCTS

2.1. MATERIALS:

A. Reinforcing shall comply with the following:

1. Reinforcing Bars: New deformed billet steel conforming to the requirements of ASTM A615 grade and size shown on the drawings

2.2. METAL ANCHORAGE & CONFINEMENT ASSEMBLIES:

A. Steel Shapes and Plates and Rods: Conform to ASTM A36.

B. Headed Stud Anchors: Headed Studs welded by full fusion process as furnished by Nelson Stud Welding Co.

C. Bolts: Conform to ASTM A307 with regular hexagon nuts and carbon steel washers.

D. Welding Electrodes: ASTM Designation A233, Series E370 - AWS 5.5.

E. Reinforcing Bars to be welded: ASTM A706.

F. Deformed Bar Anchors: ASTM A-108 cold worked steel wire per ASTM A-496 with minimum yield strength of 70,000 psi welded to steel as shown on the drawings. Anchors shall be flux filled deformed bar anchors by Neslon Stud

Division of TRW. All welding shall be in accordance with the manufacturer's recommendations.

G. All metal assemblies shall be hot-dip galvanized.

2.3. CONCRETE ACCESSORIES:

A. Concrete accessories including bar support, chairs, spacers, etc., shall be cold drawn wire and shall be fabricated in accordance with the requirements of Chapter Seven of the A.C.I. Standard 315 with heights as required. Bar supports for concrete will be exposed.

1. Use wire bar type supports complying with CRSI recommendations, unless otherwise specified.
2. For slab-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
3. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with plastic protected legs (CRSI Class 1) or stainless steel legs (CRSI Class 2).
4. For abrasive blasted or bush hammered concrete, provide plastic protected bar supports (CRSI Class 1).
5. Over water proofing membranes use precast concrete block bar supports.

2.4. FABRICATION OF REINFORCEMENT:

A. Fabricate reinforcing bars to conform to required shapes and dimensions. Fabrication tolerances shall not exceed tolerances specified in ACI 117 or CRSI "Manual of Standard Practice".

2.5. FABRICATION OF METAL ACCESSORIES AND EMBEDDED METAL ASSEMBLIES:

A. Fabricate and assemble structural steel items in the shop. Shearing, flame cutting, and chipping shall be done carefully and accurately. Holes shall be cut, drilled or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes shall be clean-cut without torn or ragged edges. Welded construction shall conform to the AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings and AWS D12.1 Welding shall be done by AWS certified welders.

B. Welding of deformed bar anchors and headed stud anchors shall be done by full-fusion process equal to that of Nelson Stud Welding Company or KSM Welding Services Division, Omark Industries.

C. Welding of reinforcing bars shall be done in strict accordance with AWS requirements, using recommended preheat temperatures and electrodes for the type of reinforcing being welded. Bars larger than No. 9 shall not be welded. All welding shall be performed subject to inspection and testing of the Owner's testing laboratory.

D. Coatings, where required, shall be applied after fabrication.

PART 3 - EXECUTION

3.1 MATERIAL STORAGE:

A. Reinforcing steel shall be stacked in tiers. Care shall be exercised to maintain all reinforcement free of dirt, mud, paint, rust, etc.

3.2 GENERAL:

A. Reinforcing steel of the sizes, shapes, lengths, spacing and other dimensions shown shall be placed where shown on the drawings. Details of reinforcing shall conform to A.C.I. Building Code Requirements for Reinforced Concrete (A.C.I. 318).

3.3 MARKING:

A. Bars shall be plainly marked. Bundles shall be limited to one (1) length, and each bundle shall be tagged with metal tags.

3.4 CLEANING:

A. Reinforcement shall be thoroughly cleaned of rust, mill scale, dirt, oil or other coatings which reduce the bonding to the concrete.

3.5 BENDING:

A. Bars shall be bend cold. Heating of reinforcement, or handling by makeshift methods, will not be permitted and bars having kinks or bends not required shall not be used.

3.6 PLACING:

A. Reinforcement shall be accurately placed and securely saddle tied at every other intersection with No. 18 gauge black annealed wire, and shall be rigidly held in place during the placing of the concrete by means of metal chairs or spacers.

B. Bars in concrete walls shall be held in position, and to proper clearance, by means of concrete or metal spacers made especially for the locations where spacers are required.

C. Bars in beams and slabs shall be held to exact location during placing of concrete by spacers, chairs, or other necessary supports with the following tolerances:

1. Top bars in slabs and beams:
    a. Members 8 in. deep or less: + 1/4 in.
    b. Members more than 8 in. but not over 2 ft. deep: + 1/2 in.
    c. Members more than 2 ft. deep: + 1 in.

2. Lengthwise of members: + 2 in.
3. Concrete cover to formed surfaces: 1/4 in.
4. Minimum spacing between bars: 1/4 in.

D. Tie wire shall not be placed in contact or within 1-1/2" of any exposed surface.

3.7 CONCRETE PROTECTION:

A. Concrete protection for reinforcing steel shall not be less in any direction than the following:

1. Reinforcing in slabs on grade and beams deposited against the ground: 3 inches.
2. Reinforcing in formed beams, columns, and girders: 1-1/2 inches.
3. Grade beams and exterior face of walls and columns exposed to the weather or in contact with the ground: 2 inches.
4. Interior faces of walls: 1 inch.
5. Beam bottoms formed with fiberboard void boxes: 2 inches.
6. Structural slabs on carton form: 1 inch.

B. Tolerances in layout, fabrication, formwork, and placing shall not permit a reduction in the specified concrete protection beyond the specified tolerance for concrete cover.

3.8 METAL ACCESSORIES:

A. All galvanizing shall be removed in areas to receive field welds prior to making the welds. Areas where paint has been removed or damaged shall be field painted with the specified paint or galvanizing compound.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1. WORK INCLUDED:

A. Furnish all labor, materials, services, equipment, and appliances required in conjunction with cast-in-place concrete including, but not limited to, the following:

1. Furnish and place cast-in-place concrete
2. Finish and curing concrete
3. Furnish concrete for helical piers
4. Concrete mix designs
5. Laboratory testing concrete

B. Related Work Specified Elsewhere:

1. Testing laboratory services – Section 01410
2. Forms and accessories – Section 03100
3. Concrete reinforcement – Section 03200

1.2. TESTING LABORATORY SERVICES

A. An independent testing laboratory shall be employed by the Owner for inspection of reinforcing steel and embedded metal assemblies. Refer to Section 01451. Inspection by the Owner's laboratory shall not relieve the Contractor of responsibility for quality control.

B. The Contractor shall allow for a minimum of 2 days' notice to be given the Laboratory for inspection of the work.

1.3. QUALITY ASSURANCE:

A. Materials and work shall conform to the requirements of all standards, codes, and recommended practices required in this section. In conflicts between standards, required standards and this Specification, or this Specification and the local building code, the more stringent requirement shall govern.

B. Materials and operations shall be tested and inspected as work progresses. Failure to detect defective work or materials shall not prevent rejection when defect is discovered nor shall it obligate the Architect to final acceptance of defective work.

C. Contractor shall provide and pay for the following testing laboratory services:

1. Qualification of materials and establishment of mix designs in accordance with ACI 301.
2. Other testing laboratory services as needed or required by the Contractor.

D. To facilitate testing and inspection, the Contractor shall:

1. Furnish necessary labor to assist testing agency in obtaining and handling samples at the job site.
2. Advise the testing agency in advance of operations to allow for the assignment of testing personnel and testing.
3. Provide and maintain for the use of the testing agency adequate facilities for proper curing of concrete test specimens on the project site in accordance with ASTM C31 "Method of Making and Curing Concrete Compression and Flexural Specimens in the Field".

E. Evaluation and Acceptance:

1 The strength level of the concrete will be considered satisfactory if 90% of the strength test results and the averages of all sets of three consecutive strength test results equal or exceed specified strength and no individual test result is below specified strength by more than 500 psi.
2 Completed concrete work will be accepted when the requirements of "Specifications for Structural Concrete for Buildings" ACI 301, Chapter 18 have been complied with.
3 In any case where the average strength of the laboratory control cylinders, as shown by the tests for any portion of the structure, falls below the minimum ultimate compressive strength specified, the Architect shall have the right to require the Contractor to provide improved curing conditions of temperature and moisture to secure the required strength. Also, if the average strength of the laboratory control cylinders should fall so low as to cause the portions of the structure to which the respective unsatisfactory tests reports apply to be in question by the Architect, the Contractor shall follow the core procedure set forth in the current edition of A.S.T.M. Designation C42. If the results of the core tests indicate, in the opinion of the Architect, that the strength of the structure is inadequate, such replacement, load testing, or strengthening as may be ordered by the Architect shall be provided by the Contractor without cost to the Owner.

F. Applicable Standards: Comply with the following

1. American Concrete Institute, ACI 301, "Specifications for Structural Concrete for Buildings"
2. American Concrete Institute, ACI 211.1, “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”

3. American Concrete Institute, ACI 211.2, “Standard Practice for Selecting Proportions for Structural Lightweight Concrete”
4. American Concrete Institute, ACI 302.1, “Guide for Concrete Floor and Slab Construction”
5. American Concrete Institute, ACI 303, “Standard Specification for Cast-in Place Architectural Concrete”
6. American Concrete Institute, ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete"
7. American Concrete Institute, ACI 305, "Recommended Practice for Hot Weather Concreting"
8. American Concrete Institute, ACI 306, "Recommended Practice for Cold Weather Concreting"
9. American Concrete Institute, ACI 309, "Standard Practice for Consolidation of Concrete”.
10. American Concrete Institute, ACI 318, "Building Code Requirement for Reinforced Concrete"
11. American Society of Testing Materials, ASTM C33, "Standard Specifications for Concrete Aggregates"
12. American Society of Testing Materials, ASTM C94, "Standard Specifications for Ready-Mixed Concrete"
13. American Society of Testing Materials, ASTM C150, "Portland Cement"
14. American Society of Testing Materials, ASTM C260, "Air-Entraining Admixtures for Concrete"
15. American Society of Testing Materials, ASTM C330, “Specification for Lightweight Aggregates for Structural concrete”
16. American Society of Testing Materials, ASTM C494, "Chemical Admixtures for Concrete"

G. Field Reference Manual:

1. Contractor shall have available in the field office "Specifications for Structural Concrete for Buildings" with selected references of ACI and ASTM-SP-15.

1.4. SUBMITTALS:

A. Submit to the Owner’s testing laboratory two (2) copies of laboratory trial mix designs proposed in accordance with ACI 301 or one copy each of 30 consecutive test results and the mix design used from a record of past performance in accordance with ACI 301.

B. Submit two (2) copies of proposed construction joints other than those indicated on the Drawings.

PART 2 - PRODUCTS

2.1. MATERIALS FOR STRUCTURAL CONCRETE:

A. Portland Cement shall conform to the requirements of A.S.T.M. Designation C150, Type I or Type III. Only one (1) brand of cement shall be used throughout the work.

B. Fine aggregate shall conform to the applicable requirements of the current edition of A.S.T.M. Designation C33, and shall be natural bank or river sand, washed and screened, consisting of hard, durable, uncoated particles free of deleterious matter, and shall be so graded from coarse to fine as to produce a minimum percentage of voids.

C. Coarse aggregate for normal weight concrete shall conform to the applicable requirements of the current edition of A.S.T.M. Designation C33, shall be gravel or crushed stone suitably processed, washed and screened, and shall consist of hard, durable particles without adherent coatings.

D. Concrete Admixtures: Provide admixtures produced and serviced by established, reputable manufacturer and used in compliance with manufacturer's recommendations.

1. Air-entraining agent, conforming to ASTM C260, and CRD C-13, "AIRTITE" neutralized vinsol resin, manufactured by GIFFORD-HILL, or "MBVR" by Master Builders.
   a. When requested, certification attesting to the percentage of effective solids and compliance with ASTM C260 shall be furnished.
2. Water-reducing, set-controlling admixture, conforming to ASTM C494, Type A (water-reducing), Type D (water-reducing and retarding), type E (water-reducing, accelerating), type F (water-reducing, high range superplasticizer), or type G (water-reducing, high range superplasticizer, retarding) manufactured by GIFFORD-HILL.
   a. Field Service: When requested a qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of the admixture and adjustment of concrete mix proportions to meet job site and climatic conditions
   b. Obtain approval of the Architect, in writing, before using set-controlling admixtures.
   c. In general, calcium chloride will not be permitted in the concrete mixtures.

E. Fly Ash conforming to ASTM C 618 may be used in concrete. Carbon content shall not exceed 3% by volume.

2.2. WATER:

A. Water shall be city water.

2.3. CONCRETE MIX:

A. Proportions: Select proportions of ingredients in accordance with ACI 301 to product a concrete having proper playability, durability, strength, appearance and other specified properties. Minimum cement content shall conform to these Specifications. Proportion ingredients to produce homogeneous mixture which will work readily into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on project, but without permitting materials to segregate or allowing excess free water to collect on surface.

B. Mix Design: Contractor shall employ, at his expense, a commercial testing laboratory, acceptable to Owner, to prepare and test mix designs for each scheduled type of concrete. Submit mix designs and test results for review in accordance with Submittals. Placing of concrete is not permitted until approved by the Engineer. All concrete mix designs shall include the following information:

1 Type of cement and aggregates.
2. Proportions of cement, fine aggregate, coarse aggregate, and water.
3. Maximum water/cement ratio, design strength, maximum slump, and air content.
4. Types and dosages of all admixtures.
5. Special requirements for pumping.
6. Range of ambient temperatures and humidity for which the mix is valid.
7. Maximum and minimum permissible temperatures of concrete at time of placement.
8. All special characteristics of the mix which require precautions in mixing, placing, or finishing.
9. Strength: Determination of average strength above specified strength shall be based on standard deviation records of field tests performed within the past 12 months and spanning a period of not less than 60 days in accordance with ACI 301. If suitable record of strength test performance is not available, proportions shall be selected by laboratory trial batches to produce an average strength as specified in ACI 301.

C. Slump: ASTM C 143, as shown on Drawings. Specified slump shall apply at time when concrete is discharged at jobsite. Slump tests shall be used to monitor uniformity and consistency of concrete delivered to jobsite but not as a basis for mix design. Under no circumstances shall the water-cement ratios for concrete exceed those specified below.

1. Slumps shown on Drawings are without superplasticizer. Mixes with superplasticizer shall have slumps between 1 inch and 3 inches prior to

dosing with superplasticizer and a maximum slump of 9 inches after dosing with superplasticizer.

D. Water-Cement Ratio: Maximum allowable water cement ratio for structures shall not exceed 0.45. Superplasticizer may be added as specified to obtain maximum water-cement ratios. Include free water in aggregate in water-cement ratio computations.

E. Admixtures: Proportion admixtures according to manufacturer's recommendations. Use of an accelerator is permitted when the air temperature is less than 40 F. Use of a retarder is permitted when temperature of placed concrete exceeds 65 F.

F. Fly Ash: Maximum replacement of cement with fly ash shall be 15 percent by weight. Fly ash shall not be used with Type IP Cement.

G. High-Range Water Reducers (Superplasticizer): Contractor may, at his option, use a superplasticizer to improve workability of concrete. Superplasticizer shall be used in strict accordance with requirements and recommendations of product manufacturer. Site mixed super-plasticizer shall be added to concrete mix at job site, just prior to dispensing of concrete in conformance with Contractor's plan submitted to Architect for review. The plant mixed super-plasticizer shall be added to concrete mix at batch plant.

H. Concrete Classification: Normal weight concrete with compressive strengths as scheduled on Drawings.

I. Proportioning: The testing laboratory will determine the ratio of water to cement not to exceed .45 for the various specified concrete strengths. The determination of the proportions of cement, aggregate, and water to attain the required strengths shall be made in accordance with the "building Code Requirements for Reinforced Concrete" (ACI 318).

2.4. CURING MATERIALS:

A. Exceeding the requirement of ASTM C309 "Standard Specifications for Liquid Membrane - Forming Compounds for Curing Concrete". B. Meet Federal and State VOC/AIM regulations.

B. Material providing water retention not exceeding loss of .055 gm/cm2 when used at a coverage of 450 sq. ft. per gallon and tested in accordance with ASTM C156.

C. Waterproof paper, for curing concrete, shall be non-staining two (2) ply, reinforced in both directions with fibers completely embedded in asphalt, and conforming to the requirements of the current edition of A.S.T.M Designation C171.

D. Polyethylene sheets may be used for flat surfaces, and shall conform to the requirements of ASTM D2103.

E. Curing compound shall be Sealco as manufactured by the GIFFORD-HILL Company, Kurez DR VOX by Euclid Chemical Company, or Master Builders' "Master seal". Curing compound used on exposed concrete walls shall be non-discoloring, fast drying and shall be conclusively demonstrated not to darken or yellow with age. Curing compound for use on concrete floor surfaces to receive resilient tile or other adherent covering shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of flooring adhesives. Apply at manufacturer's recommended rate of application.

F. Curing and Sealing compound shall comply with ASTM C1315. Compound shall be Super Rez Seal or Super Aqua Cure VOX by Euclid Chemical Company. Compound used on exposed concrete walls shall be non-discoloring, fast drying and shall be conclusively demonstrated not to darken or yellow with age. Compound for use on concrete floor surfaces to receive resilient tile or other adherent covering shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of flooring adhesives. Apply at manufacturer's recommended rate of application.

PART 3 - EXECUTION

3.1 PRODUCTION OF CONCRETE:

A. Concrete shall not be mixed for placing in the work until the mix designs and corresponding strength tests reflect that each proposed mix will develop the strengths required, nor before the mix design for each class of concrete has been approved by the Architect for use on the project.

B. Admixtures: Add to each concrete mixture shown on Drawings to require admixture a cement-dispersing agent which shall conform to the requirements of the Specifications. Depending upon the weather conditions at the time the concrete is placed, the cement-dispersing agent shall be supplemented by a set accelerating agent to improve the control of the setting and, in the case of hot weather concreting, to minimizing surface checking. Such admixtures shall be introduced in quantities and according to methods recommended by the manufacturers of the materials approved for use. The slump limits shown on the drawings shall apply AFTER the inclusion of the admixture. An air-entraining agent shall be added to the mix where called for on the drawings in sufficient quantity to assure controlled entrainment at the percentages shown on the drawings.

C. Mixing: Transmit-mixed concrete conforming to the requirements of A.S.T.M. C94 shall be used in lieu of concrete mixed at the job site. Concrete shall not be transported or used in any case after a period in excess of forty-five (45) minutes has elapsed after the introduction of water into the mixer. The agency supply transit-mixed concrete shall have a plant of sufficient capacity, and adequate transportation facilities, to assure continuous delivery at the rate required. The frequency of deliveries to the site of the work must be such as to provide for placing the concrete continuously throughout any one (1) pour.

3.2 PLACING CONCRETE:

A. Preparation:

1. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to assure a practically continuous flow of concrete at the delivery end without separation of the materials and all of the details thereof shall be submitted to the Architect for approval in advance of the use of such equipment. The use of gravity-flow or aluminum chutes or conveyors for transporting concrete horizontally will not be permitted.
2. Inserts: Give the various trades and subcontractors ample notification and opportunity to install any and all anchors nailers, pipes, conduits, boxes, inserts, thimbles, sleeves, frames, vents, wires, supports, or other items required to be built into concrete by the provisions of the Drawings or of the Specifications governing the work of such trades and subcontractors, or as may be necessary for the proper execution of their work. Obtain suitable templates or instructions for the installation of such items as are not required to be actually placed in the forms by the affected trades or subcontractors themselves.
3. Contractors shall provide access for delivery and provide sufficient equipment and manpower to rapidly place all concrete.
    a. All work shall be in accordance with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
    b. Formwork shall have been completed; snow, ice, water and debris removed from within forms.
    c. Expansion joint material, anchors and all embedded items shall have been positioned.
4. Thoroughly wet all forms and contact surfaces before pouring concrete.

B. Conveying Concrete: Convey concrete from the mixer to the place of final deposit by methods which will prevent the separation or loss of the ingredients. Concrete to be conveyed by pumping will require approval of the Architect for each class of concrete specified before being used.

C. Depositing Concrete:

1. General: Place concrete in reasonably uniform layers, approximately horizontal, and not more that twelve inches (12") deep, exercising care to avoid vertical joints or inclined planes. The piling up of concrete in the forms, in such a manner as to cause the separation or loss of any of its ingredients, will not be permitted. Concrete which has partially set or hardened shall not, under any circumstances be deposited in the work. Place concrete in the forms as nearly in its final position as is practical to avoid remanding. Exercise special care to prevent splashing the forms or reinforcement with concrete. Remove any hardened or partially hardened concrete which has accumulated on the forms or reinforcement before the work proceeds. Do not place concrete on previously deposited concrete which has hardened

sufficiently to cause formation of seams or planes of weakness within the respective member or section, except as hereinafter specified. Do not permit concrete to drop freely any distance greater than three feet (3'). Where longer drops are necessary, use a chute, tremie, or other approved conveyance to assist the concrete into place without separation. Do not pour directly into any excavations where water is standing. If the place of deposit cannot be successfully pumped dry, pour through a tremie with its outlet end near the bottom of the place of deposit.

2. Slump: Concrete shall not be placed when its plasticity, as measured by slump tests, is outside the limits shown on the Drawings and as specified herein.

3. Classes of Concrete and Usage: Concrete of the several classes of concrete required shall have the characteristics shown on the Drawings and as specified herein.

4. Vibration: As soon as concrete is deposited, thoroughly agitate the same by means of mechanical vibrators and suitable hand tools, so manipulated

5. as to work the mixture will into all parts and corners of the forms, and entirely around the reinforcement of inserts. Mechanical vibrators shall have a minimum frequency of 7000 revolutions per minute and shall be operated by competent workmen. Over vibrating and use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn as many points, from 18 to 30 inches apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 50 to 15 seconds duration. A spare vibrator shall be kept on the job site during all concrete placing operations. Do not insert vibrator into lower courses that have begun to set.

6. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, the surfaces of the latter shall be thoroughly roughened and cleaned of all foreign matter, scum, laitance. The forms shall be retightened and the surface of the previously deposited concrete shall be coated with specified bonding agent per manufacturer's directions; or shall be slushed with grout, of materials and mix identical to those of the concrete to be placed, except the coarse aggregate shall be omitted. From one inch (1") to two inches (2") of grout shall be applied, as directed by the Architect, depending upon the conditions of the respective case. The new concrete shall be deposited before the grout attains its initial set, and the work shall be performed in such a manner as to assure complete bonding of the newly poured concrete to that previously placed.

7. Construction Joints: Except as otherwise specifically indicated on the Drawings each pier, beam, and slab shall be considered as a single unit of operation, and all concrete for the same shall be placed continuously in order that such unit will be monolithic in construction. Should construction joints prove to be absolutely unavoidable, the same shall be located at or near the midpoints of spans. Additional construction joints shall not be made under any circumstances without the written approval of the

Architect.

D. Weather Conditions:

1. Cold Weather: Temperature of concrete delivered at the job site shall conform to the following minimum:

Air Temperature	*Concrete Temperature*
30˚ F to 45˚ F.	*55˚ F. to 90˚ F.*
0˚ F to 30˚ F.	*60˚ F. to 90˚ F.*
Below 0˚ F.	*65˚ F. to 90˚ F.*

a. Water heated to above 100˚ F. shall be combined with the aggregates before cement is added. Cement shall not be added to water or aggregates having a temperature greater than 100˚ F.

b. All work shall be in accordance with ACI 306 "Recommended Practice for Cold Weather Concreting".

c. When the outdoor temperature is less than 40˚ F. temperature of the concrete shall be maintained at not less than 50˚ F. for the required curing time.

a) Arrangement shall be made before placement to maintain required temperature without injury from excessive heat.

b) Combustion heaters shall not be used during the first 48 hours without precautions to prevent exposure of concrete and workmen to exhaust gases containing carbon dioxide and carbon monoxide.

2. Hot Weather: Temperature of concrete delivered at the job site shall not exceed 90˚ F. Ingredients shall be cooled before mixing to prevent concrete temperature in excess of 90˚ F.

a. All work shall be in accordance with ACI 305 "Recommended Practice for Hot Weather Concreting".

b. Provisions shall be made for windbreaks, shading, fog spraying, sprinkling or wet cover when necessary.

c. Use an evaporation retarder, finishing aid, "Confirm" Master Builders.

3.3 FINISHING CONCRETE SURFACES:

A. General: Refer to Section 02520 for walkway finishes. Concrete shall be finished to a tolerance of 1/4” in 10 feet.

1. Surfaces that do not comply within the deviation tolerances shall be corrected.

2. The Owner shall have the option of retaining a portion of the per square foot cost of slab installation for those areas that are not in compliance, or of requiring the slabs to be removed and reinstalled, based on percentage compliance with specified limits. In preparation for finishing, slab shall be

struck off true by double screening to the required level at or below the elevation or grade of the finished slabs as indicated on the Drawings.

0.4 CURING AND PROTECTION:

A. Protect all freshly placed concrete from washing by rain, flowing water, etc. Do not allow the concrete to dry out from the time it is deposited in the forms until the expiration of the curing period hereinafter specified. The methods of curing shall be as specified in the following paragraphs, unless otherwise authorized by the Architects.

B. Concrete surfaces, not otherwise specified, shall be cured by being kept wet with clean water for a period of not less than seven (7) days after placing. Each day the forms are left in place, and kept wet enough to prevent the opening of joints in the forms and the drying out of the concrete, will be counted as one (1) day of curing.

C. Floors and other similar flat finished surfaces shall be cured by covering the entire surface, as soon as practical after finishing, with waterproof paper, laid with four inch (4") lapped joints. The joints shall be covered with gummed tape or be glued with waterproof glue. Such covering shall remain in place until completion of the building, except on surfaces where ceramic tile is to be applied, in which cases the covering shall be removed before a period of at least seven (7) days has elapsed after the placing and finishing of the concrete.

D. In lieu of the wetting or the waterproof paper specified above, the Contractor may, with the approval of the Architect on floors to be permanently exposed, use a non-bituminous liquid sealing a curing compound to seal the moisture in the concrete. Such material shall not, however, be applied to surfaces which are to receive further concrete, mortar or resilient tile. Curing liquid, if used, shall be applied in conformity with the recommendations of the manufacturer of the material approved for use, and to sufficient extent to effectively hold the moisture in the concrete. The use of such material shall not relieve the Contractor of the responsibility of protecting all floor slabs, platforms, and steps whenever any scaffolding, shoring, form work, masonry, concrete or other work is being done over or above finished concrete slabs. Patches in architectural surfaces shall be cured for seven (7) days. Patches shall be protected from premature drying to the same extent as the mass of the concrete.

E. IMPERFECT OR DAMAGED WORK, or any material damaged or determined to be defective before final completion and acceptance of the entire job, shall be satisfactorily replaced at the Contractor's expense, and in conformity with all of the requirements of the drawings and Specifications. Removal and replacement of concrete work shall be done in such a manner as not to impair the appearance or strength of the structure in any way.

F. Cleaning: Upon completion of the work, all forms, equipment, protective coverings and any rubbish resulting therefrom shall be removed from the premises. Finished concrete surfaces shall be left in a clean and perfect condition, satisfactory to the Owner. After sweeping with an ordinary broom and removing all mortar, concrete droppings, loose dirt, mud, etc., wash all concrete floors and platforms with soap suds and scrub with a stiff fiber brush. Mop us the suds and flush the surfaces with clean water. Provide adequate measures during scrubbing, mopping, and flushing operations to keep excessive or injurious amounts of water off resilient tile floors. Any damage occasioned to such floors by or on account of such operations shall be promptly, effectively and satisfactorily repaired.

END OF SECTION

SECTION 03920 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sealant over expansion joints.

B. Related Sections:
1. Section 02520 – Portland cement concrete walkways
2. Section 03300 – Cast in Place Concrete

1.2 SUBMITTALS

A. Product Data:
1. Submit product data for each product. Comply with Section 01330.
2. Include color charts indicating manufacturer's full color range available of each sealant type.

B. Samples: Submit three 1/4 inch diameter by 3 inch long samples illustrating sealant colors for each product exposed to view.

1.3 QUALITY ASSURANCE

A. Qualifications:
1. Applicator shall be a company specializing in sealant application with a minimum of three (3) years' experience. Applicator shall employ on the Project installers with a minimum of two (2) years' experience.
2. Single source responsibility:
a. To greatest extent possible, materials used with a particular sealant (primers, accessories, etc.) shall be products of one manufacturer or items standard with manufacturer of sealant.
b. Provide primers and other materials which are produced by or are specifically recommended by manufacturer of sealant materials to ensure compatibility.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping:

1. Deliver materials in unopened containers as packaged by the manufacturer.

B. Storage and Protection:
1. Store in a manner to protect materials from the weather and adverse temperature.

1.5 WARRANTY

A. Joint Warranty:

1. General Contractor, sub-contractor and product manufacturer shall jointly guarantee the work against defects in materials and workmanship for a period of two (2) years from date of Substantial Completion.

B. Include warranty coverage for installed sealants and accessories which:

1. Fail to achieve air tight seal.
2. Fail to achieve watertight seal.
3. Exhibit loss of adhesion.
4. Exhibit loss of cohesion.
5. Do not cure.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Perform sealing when the following are within manufacturer's limits during and for 24 hours after sealant installation:
   a. Ambient and surface temperatures.
   b. Relative humidity.
2. Do not apply sealants to wet or frozen surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Urethane Sealant Manufacturers:
1. Mameco International, Inc.
2. Pecora Corporation
3. Sika Corporation
4. Sonneborn
5. Tremco Corporation

B. Joint Backing:
1. Applied Extrusion Technologies
2. Denver Foam
3. Sonneborn

2.2 MATERIALS

A. Polyurethane Sealants: One-part cold applied, self-leveling.

1. Specifications:
    a. ASTM C920, Type: S, Grade P, Class: 25
    b. FS TT-S-00230C, Type I, Class A 2. Products:
    c. Pecora NR-201
    d. Sonneborn SL 1
    e. Tremco TH-901

B. Polyurethane Sealants: One-part, non-sag.
1. Specifications:
    a. ASTM C920, Type S, Grade NS, Class 25
    b. FS TT-S-00230C, Type II, Grade A 2. Products:
    c. Pecora Dynatrol I
    d. Sonneborn NP 1

2.3 ACCESSORIES

A. Primer:
1. Manufactured by manufacturer of sealant or caulking material, and completely compatible with compound.

B. Joint Backing:
1. Closed-cell polyethylene rods or tape in sizes and types as recommended by manufacturer of sealant or caulking material, and completely compatible with compound.

C. Bondbreaker
1. As recommended by manufacturer for required installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure that concrete has cured minimum of 28 days.

B. Verify that sealant backing is compatible with sealant.

C. Verify that substrate surface:
    1. Is within manufacturer's moisture content range.
    2. Complies with manufacturer's cleanliness and surface preparation requirements.
D. Joint Width:

1. Verify joints are greater than minimum widths required by manufacturer.
2. If joints are narrower than minimum required widths, widen narrow joints to indicated width.
3. Do not place sealant in joints narrower than manufacturer's required minimum.

3.2 PREPARATION

A. Prepare, clean, and prime joints in accordance with manufacturer's instructions.

B. Remove loose materials and matter which might impair adhesion of primer and sealant to substrate.

C. Remove form release agents, latent, and chemical retarders, which might impair adhesion of primer and sealant to concrete and masonry surfaces.

D. Comply with ASTM C1193.

E. Protect elements adjoining and surrounding work of this Section from damage and disfiguration. Mask area as required.

F. Priming:
1. Prime joint substrates.
2. Comply with manufacturer's sequencing requirements for joint priming and sealant backing bond breaker rod installation.
3. Do not allow spillage and migration of primer onto surfaces not to receive primer.
4. Install sealant to primed substrates after primer has cured.

3.3 APPLICATION

A. Backer Rod:
1. Measure joint dimensions and size materials to achieve manufacturer required width-to-depth ratios.
2. Install using blunt instrument to avoid puncturing.
3. Do not:
a. Twist, puncture, and tear material.
b. Leave gaps between ends of material pieces.
c. Stretch or compress material along its length.
d. Stretch or compress tape material along its width.
4. Install to provide optimum joint profile and in manner to provide not less than 6 mm (1/4 inch) sealant depth when tooled.
5. Install tape where insufficient joint depth makes use of rod not possible. Match tape width to joint width to prevent three-side adhesion. Do not wrap tape onto sides of the joint.

6. Replace backing bond breaker materials which have become wet with dry materials prior to sealant application.

B. Sealant:

1. Install sealants at same time as installation of backer rod materials.
2. Use gun nozzle size to suit joint size and sealant material.
3. Install sealant with pressure-operated devices to form uniform continuous bead.
4. Use sufficient pressure to fill voids and joints full.
5. Install sealant free of air pockets and embedded matter.
6. Recess sealant 3 mm (1/8 inch) from surface of pavements and horizontal surfaces.

C. Sealant Tooling:

1. Comply with manufacturer's tooling method requirements.
2. Tool sealant within manufacturer's tooling time limits.
3. Tooling liquids:
   a. Comply with manufacturer's requirements regarding use.
   b. Do not use when not permitted by manufacturer.
   c. Do not allow tooling liquids to come in contact with surfaces receiving sealant.
4. Produce smooth exposed surface.
5. Tool sealant to be free of:
   a. Air pockets and voids.
   b. Embedded impurities.
   c. Surface ridges, sags, and indentations.
6. Remove excess sealant from surfaces adjacent to joint.

D. Masking Tape:

1. Remove immediately after tooling sealant and before sealant skin forms.
2. Remove without disturbing sealant.

3.4 CLEANING

A. Clean excess sealants and sealant smears from adjacent surfaces as application progresses; comply with sealant manufacturer's requirements and manufacturer of surface in which joints occur.

B. Repair or replace defaced or disfigured finishes caused by work of this Section and replace where installation techniques result in unsatisfactory joining of materials and unsightly conditions.

3.5 PROTECTION

A. Protect sealants from contamination until cured.

B. Protect sealant joints in horizontal surfaces from foot and vehicular traffic until cured.

3.6 SCHEDULE

Joint Location or Type	Sealant Type
Horizontal joints subject to pedestrian or vehicular traffic	
Slopes less than 1/4 in. per ft.	I
Slopes 1/4 in. per ft. and greater	II

END OF SECTION

SECTION 03350 – REINFORCED CONCRETE RETAINING WALL W/ MILSAP STONE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work shall consist of furnishing and construction of a Reinforced Concrete Retaining Wall System with Modular Milsap Stone in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans.

B. Work includes preparing foundation soil, furnishing and installing leveling pad, reinforced concrete wall (foundation and vertical section) milsap stone, continuous under drains, weep holes and backfill to the lines and grades shown on the construction drawings.

1.2 RELATED SECTIONS

A. Section 02100 - Site Preparation

B. Section 02200 - Earthwork

C. Section 03310 - Cast in Place Concrete

D. Section 04100 – Mortar and Masonry Grout

1.3 REFERENCE DOCUMENTS

A. American Society for Testing Materials (ASTM)

1. ASTM C-1372 Specification for Segmental Retaining Wall Units
2. ASTM 0-422 Particle Size Analysis

3. ASTM 0-698 Laboratory Compaction Characteristics of Soil- Standard Effort
4. ASTM 0-4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils
5. ASTM 0-3034 Polyvinyl Chloride Pipe (PVC)
6. ASTM 0-153 Zinc-Coating (Hot Dip) on Iron and Steel Hardware

1.4 SUBMITTALS/ CERTIFICATION

A. Contractor shall submit a Manufacturer's certification, prior to start of work, that the retaining wall system components meet the requirements of this specification and the structure design.

B. Contractor shall submit a sample of full size stone showing each color and size.

1.5 QUALITY ASSURANCE

A. Contractor shall submit certification, prior to start of work, that the milsap stone to be used will meet the standard define by specification. Blocks shall be from the same manufacturer and have the same size, color and finish.

B. City of Plano shall provide soil testing and quality assurance inspection during earthwork and wall construction operations. Contractor shall provide any quality control testing or inspection not provided by the Owner. Owner's quality assurance program does not relieve the contractor of responsibility for quality control and wall performance.

1.6 DELIVERY, STORAGE AND HANDLING

A. Contractor shall check all materials upon delivery to assure that the proper type, grade, color, and certification has been received.

B. Contractor shall protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be incorporated into the work.

PART 2 – PRODUCTS

2.1 DEFINITIONS

A. Unit Drainage Fill – drainage aggregate

B. Milsap Stone – It is one type of lime stone veneer.

C. Reinforced Concrete Wall - consists of reinforced concrete foundation and vertical concrete wall components.

2.2 MILSAP STONE UNITS

A. Milsap Stone units shall conform to the following architectural requirements:

1. Face color and finish – buff color and chopped material face.
2. Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of 10 feet under diffused lighting.
3. Size:
   a) Height: 6, 8, and 10 inches
   b) Length: 12 to 24 inches
   c) Thickness: 6 to 8 inches

2.3 REINFORCED CONCRETE WALL

B. Reinforced concrete wall shall be constructed as shown on the construction drawings. Prior to constructing the walls, the contractor shall draw down the elevation of the pond to no less than 2 feet below the bottom of the wall, or as directed by the City of Plano representatives.

B. The soil beneath the concrete pad shall be compacted to 95% modified proctor per ASTM D-698 and per the recommendations on the geotechnical report.

C. Surface of concrete pad only where milsap stone wall is going to be placed shall be rough with approximately ½ inch depth of roughness. The rest of the concrete top surface shall be smooth.

D. A shear key shall be placed in the concrete foundation as schedule on plan.

E. Upon completion of the construction and curing of the concrete pad, the milsap stone shall be installed to the proper grade and alignment per the construction drawings.

F. The back of the milsap stone shall serve as the front form for the vertical concrete wall component. Leave-outs for underdrains and weepholes shall be installed at this time.

G. Placement of the Reinforced concrete wall shall be per Section 03310 Cast in Place Concrete specification requirements.

H. Continuous underdrains shall be placed after removal of the formwork. Filter fabric shall overlap 18 inches minimum at closure over the granular fill. The granular fill shall be ASTM C33 or as shown on the plans.

I. Placement of the select backfill shall continue per the requirements of Section 02220 Earthwork and in conformance with the geotechnical report.

J. Underdrains shall be installed as shown on the construction plans.

2.8 DRAINAGE PIPE

A. If required, the drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM 0-3034.

PART 3 – EXECUTION

3.1 EXCAVATION

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Owner's representative shall inspect the excavation and approve prior to placement of leveling material or fill soils. Proof roll foundation area as directed to determine if remedial work is required.

B. Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated only upon prior approval and agreement in writing by the Owner.

3.2 MILSAP STONE UNIT INSTALLATION

A. First course of units shall be placed on the concrete foundation at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.

B. Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.

C. Set stone on walls in random coursed pattern with normal ½ inch to ¾ inch wide joints. Break up joints to avoid continuous horizontal and vertical joints.

D. Do not adjust stone after mortar has set. Lay stone in full mortar bed, with full head joints.

E. Cut stone with straight cuts, and chisel and chamfer edges; prevent oversized or undersized joints. Discard damaged units.

3.3 CAP INSTALLATION

A. Cap units shall be bond with mortar.

3.4 AS-BUILT CONSTRUCTION TOLERANCES

A. Vertical alignment: ± 1.5” (40mm) over any 10’ (3m) distance.

B. Wall Batter (where applied according to the plans): within 2 degrees of design batter.

C. Horizontal alignment: ± 1.5” (40mm) over any 10’ (3m) distance.

D. Corners, bends & curves: ± 1 ft (300 mm) to theoretical location.

E. Maximum horizontal gap between erected units shall be ≤ ½ inch (13mm).

3.5 FIELD QUALITY CONTROL

A. Quality Assurance – City of Plano shall engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the Contractor from securing the necessary construction control testing.

B. Quality assurance should include foundation soil inspection. Verification of geotechnical design parameters, and verification that the contractor's quality control testing is adequate as a minimum. Quality assurance shall also include observation of construction for general compliance with design drawings and project specifications. Quality assurance is best performed by the site geotechnical engineer.

C. Quality Control - The Contractor shall engage inspection and testing services to perform the minimum quality control testing described in the retaining wall design plans and specifications. Only qualified and experienced technicians and engineers shall perform testing and inspection services.

D. Quality control testing shall include soil and backfill testing to verify soil types and compaction and verification that the retaining wall is being constructed in accordance with the design plans and project specifications.

E. The Contractor shall be responsible for ensuring that construction adjacent to the wall does not disturb the wall. Heavy loads shall be kept to a minimum of three feet behind the wall.

END OF SECTION

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

Shop fabricated steel, aluminum, and ferrous metal items.

Miscellaneous metal fabrications and specialty products.

Exterior stair handrails.

1.2 RELATED REQUIREMENTS

Section 02515 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

Section 099000 - Painting and Coating: Paint finish.

1.3 SUBMITTALS

Section 01340 - Manufacturer's Drawings and Product Data: Submittal procedures.

Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

- Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- Include the design engineer's stamp or seal on each sheet of shop drawings for Steel Stairs.

Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 - PRODUCTS

2.1 MATERIALS - STEEL

Steel Sections: ASTM A 36/A 36M.

Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

Plates: ASTM A 283.

Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 MATERIALS - ALUMINUM

Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.

Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.

Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.

Aluminum-Alloy Sand Castings: ASTM B26.

Aluminum-Alloy Die Castings: ASTM B85/B85M.

Bolts, Nuts, and Washers: Stainless steel.

Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3 FABRICATION

Fit and shop assemble items in largest practical sections, for delivery to site.

Verify dimensions on site prior to shop fabrication.

Fabricate items with joints tightly fitted and secured.

Continuously seal joined members by intermittent welds and plastic filler.

Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.4 FABRICATED ITEMS

Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

Lintels: As detailed; galvanized finish.

2.5 FINISHES - STEEL

Prime paint all steel items.

> Exceptions: Galvanize items to be embedded in concrete, items to be imbedded in masonry, and items specified for exterior finish.
> Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

Prepare surfaces to be primed in accordance with SSPC-SP2.

Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

Prime Painting: One coat.

Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

Field paint all castings in contact with the ground on the inside of casting with one coat of bituminous paint and on the outside of casting where it is in contact with grade. Provide one coat of rust inhibited primer to castings above grade.

2.6 FINISHES - ALUMINUM

Exterior Aluminum Surfaces: Class I natural anodized.

Interior Aluminum Surfaces: Class I natural anodized.

Comply with AA DAF-45 for aluminum finishes required.

Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.7 FABRICATION TOLERANCES

Squareness: 1/8 inch maximum difference in diagonal measurements.

Maximum Offset Between Faces: 1/16 inch.

Maximum Misalignment of Adjacent Members: 1/16 inch.

Maximum Bow: 1/8 inch in 48 inches.

Maximum Deviation From Plane: 1/16 inch in 48 inches.

2.8 SCHEDULE

Provide and install items listed in Schedule and shown on Drawings with anchorage and attachments necessary for installation.

The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

Items of Work - Custom Fabricated:

1. Galvanized steel pipe handrails at front entrance.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

Clean and strip primed steel items to bare metal where site welding is required.

Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

Install items plumb and level, accurately fitted, free from distortion or defects.

Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

Field weld components indicated.

Perform field welding in accordance with AWS D1.1/D1.1M.

Obtain approval prior to site cutting or making adjustments not scheduled.

After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

Install stock manufactured items in accordance with manufacturer's directions.

Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

At loose plates, clean concrete and masonry bearing surfaces of any bond-reducing materials. Clean bottom surface bearing plates.

Replace, repair or touch up pre-finished items as directed by Architect.

3.4 DISSIMILAR MATERIALS

Where aluminum surfaces will contact steel, other incompatible metals, masonry, stone or concrete, keep the aluminum surfaces from direct contact with such dissimilar material by painting the compatible metal with prime coat of zinc chromate primer followed by one or two coats of aluminum metal paint or other suitable protective coating excluding those containing lead pigmentation.

3.5 CLEAN UP

Remove all trash and debris resulting from installation of products and equipment. Sweep clean and leave in a clear and orderly fashion.

3.6 TOLERANCES

Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

Maximum Offset From True Alignment: 1/4 inch.

Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCED DOCUMENTS

A. Comply with Division 1- General Requirements and related documents.

B. All sections of this Specification.

1.2 DESCRIPTION

Work Included: Provide miscellaneous materials for the supporting of electrical material and equipment.

1.3 QUALITY ASSURANCE

The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.

All equipment supplied shall be Underwriters Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

Product Data: If materials are by manufacturers other than specified, submit product data giving complete description.

1.5 MANUFACTURERS

Listed with Materials.

Acceptable Manufacturers

Kindorf

Unistrut

Caddy

PART 2 - PRODUCTS

2.1 MATERIALS

Continuous Slotted Channel: #12 gauge steel, electrogalvanized, with zinc chromate, bases and dimensions as required for application.

Hanger Rods: Continuous thread, electro-galvanized, with zinc chromate, sizes as required for loads imposed.

Hex Head Cap Screws and Nuts: No. H-113 and No. H-114, respectively.

One-Hole Pipe Straps: Series HS-100, galvanized steel.
Single Bolt Channel Pipe Straps: Steel, with machine screws and nut, Series C-105 and Series C-106.

Lay-In Pipe Hanger: Series C-149.

Conduit and Pipe Hanger: Series 6H.

Beam Clamps: Series 500, RC, EC, and PC for applications.

Concrete Inserts, Spot: Series D-256 or No. D-255.

Concrete Inserts, Channel: Series D-980 or Series D-986.

Riser Clamps: Series C-210.

Cable Supports: O-Z/Gedney Type S.

PART 3 - EXECUTION

3.1 INSTALLATION

Continuous Slotted Channel: #12 gauge steel, electrogalvanized, with zinc chromate, bases and dimensions as required for application.

Carefully lay out and provide concrete inserts.

Securely fasten and support conduits and raceways to the building structure.

Suspend horizontal runs of conduit and raceways from the floor and roof construction by rod hangers spaced 10 feet on less on centers for sizes 2-1/2 inches and greater and 9 feet or less on centers for sizes 2 inch and smaller.

Fasten single runs of conduit to the structure with one-hole pipe straps and beam clamps or hang on rod hangers.

Support multiple runs of conduit and raceways from continuous channel inserts or from trapeze hangers constructed of rod hangers and channels.

Fasten single conduits to rod hangers with adjustable lay-in pipe hangers or for 2 inches and smaller conduits with Series 6H pipe hangers.

Fasten conduits to channels with pipe channel straps.

Support conduits and raceways within 3 feet of each end of each bend, of each termination, and at other intervals to maintain horizontal and vertical alignment without sag and deformation.

Do not use cable, strap, and wire hangers as fasteners.
Provide riser clamps for conduits at floor lines. Provide wire and cable supports in pull boxes for risers in accordance with NEC Section 300-19 and Table 300-19 (a).

Install supports to permit equally distributed expansion and contraction of conduits and raceways with expansion joints. Use guides or saddles and U-bolts and anchors designed for equal effectiveness for both longitudinal and transverse thrusts.

Do not support conduits and raceways for equipment connections.

Provide special supports with vibration dampers to minimize transmission of vibrations and noises.

Provide trapeze hangers for conduits and raceways where routing interferes with ducts

Provide hangers, racks, cable cleats and supports for wires and cables in cable chambers and other locations to make a neat and substantial installation.

Provide angle iron and channel supports to the floor and structure for panelboards, cabinets, pull and junction boxes. Support independently from entering conduits and raceways. Provide supports as specified for conduits and raceways for outlet boxes and pull boxes 100 cubic inches and smaller.

Provide supports sized for the ultimate loads to be imposed.

3.2 CLEANING

Clean surfaces to be painted.

END OF SECTION

SECTION 260533 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 REFERENCE DOCUMENTS

Comply with Division 1 - General Requirements and related documents.

Comply with all of the Division 26 sections as applicable.

Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

Work Included: Provide outlet boxes for the installation of wiring devices, lighting fixtures, and power and control connections.

Related work specified in other section:

General Provisions: Section 26 00 01

Wiring Devices: Section 26 27 26

Lighting: Section 26 51 00

Control Voltage Electrical Power Cables: Section 26 05 23

1.3 QUALITY ASSURANCE

The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.

All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

Samples: Provide samples upon specific request.

Product Data: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and electrical ratings.

1.5 MANUFACTURERS

Listed with Materials.

Appleton Electric Company

Raco

Steel City

Crouse Hinds

Hubbell

Raceway Components

Walker

PART 2 - PRODUCTS

2.1 MATERIALS

Flush Mounted Outlet Boxes: Standard, stamped galvanized steel with factory conduit knockouts, one piece and welded construction:

Series 4S and 4S0 square boxes with covers.

Series M1, M2, M3 - 250 and Series M1, M2, M3 - 350 masonry boxes with covers.

Series 2G and GC-5075 switch boxes with covers.

Series OCR concrete rings with Series OCP and OCP-3/8 back plates.

Series 40 and 40D octagonal boxes with raised covers.

Series SX expandable bar hangers.

Surface Mounted Outlet Boxes: Cast metal with threaded hubs. Type FS and FD of form suited to the application.

Fire Rated, Flush, Poke-Thru Outlets: Raceway Components, Inc. #RC-700A.

Fire Rated, Flush, Poke-Thru Outlets with Conduit Adapter: Raceway Components, Inc. #RC-700-6-A.

Floor Outlet Boxes: Hubbell cast flush floor boxes, fully adjustable with flush service fitting, and carpet flange (if required).

PART 3 - EXECUTION

3.1 INSPECTION

Examine building structure to which outlet boxes are to be secured for defects which affect the execution and quality of work.

Do not start work until defects are corrected.

3.2 PREPARATION

Carefully measure and lay out exact locations in conference with the Construction Manager.

Owner may change outlet box locations a distance of 5 feet before rough-in without additional cost.

3.3 INSTALLATION

In dry walls for single and two gang outlet provide 4S and 4D boxes; for 3 or more outlets use masonry boxes.

In poured concrete floors, provide cast flush floor boxes complete with service fittings and carpet flanges (if required).

In existing concrete floors, provide fire-rated poke-thru outlets complete with wiring devices and other accessories (if required).

In block and masonry walls provide masonry boxes of depths required for wall thickness.

In poured concrete and plastered walls provide 4S and 4D boxes for single gauge outlets and 2G and 3G-5075 boxes for multiple ganged outlets.

In concrete ceiling provide OCR rings.

In other ceilings provide 40 and 40D boxes. Omit covers if standard canopy and device plates entirely cover the ceiling opening.

In exposed work, exterior of the building, in wet locations, and flush in non-waterproofed walls below grade provide FS and FD boxes.

Submit for approval special boxes for special devices and applications. Size according to device and application in accordance with NEC.

Install outlet boxes finished to within 1/8 inch of finished surfaces.

Install center of box at heights above finished floor:

Wall Switches: 45 Inches

Convenience Outlets: 18 Inches

Telephone/Data Outlets: 18 Inches

Wall Telephone Outlets: 45 Inches

Boxes Indicated Above Counters: 4 Inches above backsplash and trim, unless otherwise indicated.

Install wall switch outlet boxes on the strike side of doors as finally hung.

Group outlet on circuits with homeruns as indicated on the Drawings.

Do not provide through-the-wall and back-to-back boxes unless specifically noted on the drawings.

Provide standard manufactured plugs in unused openings of boxes.

Provide boxes at the terminal of conduit runs to outlets and devices.

Provide plaster rings and covers where required by the building structure.

In brick finished walls, locate to work brick in a brick course where possible, and to permit conduits and raceways to enter from the rear without cutting brick, where possible.

Provide 3/8 inch studs and lighting fixture outlet boxes where shop drawings of fixtures require and elsewhere as may be required for fixtures.

Rigidly attach to structure and ceiling supporting members in suspended ceilings to avoid cutting mechanical ceiling members.

Center outlet in paneling and in other Architectural features.

Locate light fixture outlets in uniform relation with ceiling tiles.

Label all junction boxes with circuit information as to its use for special system equipment. Use an indelible marker to mark information on cover.

3.4 CLEANING

Clean surfaces to be painted.

END OF SECTION

SECTION 265100 - LIGHTING

PART 1 - GENERAL

1.1 REFERENCE DOCUMENTS

Comply with Division 1 - General Requirements and related documents.

Comply with all other Division 26 sections as applicable.

Refer to other Divisions for coordination of work with other portions of work.

1.2 DESCRIPTION

Work Included: Provide lighting fixtures, lamps, and accessories for interior and exterior illumination of the building.

1.3 QUALITY ASSURANCE

The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.

All equipment supplied shall be Underwriters Laboratories Inc. listed and so labeled.

Laboratory Testing: Photometric testing shall be by Independent Testing Laboratories, Inc., based on Illuminating Engineering Society published procedures, and shall include candlepower distribution tabulation and zonal cavity coefficient of utilization tabulation.

1.4 REFERENCE STANDARDS

Underwriters' Laboratories No. 57 - Fixtures, Electric Lighting.

Underwriters' Laboratories No. 1570 - Fixtures, Fluorescent Lighting.

Underwriters' Laboratories No. 935 - Ballasts, Fluorescent Lamps.

Underwriters’ Laboratories No. 924 - Emergency Lighting and Power Equipment.

Certified Ballasts Manufacturers Association - Lamps and Ballasts Combinations Safety and Performance Standards.

1.5 SUBMITTALS

Submit manufacturer's literature giving materials, finishes, dimensions, coefficients of utilization, and lamp types for each fixture which is the product of one of the listed acceptable manufacturers.

Submit large scale shop drawings and copies of independent testing laboratory test report, along with manufacturer's literature for each fixture which is the product of any manufacturer not listed as acceptable.

Submit samples of fixtures upon specific request.

Certificates: Labels of Underwriters' Laboratories, Inc.; Certified Ballasts Manufacturers, and Electrical Testing Laboratories affixed to each item of material.

1.6 DELIVERY, STORAGE AND HANDLING

Equipment shall be included and off loaded in accordance with the manufacturer’s published instructions.

Upon arrival, inspect equipment for damage incurred in shipping.

Store in a clean, dry environment. Maintain factory packaging and, if required, provide an additional heavy canvas or heavy plastic cover to protect enclosure(s) from dirt, water, construction debris, and traffic.

1.7 MANUFACTURER

The equipment shall be the product of a manufacturer with a minimum of ten years’ experience with the manufacturer of similar equipment.

Listed in schedule and with materials.

1.8 WARRANTY

The equipment shall be warranted to be in proper working order for a period of one year following the date of final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

Lighting Fixtures:

Fixtures shall be of the lighting fixture types scheduled on the drawings according to the letter type designations on the plans.

If letter type designation is omitted from any fixture shown on the plans, provide the same fixture type as employed in rooms of similar usage.

Where manufacturer's model numbers are used to describe fixtures, the intent is to establish the kind and quality of the fixture. The Contractor is responsible for examining the drawings to establish correct ordering information for each fixture including but not limited to number of ballasts to accommodate switching schedule, ballast voltage for the branch circuit supply, ceiling trim and mounting means for the ceiling material.

Fixtures that utilize double ended lamps and contain ballasts that can be services in place shall have a disconnecting internal to each fixture.

Lamps:

Four Foot, T8, 32 watt fluorescent lamps:

Equal to Osram Sylvania F032/841/ECO Series

Inital Lumens: 2950

Mean Lumens: 2773

CRI: 85

Color Temperature: 4100K

Average Rated Life: 30,000 Hours

TCLP Compliant

Ballasts

For Four Foot, T8, 32 watt fluorescent lamps.

Equal to Osram/Sylavania QTP/32T8/UNIV/PSX Series

Programmed Rapid Start

Universal Input Volume

Ballast Factor: 0.71

THD: <10%

Power factor: >0.98

U.L. Listed Class P

1, 2, 3, or 4 lamp as required by circuit switching

Parallel lamp wiring for operation with lamps missing or inoperative

Starting temperature: 0 Deg.F.

Emergency Battery Ballast Units

Selected to operate the lamp and ballast combination for the specific light fixture for a minimum of 90 minutes at not less than 1100 initial lumens for one lamp.

Include nickel-cadium battery, charger, and inverter for either switched fixture or unswitched fixture operation.

Include status indicator light, to monitor charger, fault condition and battery and test switch.

Include controls for automatic self-test for 30 seconds every 30 days and for 90 minutes once per year, with audible and visual signal to indicate test result.

For switched fixture installations, provide unswitched branch circuit conductor to the fixture from the same branch circuit serving the area.

Accessories: Manufacturers' standard mounting ring, trim flanges, hanger bars, spacers, supports, plaster frames of non-ferrous material or cadmium plated steel. Do not use painted steel plaster frames.

PART 3 - EXECUTION

3.1 INSPECTION

Examine building structure to which outlet boxes are to be secured for defects which affect the execution and quality of work.

Do not start work until defects are corrected.

Inspect Architectural drawings and specifications, including ceiling alternates, to determine ceiling material to be installed.

Inspect Architectural reflected ceiling plans.

Inspect installed ceiling components for defects affecting the quality and execution of work.

3.2 PREPARATION

Verify ceiling material and alignment.

Layout exact locations of fixtures in accordance with reflected ceiling plans, fixtures' and switches' outlet boxes and supports.

Provide outlet boxes and conduit.

Do not support light fixtures from the ceiling system if the weight of the fixture causes the total dead load to exceed the ceiling system design load or deflection specification. In such cases, light fixtures shall be supported by supplementary hangars located within 6 inches of each corner, or supported independently from the structure.

Where existing fixtures are required to have ballasts replaced, fixtures that utilize double ended lamps shall be provided with a disconnecting means internal to each fixture.

3.3 INSTALLATION

Provide lighting fixtures, lamps, switches, and control systems, and wiring.

If designation omitted on drawings, provide same type fixtures employed in rooms of similar usage.

Provide spacers for fixtures mounted on low density ceiling material.

Provide plaster frames for recessed fixtures in plaster or gypboard ceilings.

Install fixtures in and on acoustical tile ceilings in alignment with tile joints.

Install fixtures in gypsum board ceilings to recess in the space available between structural members where the ceiling is installed tight against the structure.

Note: Outlet boxes locations on drawings are diagrammatic only. Position outlet boxes to coincide with suspension hangers and knockouts.

Install in accordance with manufacturer's instructions, submittal data, and details on the drawings.

3.4 ADJUSTMENT AND CLEANING

Adjustment: Adjust lamp positions for desired effects. Align fixtures with building walls and tile joints.

Cleaning: Remove dirt, grease, and foreign materials from fixtures. Remove fingerprints, smudges, and dirt from fixture's lenses and lamps.

3.5 LIGHTING FIXTURE SCHEDULE

Reference drawings for Lighting Fixture Schedule.

END OF SECTION

SECTION 260520 – CABLE CONNECTIONS

PART 1 – GENERAL

1.4 REFERENCED DOCUMENTS

A. Comply with Division 1- General Requirements and related documents.

B. All sections of this Specification.

1.2 DESCRIPTION

Work Included: Provide wire connections and devices to be readily identifiable, mechanically and electrically secure wiring system.

1.3 QUALITY ASSURANCE

The equipment supplied and installed shall meet the requirements of the National Electrical Code and all applicable local codes and ordinances.

All equipment supplied shall be Underwriter's Laboratories Inc. listed and so labeled.

1.4 SUBMITTALS

Samples: Provide samples upon specific request.

Product Data: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and electrical ratings.

1.5 DELIVERY, STORAGE AND HANDLING

Connections shall be made in atmospheres that are free from dirt, moisture, and elements which may be damaging.

PART 2 – PRODUCTS

2.1 MATERIALS

Spring Connectors: Ideal "Wingnut" 3M-Scotch, Buchanan, and Thomas and Betts.

Terminal Connectors: O-Z/Gedney, Burndy, and Thomas and Betts.\

Splice Connectors: O-Z/Gedney or Burndy with insulating cover.

"T" and Parallel Connectors: O-Z/Gedney or Burndy with insulating cover.
Vinyl Plastic Tape: 3M-Scotch #33 or #88, Plymouth and Okonite.

PART 3 – EXECUTION

3.1 INSPECTION

Examine wires to be joined, tapped, spliced, terminated, and their connecting devices for defects which may affect the mechanical and electrical integrity of the connection.

Do not proceed until defects are corrected.

3.2 PREPARATION

Remove proper amount of insulation necessary for connection, clean conductors.

3.3 INSTALLATION

No. 10 Wire and Smaller: Connect with spring connectors, terminate at terminal strips.

No. 8 Wire and Larger: Connect and terminate with above specified tape half-lapped to produce a dielectric value equal to wire insulation.

Train, hold, clamp, and tag wiring in cabinets, pull boxes, panels, and junction boxes with above specified devices.

Splices in feeders and mains may only be made where designated on the drawings and where prior approval is obtained from the Architect.

Install terminal strips in enclosures without means for termination of wiring.

Install cable and cord grips on all cables and cords, entering enclosures. Use wire mesh grips where necessary for strain relief.

3.4 FIELD QUALITY CONTROL

Test: Connections shall be resistance tested with megohm meter as specified for wire.

3.5 ADJUSTMENTS

Assure that wire connections made by others in equipment furnished by others are mechanically and electrically sound prior to energization.

END OF SECTION

SECTION 09998- PREMANUFACTURED LOG CABIN SPECIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. General Details
2. Reference Documents
3. Product Details
4. Execution

B. Related Sections:

1. Scope of Work

1.2 GENERAL DETAILS

The Mesquite Parks and Recreation Department (MPAR) has a project to provide a new camp office at the Camp Rorie Galloway Day Camp and make other miscellaneous improvements to accessibility.

1.3 REFERENCE DOCUMENTS

1. Cabin shall comply with Building Codes, City Standards and ADA Accessibility Standards. Services may include but are not necessarily limited to the following: Services: Architecture: It is anticipated that a pre-engineered log cabin structure and a modular building shall be specified. Structures shall be fabricated, transported and installed on a foundation as engineered and to be constructed by the General Contractor. Additional features, utilities and access shall be coordinated with supplier and executed by the General Contractor.

    a. Structural Engineering: Provide foundation connection designs for modular building.

b. MEP: provide utility service or connections.

Provide:

1. Record Documents: prepare by incorporating contractor's field notes, supplemental instructions, and change orders into construction documents.
2. Register project with TDLR and pay associated fees.

PART 2 – PRODUCTS

2.1 Pre-engineered / Pre-manufactured Log Cabin

a. 12'' eaves on end walls or (optional no eaves with facial plate for porch add-on)

b. Full Lower Cabinet –No Locks

c. 11'9'' Upper Cabinets- No Locks

d. One Instant hot water unit

e. Embossed Fiberglass Board Wainscot in Toilette

f. 16'' Laminate Back Splash in Kitchen

g. 4'' Laminate Back Splash in Guest Room

h. Garbage Disposal

i. Exhaust Fan in Kitchen and Bath

j. 3 LED Light Kits for fans

k. 3 to 1 HVAC –Mitsubishi Mini-Split

l. 15 ~ 2 x 2 1'' Low E Fixed Windows with frost vinyl

m. 3x5 Insulated Single Hung Exterior Windows

n. Data and Phone Outlets

o. 2 Additional Exterior Doors

p. Framed Mirror with Wall Sconces in guest room

q. 3 Exterior Lock Sets with Best interchangeable core

r. Shaw Premio 0490V- Vinyl Plank Flooring

s. Standing Seam Metal Roof

PART 3 – EXECUTION

Design Criteria and Specification

The improvements shall be fully functioning and complete while being consistent with the intentions of the following description. All work shall be fabricated and constructed to the current Building Codes of the City of Mesquite (IBC 2015), City Standards, and Texas Accessibility Standards.

3.1 Modular Building/Office: Provide a custom built Modular Building for the office from Ulrich Cabins Ft. Wort h, Texas or approved equal. Install and connect utilities. Components of the office and shelter must be integrated.

3.2 French drain: a sub-surface drainage system shall be installed between the office structure and the pavilion to address roof water. Connect downspouts and floor drains into drain pipe. The pipe shall extend beyond the BBQ grille area and daylight through a concrete headwall.

3.3 Shelter foundation/slab: Provide a perimeter grade beam foundation appropriate for structural loading of structure while creating a ventilated, accessible crawl space as required by Code. Finished floor elevation shall be above adjacent concrete slab of picnic shelter with sloped sidewalk access.

3.4 Building shell: Exterior walls shall be 2x6 western red cedar log sliding with 2x4 trim with a total wall height of 7’-10”. R-13 fiberglass insulation. 5’w by 4’d overhangs shall be provided on the north and south ends over the doors,

3.5 Roof: A 4:12 R-Type steel panel gable roof shall extend 6” beyond the exterior wall surface. A “leaf guard” type gutter shall be provided on the east & west side and be connected into the French drain system.

3.6 Windows: Shall be fixed 1” low E insulated glass in alum. Frames and sills. Clear vision glass in the front full height picture window. All other windows shall have a frosted vinyl film applied to the inside face. Provide 1’ mini-blinds for front picture window. **Refer to plans for window sizes and locations.**

3.7 Doors: Exterior doors on Kitchenette and Guest Room shall be painted steel in hollow metal frames. Exterior door on office shall be mahogany veneer with frosted glass lights. **Stained and varnished door shall be ETO MAHOGANY MODERNO (1-3/4”) or approved equal**. Interior doors shall be painted wood doors in wood frames.

3.8 Accessibility: ADA compliant sloped sidewalks shall be provided at the 3 entries. Provide porch lights for each.

3.9 Hardware: all hardware shall be commercial grade, ADA compliant lever set. Locks shall be “Best” and coordinated with City’s keying system. Brushed stainless steel finish. Provide cabinet locks on all upper and lower cabinets in kitchenette.

3.10 Heating/AC: Separate thru-the-wall thermostat controlled units shall be provided in each of the 3 rooms.

3.11 Interior walls: Walls shall be 1x6 cedar wainscoting and 1x6 pine planks with 1x4 trim. Stained and varnished. All walls in toilet and kitchenette shall have RFP wainscot.

3.12 Flooring: Floors shall be finished with luxury vinyl planks and wood base.

3.13 Ceiling: 1x6 pine planks, stained and varnished.

3.14 Exhaust: provide exhaust fans in kitchenette and toilet.

3.15 Ceiling fans (52’) with LED light: Provided in 3 main rooms.

3.16 Make-up vanity: provide a solid surface counter with 3 vanity wall sconce lights on separate switches in Office #2.

3.17 Kitchenette: provide solid surface counter on stained wood base cabinets. Provide upper open shelving. Provide icemaker and coffee maker water connections for ice maker, coffee maker. Provide floor drain for ice maker. Provide a stainless steel farm style sink with disposal and goose neck spray faucet.

3.18 Electrical: Locate breaker box in office space. Provide wiring and connection point for Pavilion’s PA/Music system. Provide electrical, data, phone outlets.

3.19 Plumbing: connect to existing water service and sanitary sewer. Provide grease trap for kitchenette sink. Provide instant hot water unit(s) for kitchenette and toilet. Provide exterior hose bibs.

3.20 **Crawl Space Access: Manufacturer shall provide 18” X 24” minimum crawl space access panel as indicated on floor plans for log cabin.**

END OF SECTION

SECTION 09999- PREMANUFACTURED PAVILION SPECIFICATIONS

PART 1 - GENERAL:

1.1 SUMMARY

A. Section includes:

1. General Details
2. Reference Documents
3. Product Details
4. Execution

C. Related Sections:

1. Scope of Work

1.2 GENERAL DETAILS

A. The Mesquite Parks and Recreation Department (MPAR) has a project to provide a new pavilion at the Camp Rorie Galloway Day Camp and make other miscellaneous improvements to accessibility.

B. All shelter components shall be designed and fabricated per the latest applicable edition of the International Building Code (IBC) and designed to meet site specific snow, wind and seismic load criteria.

D. All structural members shall be designed according to the American Institute of Steel Construction (AISC) and the American Iron and Steel Institute (AISI) specifications.

E. All welding is to be done in accordance with the latest American Welding Society (AWS) standards and all welds are to develop full strength of component parts (E7081 Electrodes).

F. Manufacturer shall submit site specific engineer sealed structural calculations by a registered engineer in the state of texas.

1.3 REFERENCE DOCUMENTS

Pavilion shall comply with Building Codes, City Standards and ADA Accessibility Standards. Services may include but are not necessarily limited to the following: Services:

1. It is anticipated that a pre-engineered pavilion structure shall be specified. Structures shall be fabricated, transported and installed on a foundation as engineered under these plans constructed by the General Contractor. Additional features, utilities and access shall be coordinated with supplier and executed by the General Contractor.

a. Structural Engineering: Provide foundation anchor designs column connections to concrete piers.

b. MEP: provide utility service or connections.

c. Provide construction services including submittals, request for information, clarification, incorporation of changes, preparation of markups for documents.

1. Record Documents: Provide contractor's field notes, supplemental instructions, change orders into construction documents.
2. Register project with TDLR and pay associated fees.

1.4 FOOTINGS & COLUMNS:

Standard columns shall have a welded base plate to be surface mounted to concrete footings. All concrete material and installation shall be supplied by the owner / contractor. Anchor bolts shall be ASTM A-307 and will be provided along with bracing

templates by manufacturer. Recommended concrete compressive strength is 4000 psi. Footing designs are included in plans.

1.5 FRAMING MEMBERS:

A. All frame members shall be structural steel tube ASTM A-500 Grade B with ASTM A-36 welded connection plates. Minimum steel tube wall thickness shall be 0.120 (1/8") and minimum connection plate thickness shall be 0.250 (1/4").

B. All framing connections are done using ASTM A-325 grade bolts (included with shelter) within concealed access openings from above and will later be concealed by the roofing. All roof framing shall be flush against the underside of the roof decking to eliminate the possibility of bird nesting.

C. Open framing members such as "I" beams, angle iron and "C" or "Z" channels shall not be used.

1.6 PAINT:

All frame members shall be blasted and washed to a white condition to completely rid the steel of all rust, oil, grease and contaminates. 3-6 mils of electro-statically applied epoxy primer and 4-6 mils of electro-statically applied TGIC polyester powder coat. Final powder coat is oven cured at 400 degrees. Many standard color choices are available with custom colors available upon request at an additional charge.

1.7 ROOFING & TRIM

A. All roofing shall be 24ga. Medallion-Lok standing seam steel panels by McElroy Metal, Inc. Roof panels are Galvalume coated with white bottom and 20 year warranted Kynar 500 top finish color in a variety of many standard colors. Panels

shall be pre-cut with ribs at 16” O.C. running with the slope of the roof. Fastened to steel frame using concealed clips and self-tapping screws. Standard roof slope is a 4/12 pitch with an 8’-0” high clear eave height (some shelters may vary). Also available with exposed fastener profiled panels.

B. Roof trim shall be 24ga. pre-finished Galvalume coated steel to match roof color with exposed screws in matching color.

C. Wood Decking ~~**(optional)**~~ shall be 2" x 6" (nominal) #1 Grade, single tongue and groove with V-joint bottom face, Southern Yellow Pine. 30# roofing felt and 24ga. pre-finished drip flashing shall be included **(lower roof area only) with semi-transparent penetrating strain**.

1.8 SHIPPING & INSTALLATION:

A. Prior to delivery of steel members from factory to job site all members shall be wrapped in a protective wrap to protect the factory finish during shipping. Protective wrap should be removed upon receipt of delivery to avoid prolonged exposure to packaging materials which could damage factory finish. Should damage occur to the surface finish, whether during shipment or on-site, touch up paint is provided.

B. Coverworx shall provide complete installation drawings and instructions. Installation should be performed by someone of experience and competence. It shall be the responsibility of the installer to properly assemble the shelter as described in installation documents and to construct shelter foundations as specified in supplemental engineering documents.

1.9 WARRANTY:

Manufacturer shall warranty the structure to be free from defects in materials and workmanship under normal use for 10 years from delivery date. 10 year limited warranty is void if any damage has resulted from abnormal use, abuse, accident, vandalism, poor installation, lack of maintenance, misapplication or acts of god. The entire liability of Coverworx and its suppliers, and the exclusive remedy shall be for Coverworx to repair or replace at their option those materials found to be defective to match existing material.

PART 2 – PRODUCTS

2.0 Pre-engineered / Pre-manufactured Pavilion

a. Tubular Steel Columns and Beams:

Standard column dimension shall be 8" x 8" x 3/16" tubular steel welded to 5/8" base plates for surface mounting. Main support beams are 10" x 6" x 3/16" and purlins are 6" x 4" x 3/16". Steel sizes are preliminary and may change due to ongoing review and final engineering.

b. Roof Deck:

2" x 6" (nominal) #1 Grade, end matched, single tongue and groove with V-joint bottom face, kiln-dried to an average of 15% moisture content, Southern Yellow Pine. Staining shall be by others if required.

c. Roofing:

Pre-cut 24 Ga. steel Medallion-Lok standing seam panels, 16" wide by 1 3/4" high, with Kynar 500 finish in a variety of colors with white underside. Roof slope is a 4/12

pitch with a eave height of 10'-0". Attached to structural framing with concealed fasteners. Matching 24 Ga. trim is included.

PART 3 – EXECUTION

Design Criteria and Specification

Structure shall be designed to meet site specific snow and wind load design criteria using most current applicable building codes. All structural members are ASTM A-500 U.S. grade B steel. Welded connection plates shall be ASTM A-36 hot rolled steel. All fabrication performed to latest AISC standards by AWS Certified welders. All framing connections are done using A325 grade bolts within concealed access openings from above and will later be concealed by the roofing. All roof framing shall be flush against the roof decking to eliminate the possibility of bird nesting.

3.1 Tree protection: Provide appropriate protection around large pecan trees adjacent to work area to prevent harm during demolition and construction.

3.2 Demolition: Remove existing concrete pad, affected portion of existing concrete sidewalks. Remove spoils and properly dispose of.

3.3 Grading: Modify immediate site and subgrade as required for improvements. Final grading to provide positive drainage away from shelter and office.

3.4 Shelter foundation/slab: Provide concrete foundation/floor slab appropriate for structural loading of structure. Slab shall extend beyond centerline of columns and be patterned with saw cut or tooled control joints and finished with special textures. Slab shall be flat and sloped to drain to sides.

3.5 Utilities: Set a new electrical service pole at the entry railing and accommodate service to; storage trailer, site lighting, pavilion and building.

3.6 Shelter: Provide an elongated hexagon, two tiered pre-engineered steel structure, (approx. 48’ x 77’ structural grid). Roof area shall extend 4’ beyond centerline of columns with a minimum 10’ eave height. Approved manufacturers: CoverWorx, Americana, Superior Recreational Products, Classic Recreation Systems, **Poligon, American Play Systems, ACP Shelters, RCP Shelters** or approved equal.

a. 3 bays at 15’ O.C. along sides with pointed ends at 60 degrees.

b. 4:12 pitch, 24 ga. Steel R panel roof with Kynar 500 finish (or equal) over exposed tongue and groove decking, stained #1 Grade or better kiln-dried cedar.

c. 10 round or square steel tube columns wrapped with 24” x 24” x 9’-6” high tan lueders stone (chopped block/brick) with 3” thick cast stone cap to match existing entry gate.

d. All steel framework shall have a corrosion protective polyester powder coat.

e. Structure shall have a warranty against manufacturer’s defects for a period of 10 years minimum from the date of acceptance by City. Installation and associated site modification shall have a two-year contractor’s warranty.

d. Provide 8 wall sconce light fixtures on the inside of the side columns. Mounted at 9’ AFF. Similar to Copenhagen by Antique Street Lamps on an EAJ4-small pendent wall bracket, black. Connect to switch in control box.

e. Provide exterior duplex receptacles at the base of 8 side columns. Connect to switch in control box.

f. Provide one ceiling fan by “Big Ass Fans”. **16’ diameter Basic 6** with light in standard silver/black trim mounted to upper tier framing but extended down to 15’ above floor. Locate controller in control box.

g. Fireplace: provide a two-sided see-thru wood burning stone clad fireplace at the center bay on the east side.

i. Construct of lueders stone block, Oklahoma flagstone, Milsap stone, and cast stone.

ii. Provide rain diverting flashing from shelter roof and counter flashing from the chimney to close gap between the two structures.

iii. Extend chimney as required by Building Code.

iv. Provide a steel, screened chimney cap.

3.7 Provide several patio areas finished with 1" thick Oklahoma flagstone (18'x18" pieces) in a random pattern. Grouted joints. Align patio and shelter slab. Provide retaining wall to accommodate required grade changes. Stone and pattern shall match basketball court.

3.8 Plumbing: Provide 2 exterior freeze-protected hose bibs per plans.

3.9 Concrete Sidewalk: Provide 5' wide concrete sidewalks to stone entry paving. Sandblast medium broom finish and existing sidewalk out to parking lot.

3.10 Stone entry paving (2): Provide a 6' wide concrete sidewalk finished with 1" thick Oklahoma flagstone (18"x18" pieces) in a random pattern at both points of the shelter, per plans. Align with sidewalks and shelter slab.

3.11 Provide 5 exterior rate sound system speakers (on every other column starting with southern point), a microphone connection in the base of the southern column. Wire to office area of building and provide wall outlets to connect PA/music system component.

3.12 TO 3.16 – REMOVED (NOT USED)

END OF SECTION

SECTION 09900 – PAINTING AND COATING

PART 1 - GENERAL

1.1 SECTION INCLUDES

Surface preparation and finishing.

Field application of paints, stains, varnishes, and other coatings.

Scope: Finish all interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

Exposed surfaces of steel lintels and ledge angles.

See Schedule - Colors, at the end of Section for Fire/Smoke Barrier Identification.

Do Not Paint or Finish the Following Items:
Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
Items indicated to receive other finishes.

Items indicated to remain unfinished.

Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

Floors, unless specifically so indicated.

Glass.

Concealed pipes, ducts, and conduits.

See Schedule - Surfaces to be finished, at end of Section.

1.2 RELATED REQUIREMENTS

Section 05 50 00 - Metal Fabrications: Shop-primed items.

1.3 DEFINITIONS

Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

Product Data: Provide data on all finishing products, including VOC content and Material Safety Data Sheets (MSDS).

Samples: Submit two paper chip samples, 6 x 6 inch in size illustrating range of colors, lusters and textures available for each surface finishing product scheduled.

Certification: Indicating contractor or renovation firm is EPA-certified, identifying certified on site staff, furnish evidence of worker training by certified staff and provide summary of lead-safe work practices to be implemented as required by 40 CFR 745.

Certification: By manufacturer that all paints and coatings comply with VOC limits specified.

Manufacturer's Instructions: Indicate special surface preparation procedures.

Maintenance Data: Submit data including care and cleaning instructions, touch-up procedures, and repair of painted and coated surfaces.

Maintenance Materials: Furnish the following for Owner's use in maintenance of project. 1. See Section 016000 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

The intent of this specification is to produce the highest quality appearance of paint and finish surfaces. Employ skilled mechanics only. The proper preparation of all surfaces will be strictly enforced and wherever finished surfaces show any defects due to improper preparation, workmanship, etc., remove the defects and refinish the work at no additional expense to the Owner.

Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.

Applicator Qualifications: Company specializing in commercial painting and finishing with minimum 3 years documented experience in projects of similar size and complexity.

1.6 REGULATORY REQUIREMENTS

Conform to applicable code for flame, fuel and smoke rating requirements for products and finishes.

1.7 MOCK-UP

Provide panel, 4 feet long by 4 feet wide, illustrating coating color, texture, and finish.

Provide door and frame assembly illustrating coating color, texture, and finish.

Locate where directed.

Mock-up may remain as part of the work.

1.8 DELIVERY, STORAGE, AND HANDLING

Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

Store paints, oils, thinners and other flammable items outside the building wherever possible. When necessary to store inside, store in approved containers when not in actual use during painting activity.

Take all necessary precautions to prevent fire hazards and spontaneous combustion.

Take precautions to protect the public and construction workers during the progress of the work.

Fire Extinguishers: Furnish temporary fire extinguishers of suitable chemicals and capacity, located at the storage area for painting and coating materials.

1.9 FIELD CONDITIONS

Do not apply materials when surface and ambient temperatures are outside the ranges required by the paint product manufacturer.

Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

Provide lighting level of 80 ft candles measured mid-height at substrate surface.

Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless directed otherwise by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

Paints, Primers, Block Fillers:

Benjamin Moore & Co. (BM): www.benjaminmoore.com.

PPG / Glidden Professional (Formerly ICI Paints): www.gliddenprofessional.com.

Kelly-Moore Paint Co., Inc. (KM): www.kellymoore.com.

Sherwin-Williams Company (SW): www.sherwin-williams.com.

Substitutions: See Section 016000 - Product Requirements.

Accessory materials such as linseed oil, turpentine and shellacs shall be first quality products of a reputable manufacturer.

2.2 PAINTS AND COATINGS - GENERAL

Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

Supply each coating material in quantity required to complete entire project's work from a single production run.
Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best suited for intended operating environment" by the manufacturer.

Volatile Organic Compound (VOC) Content:

Provide coatings that comply with the most stringent requirements specified in the following:

40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

Architectural coatings VOC limits of Texas.

Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.3 PAINT SYSTEMS - EXTERIOR

Ferrous Metal:

Primer: Alkyd resin base, rust inhibitive primer, white or off-white color, minimum 3 mils DFT.

A. BM P07-01 Universal Primer.

PPG / Glidden Professional; Devoe Coatings Devguard 4160 Multi-purpose Tank & Structural Primer.
KM #1711 Kel-Guard White Rust Inhibitive Primer.

Kwal / Comex UltraTech C309 Universal Water based primer.

Rust-Oleum 7400 Series High Solids Quick Dry Alkyd Primer.

SW Kem Kromik Universal Metal Primer #B50Z.

First Coat: Acrylic base first coat, minimum 1.3 mils DFT, available in manufacturer's full range of tinted colors.

BM 184 Super Spec Exterior Satin or BM 449 Ultra Spec Exterior Satin.

PPG / Glidden Professional FORTIS® 350Exterior Satin Paint 2402V.

KM #1250 Acry-Lustre Acrylic Semi-Gloss.

Kwal / Comex UltraTech C206 100% Acrylic semi-loss enamel.

Rust-Oleum Zinsser Perma White Exterior Mold & Mildew Semi Gloss Acrylic #3131.

SW A-100 Exterior Latex Satin House Paint #A82 series.

Top Coat: Acrylic base top coat, minimum 1.3 mils DFT, available in manufacturer's full range of tinted colors.

BM 184 Super Spec Exterior Satin or BM 449 Ultra Spec Exterior Satin.

PPG / Glidden Professional FORTIS® 350Exterior Satin Paint 2402V.

KM #1250 Acry-Lustre Acrylic Semi-Gloss.

Kwal / Comex UltraTech C206 100% Acrylic semi-loss enamel.

Rust-Oleum Zinsser Perma White Exterior Mold & Mildew Semi Gloss Acrylic #3131.

SW A-100 Exterior Latex Satin House Paint #A82 series. C. Galvanized Metal:

Primer: Acrylic based primer for galvanized surfaces, minimum 2.5 mils DFT.

BM P04-01 Acrylic Metal Primer.

PPG / Glidden Professional; Devoe Coatings Devguard 4160 Multi-purpose Tank & Structural Primer.

KM #1725 Kel-Guard Acrylic Metal Primer.

Kwal / Comex UltraTech C309 Universal Water based primer.

Rust-Oleum Zinsser Bulls Eye 123 WB Acrylic Primer #2001.

SW Pro Industrial Pro-Cryl Universal Acrylic Metal Primer #B66-310 Series.

First Coat: Acrylic base first coat, minimum 1.3 mils DFT, available in manufacturer's full range of tinted colors.

BM 184 Super Spec Exterior Satin or BM 449 Ultra Spec Exterior Satin.

PPG / Glidden Professional FORTIS® 350Exterior Satin Paint 2402V.

KM #1250 Acry-Lustre Acrylic Semi-Gloss.

Kwal / Comex UltraTech C206 100% Acrylic semi-loss enamel.

Rust-Oleum Zinsser Perma White Exterior Mold & Mildew Semi Gloss Acrylic #3131.

SW A-100 Exterior Latex Satin House Paint #A82 series.

Top Coat: Acrylic base top coat, minimum 1.3 mils DFT, available in manufacturer's full range of tinted colors.

BM 184 Super Spec Exterior Satin or BM 449 Ultra Spec Exterior Satin.

PPG / Glidden Professional FORTIS® 350Exterior Satin Paint 2402V.

KM #1250 Acry-Lustre Acrylic Semi-Gloss.

Kwal / Comex UltraTech C206 100% Acrylic semi-loss enamel.

Rust-Oleum Zinsser Perma White Exterior Mold & Mildew Semi Gloss Acrylic #3131.

SW A-100 Exterior Latex Satin House Paint #A82 series.

2.4 PAINT SYSTEMS - INTERIOR

Wood:

Primer: Alkyd Enamel undercoat, minimum 2 mils DFT.

BM C245-00 Super Spec Alkyd Undercoater.

PPG / Glidden Professional STAIN JAMMER® Alkyd Interior Primer Sealer 1110-1200.

KM #985 Flo-Cote Enamel Undercoater.

Kwal / Comex 9200 Accu-Pro Duo Prime Ext Alkyd Primer.

Rust-Oleum Zinsser Cover Stain Alkyd Primer #3501.

SW ProBlock Interior Oil-Based Primer #B79W8810.

First Coat: Vinyl Acrylic first coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.

PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Top Coat: Vinyl Acrylic top coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.
PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Gypsum Board:

Primer: Vinyl acrylic primer/ sealer, minimum 1.1 mils DFT.

BM 253 Super Spec Latex Enamel Undercoater Primer Sealer.

PPG / Glidden Professional PVA Wall Interior Primer Sealer 1030-1200N.

KM #970 Acry-Plex Hi-Hide Vinyl Wall Sealer.

Kwal / Comex UltraTech C152 Interior Latex Primer-Sealer.

Rust-Oleum Zinsser Drywall Primer #1501.

SW ProMar 200 Latex Wall Primer #BB28W8200 Series.

First Coat: Vinyl Acrylic first coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.

PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Top Coat: Vinyl Acrylic top coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.

PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Concrete / Concrete Block: (Only where indicated.)

Primer: Acrylic filler/ primer, minimum 8 mils DFT.

BM 206 Super Spec Interior Exterior High Build Block Filler.

PPG / Glidden Professional Concrete Coatings Block Filler Interior Exterior Primer 3010-1200.

KM #521 Acrylic Block Filler.

Kwal / Comex UltraTech C302 Int/Ext 100% Acrylic Block Filler.

Rust-Oleum Zinsser Water Tite LV Masonry & Concrete Coating #5051

SW PrepRite Interior/Exterior Latex Block Filler #B25W25.

First Coat: Vinyl Acrylic first coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.

PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Top Coat: Vinyl Acrylic top coat, minimum 1.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 276 Super Spec Interior Semi-Gloss Enamel or Ultra Spec N539 Semi-Gloss Enamel MPI # 43.
PPG / Glidden Professional; Ultra Hide 250 Interior Semi-Gloss Paint 1406N Series.

KM#1050 KM PROFESSIONAL Interior Acrylic Semi-Gloss Enamel.

Kwal / Comex UltraTech C119 Interior Latex semi-gloss.

Rust-Oleum Perma White Interior Mold & Mildew Semi Gloss Acrylic #2750.

SW ProMar 200 Zero VOC Interior Latex Semi-Gloss #B31W2600 series.

Metal:

Primer: Alkyd resin base, rust inhibitive primer, white or off-white color, minimum 3 mils DFT.

BM P07 Universal Primer.

PPG / Glidden Professional; Devoe Coatings Devguard 4160 Multi-Purpose Tank & Structural Primer.

KM #1711 Kel-Guard White Rust Inhibitive Primer.

Kwal / Comex UltraTech C309 Universal Water Based Metal Primer.

Rust-Oleum 7400 Series High Solids Quick Dry Alkyd Primer.

SW Kem Kromik Universal Metal Primer #B50Z.

First Coat: Polyamide Epoxy first coat, minimum 3 mils DFT, available in manufacturer's full range of tinted colors.

BM P36/P36-84 Super spec HP Polyamide Epoxy.

PPG / Glidden Professional; Devoe Coatings Tru-Glaze 4508 Chemical Resistant Epoxy Coating.

KM# 15 Chemical Mastic High Build Epoxy.

Kwal / Comex 3165 Accu-Guard Water Epoxy Polyamide.

Rust-Oleum 9100 Series Epoxy Mastic.

SW Tile-Clad High Solids Epoxy B62Z series.

Top Coat: Polyamide Epoxy top coat, minimum 3 mils DFT, available in manufacturer's full range of tinted colors.

BM P36/P36-84 Super spec HP Polyamide Epoxy.

PPG / Glidden Professional; Devoe Coatings Tru-Glaze 4508 Chemical Resistant Epoxy Coating.
KM# 15 Chemical Mastic High Build Epoxy.

Kwal / Comex 3165 Accu-Guard Water Epoxy Polyamide.

Rust-Oleum 9100 Series Epoxy Mastic.

SW Tile-Clad High Solids Epoxy B62Z series.

Galvanized Metal:

Primer: Acrylic based primer for galvanized surfaces, minimum 2.5 mils DFT.

BM P04 Acrylic Metal Primer.

PPG / Glidden Professional; Devoe Coatings Devguard 4160 Multi-Purpose Tank & Structural Primer.

KM #1725 Kel-Guard Acrylic Metal Primer.

Kwal / Comex UltraTech C309 Universal Water Based Metal Primer.

Rust-Oleum Zinsser Bulls Eye 123 WB Acrylic Primer #2001.

SW Pro-Cryl Universal Acrylic Metal Primer #B66-310 Series.

First Coat (acrylic): Acrylic epoxy first coat, minimum 2.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 256/256-84-86 Catalyzed Acrylic Epoxy or Corotech V-341 Pre Catalyzed Waterborne Acrylic Epoxy.

PPG / Glidden Professional; Devoe Coatings Tru-Glaze-WB 4428 Waterborne Epoxy Coating.

KM# 7100 ENVIRA-POXY Water Reducible Epoxy.

Kwal / Comex 3170 Accu-Pro WB Catalyzed Acrylic Epoxy.

Rust-Oleum 5300 Water Borne Catalyzed Epoxy.

SW Pre-Catalyzed WaterBased Epoxy #K40-150 Series.

Top Coat (acrylic): Acrylic epoxy top coat, minimum 2.5 mils DFT, available in manufacturer's full range of tinted colors.

BM 256/256-84-86 Catalyzed Acrylic Epoxy or Corotech V-341 Pre Catalyzed Waterborne Acrylic Epoxy.

PPG / Glidden Professional; Devoe Coatings Tru-Glaze-WB 4428 Waterborne Epoxy Coating.

KM# 7100 ENVIRA-POXY Water Reducible Epoxy.

Kwal / Comex 3170 Accu-Pro WB Catalyzed Acrylic Epoxy.

Rust-Oleum 5300 Water Borne Catalyzed Epoxy.

SW Pre-Catalyzed WaterBased Epoxy #K40-150 Series.

2.5 ACCESSORY MATERIALS

Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

Patching Material: Latex filler.

Fastener Head Cover Material: Latex filler.

Wood filler for transparent wood finishes.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify that surfaces are ready to receive work as instructed by the product manufacturer.

Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

Test shop-applied primer for compatibility with subsequent cover materials.

Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

Gypsum Wallboard: 12 percent.

Plaster and Stucco: 12 percent.

Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

Interior Wood: 15 percent, measured in accordance with ASTM D4442.

Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

Concrete Floors and Traffic Surfaces: 8 percent.

Beginning of coating application constitutes acceptance of surfaces and substrates.

3.2 PREPARATION

Clean surfaces thoroughly and correct defects prior to coating application.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

Seal surfaces that might cause bleed through or staining of topcoat.

Remove mildew from impervious surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

Concrete and Unit Masonry Surfaces to be painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

Gypsum Board Surfaces to be painted: Fill minor defects with filler compound. Spot prime defects after repair.

Plaster Surfaces to be painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

Asphalt, Creosote, or Bituminous Surfaces to be painted: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.

Insulated Coverings to be painted: Remove dirt, grease, and oil from canvas and cotton.

Concrete Floors and Traffic Surfaces to be painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry. Contractor optional: utilize diamond grinder or other suitable mechanical method to remove laitance to accept coating.

Aluminum Surfaces to be painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

Galvanized Surfaces to be painted: Remove surface contamination and oils and wash with solvent.

Uncorroded Uncoated Steel and Iron Surfaces to be painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Prime paint entire surface; spot prime after repairs.

Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

Metal Doors to be painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

Apply products in accordance with manufacturer's instructions.

Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

Apply each coat to uniform appearance, finish and thickness. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

Sand wood and metal surfaces lightly between coats to achieve required finish.

Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

Prime with primer paint the back surfaces and surfaces in contact with concrete or concrete block of interior and exterior woodwork scheduled to be painted.

Prime back surfaces and surfaces in contact with concrete or concrete block of interior woodwork scheduled to receive stain or varnish finish with glass varnish reduced 25 percent with mineral spirits.

Edges of coating adjoining other materials or colors shall be sharp and clean with no overlapping.

3.4 FIELD QUALITY CONTROL

See Section 01400 - Quality Control, for general requirements for field inspection.

3.5 CLEANING/TOUCH-UP

As Work proceeds, promptly remove coating where spilled, splashed, or spattered.

During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

Spot painting will be allowed to correct soiled or damaged paint surfaces only when touch-up spot will blend into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.

Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

Protect finished coatings until completion of project.

Touch-up damaged coatings after Substantial Completion.

3.7 SCHEDULE - SURFACES TO BE FINISHED

Do Not Paint or Finish the Following Items:

Items fully factory-finished unless specifically noted.

Fire rating labels, equipment serial number and capacity labels, equipment names, identification, performance rating or nomenclature plates. Repair or replace identification markings on all equipment when painted accidentally.

Stainless steel items.

Copper, bronze, chromium plate, nickel, Monel metal, lead, and lead-coated copper, except as otherwise specified or scheduled.
Face brick; prefinished wall materials, ceiling finish materials and floor coverings; items with factory applied final finish (except where exposed to view on roofs and in finished spaces).

Items within generally inaccessible areas such as elevator shafts; crawl spaces; chases; plenums above suspended ceilings.

Operating parts, including moving parts of operating equipment such as valve and damper operators, linkages, sensing devices, motor and fan shafts.

Paint the surfaces described below under Schedule - Paint Systems.

3.8 SCHEDULE - PAINT SYSTEMS

Interior Finishes:

Wood - Semi-gloss finish: one coat primer, two coats latex (or) alkyd semi-gloss enamel for a total of 5 mils DFT minimum.

Gypsum Board - Eggshell finish: one coat primer/sealer, one coat wall texture, two coats latex eggshell paint for a total of 5.2 mils DFT minimum.
Gypsum Board - Semi-Gloss finish (typical finish): one coat primer/sealer, one coat wall texture, two coats latex semi-gloss enamel for a total of 5.2 mils DFT minimum.

Gypsum Board - Epoxy finish (at all restrooms and other wet areas, and other areas scheduled): one coat primer/sealer, two coats polyamide epoxy enamel (or) acrylic epoxy enamel for a total of 7.2 (or) 6.2 mils DFT minimum.
Concrete, Plaster and Concrete Block Masonry - Semi-gloss finish (typical finish): one coat block filler, two coats latex (or) alkyd semi-gloss enamel for a total of 11 mils DFT minimum.
Concrete and Concrete Block Masonry - Epoxy finish (at all restrooms and other wet areas, and other areas scheduled): one coat block filler, two coats polyamide epoxy enamel (or) acrylic epoxy enamel for a total of 14.0 (or) 13.0 mils DFT minimum.

Metal Items - Semi-gloss finish (Hollow metal framing, doors, equipment, handrails, etc.): one coat metal primer, two coats alkyd semi-gloss enamel for a total of 6.0 mils DFT minimum.

Galvanized Metal Items - Semi-gloss finish (exposed mechanical items, etc.): one coat galvanized metal primer, two coats alkyd semi-gloss enamel for a total of 6.0 mils DFT minimum.

Exterior Finishes:

Ferrous Metal items - semi-gloss or gloss finish: one coat alkyd metal primer, two coats High Performance acrylic semi-gloss or gloss enamel for a total of 4.7 mils DFT minimum.

Galvanized Metal items - semi-gloss or gloss finish: one coat acrylic metal primer, two coats High Performance acrylic semi-gloss or gloss enamel for a total of 4.7 mils DFT minimum.

END OF SECTION

SECTION 09930 – STAIN WOOD INTERIOR AND EXTERIOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
   1. *Uniform General Conditions for Construction Contracts*, State of Texas, 2010 (UGC).
   2. The University of Houston's *Supplemental General Conditions and Special Conditions for Construction.*

1.2 SUMMARY

A. Section includes surface preparation and application of wood finishes**.**

   1. Exterior Substrates:
      a. Exposed wood panel products.

   2. Interior Substrates:
      a. Dressed lumber (finish carpentry).
      b. Exposed wood panel products.

1.3 DEFINITIONS

A. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

C. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. LEED Submittals (Projects authorized for LEED certification only):

   1. Product Data for Credit E Q 4.2: For interior stains and coatings, documentation including printed statement of VOC content.
   2. Laboratory Test Reports for Credit EQ 4: For interior stains and coatings, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Volatile

Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1. Submit Samples on representative samples of actual wood substrates, 8 inches square.
2. Label each Sample for location and application area.

E. Product List: For each product indicated, include the following:

1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Stains and Transparent Finishes: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg. F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg. F.

B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg. F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide product listed in other Part 2 articles for the category indicated.

2.2 MATERIALS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
3. Supply each coating material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
5. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior stains and finishes applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
2. Shellacs, Clear: VOC not more than 730 g/L.
3. Stains: VOC not more than 250 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.

D. Low-Emitting Materials: Interior stains and finishes shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Stain Colors: As selected by Architect from manufacturer's full range.

2.3 WOOD FILLERS

A. Wood Filler Paste: MPI #91.

2.4 PRIMERS AND SEALERS

A. Provide all primer, sealants, and coating products used in any individual system from the same manufacturer, no exceptions.

B. Primer, Latex for Exterior Wood: MPI #6.

2.5 STAINS

A. Provide all stain and varnish products used in any individual system from the same manufacturer, no exceptions.

B. Stain, Exterior, Water Based, Solid Hide: MPI #16.

C. Stain, for Exterior Wood Decks: MPI #33.

D. Stain, Semi-Transparent, for Interior Wood: MPI #90.

2.6 WATER-BASED VARNISHES

A. Varnish, Water Based, Clear, Satin (Gloss Level 4): MPI #128.

B. Varnish, Water Based, Clear, Semi-Gloss (Gloss Level 5): MPI #129.

C. Varnish, Water Based, Clear, Gloss (Gloss Level 6): MPI #130.

2.7 POLYURETHANE VARNISHES

A. Varnish, Polyurethane, Moisture-Cured, Gloss (Gloss Level 6): MPI #31.

B. Varnish, Aliphatic Polyurethane, Two-Component (Gloss Level 6 or 7): MPI #78.

2.8 OIL FINISH

A. Danish Oil: MPI #92.

2.9 SOURCE QUALITY CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

C. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with finish application only after unsatisfactory conditions have been corrected.

1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Exterior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Prime edges, ends, faces, undersides, and backsides of wood.

a. For solid hide stained wood, stain edges and ends after priming.
b. For varnish coated stained wood, stain edges and ends and prime with varnish. Prime undersides and backsides with varnish.

3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final color. Sand smooth when dried.

E. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces that will be exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for finish and substrate indicated.
2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood substrates, non-traffic surfaces, including wood trim architectural woodwork doors wood-based panel products glued-laminated construction exposed joists exposed beams.

1. Solid Hide, Water-Based Stain System:
    a. Prime Coat: Primer, oil for exterior wood, MPI #7.
    b. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

2. Solid Hide, Water-Based Stain System:

    a. Prime Coat: Primer, latex for exterior wood, MPI #6.
    b. Prime Coat: Primer, alkyd for exterior wood [**, MPI #5**].
    c. Prime Coat: Primer, oil for exterior wood [**, MPI #7**].
    d. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
    e. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

3. Semitransparent Stain System:

    a. Prime Coat: Stain, exterior, solvent based, semi-transparent, matching topcoat.
    b. Topcoat: Stain, exterior, solvent based, semi-transparent, MPI #13.

4. Varnish over Semitransparent Stain System:

    a. Stain Coat: Stain, exterior, solvent based, semi-transparent, MPI #13.
    b. First Intermediate Coat: Varnish matching topcoat.
    c. Second Intermediate Coat: Varnish matching topcoat.
    d. Topcoat: Varnish, with UV Inhibitor, Exterior, Semi-Gloss (Gloss Level 5), MPI #30.

5. Varnish System:

    a. Prime Coat: Varnish matching topcoat.
    b. First Intermediate Coat: Varnish matching topcoat.

c. Second Intermediate Coat: Varnish matching topcoat.
d. Topcoat: Varnish, with UV Inhibitor, Exterior, Semi-Gloss (Gloss Level 5), MPI #30.

6. Clear, Two-Component Polyurethane Varnish over Stain System:

a. Stain Coat: Stain, exterior, solvent based, semi-transparent, MPI #13.
b. First Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
c. Second Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
d. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7), MPI #78.

7. Clear, Two-Component Polyurethane Varnish System:

a. Prime Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
b. Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
c. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7), MPI #78.

B. Wood substrates, traffic surfaces, including wood decks and stairs.

1. Deck Stain over Wood Preservative System:

a. Preservative Coat: Preservative, for exterior wood, MPI #37.
b. Intermediate Coat: Stain, for exterior wood decks, matching topcoat.
c. Top coat: Stain, for exterior wood decks, MPI #33.

2. Deck Stain System:

a. Prime Coat: Stain, for exterior wood decks, matching topcoat.
b. Top coat: Stain, for exterior wood decks, MPI #33.

3.6 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood substrates, non-traffic surfaces, including wood trim architectural woodwork doors windows wood-based panel products glued-laminated construction exposed joists exposed beams.

1. Solid-Color Latex Stain System:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.
b. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
c. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

2. Solid-Color Latex Stain System:

    a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
    b. Prime Coat: Primer, oil for exterior wood, MPI #7.
    c. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
    d. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

3. Semitransparent Stain System:

    a. Prime Coat: Stain, semi-transparent, matching topcoat.
    b. Topcoat: Stain, semi-transparent, for interior wood, MPI #90.

4. Semitransparent Stain System:

    a. Prime Coat: Stain, exterior, solvent based, semi-transparent, matching topcoat.
    b. Topcoat: Stain, exterior, solvent based, semi-transparent, MPI #13.

5. Water-Based Varnish over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Water-based varnish matching topcoat.
    c. Second Intermediate Coat: Water-based varnish matching topcoat.
    d. Topcoat: Varnish, water based, clear, satin (Gloss Level 4), MPI #128.

6. Water-Based Varnish System:

    a. Prime Coat: Water-based varnish matching topcoat.
    b. Intermediate Coat: Water-based varnish matching topcoat.
    c. Topcoat: Varnish, water based, clear, satin (Gloss Level 4), MPI #128.

7. Polyurethane Varnish over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Polyurethane varnish matching topcoat.
    c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
    d. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (Gloss Level 4), MPI #57.

8. Polyurethane Varnish System:

    a. Prime Coat: Polyurethane varnish matching topcoat.
    b. Intermediate Coat: Polyurethane varnish matching topcoat.
    c. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (Gloss Level 4), MPI #57.

9. Moisture-Cured Clear Polyurethane over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Moisture-cured polyurethane matching topcoat.

c. Second Intermediate Coat: Moisture-cured polyurethane matching topcoat.
d. Topcoat: Varnish, polyurethane, moisture-cured, gloss (Gloss Level 6), MPI #31.

10. Moisture-Cured Clear Polyurethane System:

a. Prime Coat: Moisture-cured polyurethane matching topcoat.
b. Intermediate Coat: Moisture-cured polyurethane matching topcoat.
c. Topcoat: Varnish, polyurethane, moisture-cured, gloss (Gloss Level 6), MPI #31.

11. Clear, Two-Component Polyurethane System:

a. Prime Coat: Two-component polyurethane matching topcoat.
b. Intermediate Coat: Two-component polyurethane matching topcoat.
c. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or Gloss Level 7), MPI #78.

12. Danish Oil System:

a. Prime Coat: Danish oil, MPI #92.
b. Topcoat: Danish oil, MPI #92.

END OF SECTION

SECTION 16050 - ELECTRICAL GENERAL NOTES AND SPECIFICATIONS

PART 1 - GENERAL:

A. CONTRACTOR SHALL PROVIDE ALL NECESSARY MATERIALS, LABOR, TOOLS, TRANSPORTATION, SUPERINTENDENCE AND RELATED ITEMS TO INSTALL A COMPLETE AND FULLY OPERATIVE INTERIOR AND EXTERIOR ELECTRICAL SYSTEM AS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS AND ELSEWHERE REQUIRED.

B. ALL OUTLETS, FIXTURES AND EQUIPMENTS SHALL BE FULLY CONNECTED TO PROPER SOURCES OF POWER SUPPLY AND LEFT READY FOR USE.

C. PROVIDE ALL EXCAVATION AND TAMP-BACKFILL AS REQUIRED TO COMPLETE WORK. CORRECT ANY SETTLING DURING GUARANTEE PERIOD TO OWNER'S SATISFACTION.

D. PROVIDE ALL NECESSARY CUTTING AND PATCHING AS REQUIRED TO COMPLETE WORK. PATCHING SHALL BE DONE BY MECHANICS SKILLED AT THEIR WORK. ALL OPENINGS SHALL BE FILLED AND PATCHED TO CONFORM TO FIRE REGULATIONS.

E. COOPERATE WITH OTHER TRADES: MAKE KNOWN TO OTHER TRADES ARRANGEMENT OF ELECTRICAL WORK AND EXAMINE WORK OF OTHER TRADES TO AVOID CONFLICTS. EXAMINE DRAWINGS OF OTHER TRADES TO DETERMINE EXACT EQUIPMENT LOCATIONS OF POWER REQUIREMENTS AND CONTROLS. EXAMINE MANUFACTURERS' SHOP DRAWINGS TO DETERMINE ROUGHING-IN REQUIREMENTS.

F. PERMITS, FEES & CODES. PAY ALL COST FOR PERMITS, FEES AND INSPECTIONS REQUIRED BY AUTHORIZED AGENCIES HAVING JURISDICTION OVER ELECTRICAL WORK ELECTRICAL SYSTEM SHALL CONFORM TO REQUIREMENTS OF THE MOST CURRENT NATIONAL, STATE AND LOCAL ELECTRIC CODES, LOCAL AUTHORITIES AND UTILITY COMPANY.

G. ALL ELECTRICAL MATERIALS SHALL BE NEW, LISTED AND LABELED BY UL AND SHALL CONFORM TO INDUSTRY STANDARDS, PARTICULARLY NEMA, NFPA, N.E.C. & OTHERS.

H. PROVIDE TYPEWRITTEN DIRECTORIES IN PANEL BOARD WITH CLEAR PLASTIC SHIELD. PROVIDE ENGRAVED PLASTIC LOAD NAMEPLATES ON ALL DISCONNECT SWITCHES, MOTOR STARTERS AND CONTROL DEVICES.

I. TESTS: ENTIRE ELECTRICAL SYSTEM SHALL BE FULLY TESTED AND CORRECTED OF ANY SHORT CIRCUITS, OPEN GROUNDS, FAULTY WIRING AND INCORRECT CONNECTIONS.

J. GUARANTEE: COMPLETE ELECTRICAL SYSTEM INCLUDING ALL MATERIALS, EQUIPMENT AND LABOR SHALL BE GUARANTEED FOR A: PERIOD OF ONE YEAR BEGINNING WITH DATE OF ACCEPTANCE OF BUILDING BY OWNER.

K. EACH BIDDER SHALL, BEFORE SUBMITTING A PROPOSAL, VISIT AND EXAMINE THE SITE IN ACCORDANCE WITH DIVISION 1 TO SATISFY HIMSELF AS TO MATERIALS AND SCOPE OF THE NEW CONSTRUCTION AND ANY DIFFICULTY ATTENDING THE PERFORMANCE OF THE WORK.

L. THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. CLAIMS MADE SUBSEQUENT TO THE TIME OF SUBMISSION OF THE PROPOSAL FOR LABOR, EQUIPMENT AND MATERIAL REQUIRED FOR DIFFICULTIES ENCOUNTER, WHICH COULD HAVE BEEN FORESEEN HAD AN EXAMINATION BEEN MADE, WILL NOT BE RECOGNIZED.

M. WORKMANSHIP: ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN NEAT, WORKMANLIKE MANNER. UNSIGHTLY INSTALLATIONS SHALL BE REMOVED OR REWORKED AT NO ADDITIONAL EXPENSE TO THE OWNER.

END OF SECTION

SECTION 16121 - ELECTRICAL BASIC MATERIALS AND METHODS

PART 1 - GENERAL:

A. SECTION 16A APPLIES TO ALL WORKS HEREUNDER AND SHALL INCLUDE CONDUIT, BOXES, WIRE, WIRING DEVICES, LIGHTING FIXTURES AND RELATED MATERIALS.

2. CONDUIT:

A. CONNECTIONS TO EQUIPMENT, WHICH SHALL BE MADE WITH THREE FEET FLEXIBLE LIQUID-TIGHT CONDUIT WITH LIQUID-TIGHT CONNECTORS.

B. CONNECTIONS TO RECESSED LIGHTING FIXTURES SHALL BE MADE WITH SIX FEET OF FLEXIBLE CONDUIT FROM A JUNCTION BOX. LOCATE JUNCTION BOX TO PREVENT RELOCATION OF THE LIGHT FIXTURE.

C. INTERMEDIATE GRADE CONDUIT WITH THREADED FITTING

D. SHALL BE PROVIDED IN SLAB-ON-GRADE, OUTSIDE BUILDING, BURIAL BELOW GRADE AND IN WET LOCATIONS.

E. ALL OTHER CONDUIT SHALL BE ELECTRIC METALLIC TUBING WITH COMPRESSION TYPE FITTINGS. EXCEPT EXTERIOR EXPOSED CONDUIT SHALL BE RIGID GALVANIZED CONDUIT.

3. BOXES:

A. CONCEALED BOXES SHALL BE 4-INCH SQUARE GALVANIZED STEEL WITH GALVANIZED EXTENSION RINGS, TOTAL DEPTH OF NOT LESS THAN 2-1/2 INCHES.

B. SURFACE MOUNTED BOXES SHALL BE PRESSED GALVANIZED STEEL, UTILITY TYPE.

C. GANGABLE SECTIONAL SWITCH BOXES ARE SPECIFICALLY NOT ALLOWED.

4. WIRE & CABLE (600V AND LESS):

A. THE WIRE MEETING REQUIREMENTS BELOW SHALL BE SUITABLE FOR SECONDARY POWER AND LIGHT CIRCUITS AND CONTROL CIRCUITS WITHIN THE LIMITATIONS OF THESE SPECIFICATIONS.

B. INSULATED WIRE NO. 8 AWG AND LARGER SHALL BE STRANDED.

C. ALL WIRE SHALL BE BROUGHT TO THE JOB IN UNBROKEN PACKAGES, AND SHALL BEAR THE DATE OF MANUFACTURING AND SHALL NOT BE OLDER THAN TWELVE MONTHS.

D. TYPE OF WIRE SHALL BE AS FOLLOWS:

1. UNLESS OTHERWISE SPECIFIED OR INDICATED OTHERWISE ON DRAWINGS, ALL #12 AND #10 WIRE SHALL BE THHN AND ALL WIRE #8 AND LARGER SHALL BE THHN-THWN TYPE.

2. WIRING ADJACENT TO HEAT PRODUCING EQUIPMENT SHALL BE TYPE AVA.

3. NO WIRE SMALLER THAN #12 GAUGE SHALL BE USED, EXCEPT FOR SIGNAL OR CONTROL SYSTEMS OR WHERE OTHERWISE INDICATED. WIRE SHALL BE COPPER, 600 VOLT MINIMUM RATING, EXCEPT FOR SPECIAL SYSTEMS.

4. UNLESS NOTED OTHERWISE, ALL CONDUCTORS SHALL BE SOFT DRAWN COPPER CONFORMING TO THE LATEST ASTM SPECIFICATIONS AND THE LATEST REQUIREMENTS OF NEC. UNLESS OTHERWISE NOTED OR SPECIFIED, ALL INSULATION SHALL BE RATED 600 VOLT.

5. ALL WIRE SHALL BE AS MANUFACTURED BY GENERAL CABLE CO., PHELPS DODGE, ANACONDA, OR A CABLE EQUIVALENT.

6. ALL WIRE SHALL BE INSTALLED IN CONDUIT ANDCOLOR-CODED. ALL WIRE SHALL BE 98% CONDUCTIVE COPPER, RATED FOR MAXIMUM OF 600 VOLTS.

7. WIRE CONNECTORS: WIRE CONNECTORS FOR SIZED #10 AWG AND LESS SHALL BE "PRESS-SNURE", IDEAL "WRAP-CAP", T&B "STAKONS" OR 3M "SCOTCHLOK". CONNECTORS FOR WIRE SIZE #8 AND LARGER SHALL BE T&B OR BURNDY METHODS USING HYDRAULIC PRESSES.

5. ELECTRIC TAPE SHALL BE JOHNS-MANVILLE "DUTCH-BRAND" 3M," SCOTCH BRANCH," OR PLYMOUTH "SLIPKNOT BRAND".

6. WALL SWITCHES SHALL BE AS FOLLOWS OR APPROVED EQUAL WITH COLOR AS DIRECTED BY ARCHITECT:

   A. 20A, SP, 125/277V. HUBBELL #1221.

   B. 20A; 3W, 125/277V. HUBBELL #1223.

   C. 20A, 4W, 125/277V. HUBBELL #1224.

   D. 20A, SP, 125/277V. WITH PILOT LIGHT -HUBBELL #1221-PL

   E. 20A, SP, 125/277V. WEATHERPROOF - HUBBELL #1281/1795.

   F. 20A, SP, 125/277V KEYED SWITCH, HUBBELL #1221-L

7. RECEPTACLES SHALL BE AS FOLLOWS OR APPROVED EQUAL. PROVIDE OTHER RECEPTACLES AS INDICATED ON THE DRAWINGS.

   A. 20A, 125V, DUPLEX - HUBBELL #5362 (I)

B. 20A, 250V, 2W+G - HUBBELL #5461

C. 50A, 250V, 3W+G - ARROW-HART #5700, BRYANT #9630FR OR P & S #5950.

D. GROUND FAULT (20A/125V) - HUBBELL #GF.-5362. PROVIDE SPRING LOADED WEATHERPROOF WHILE IN USE COVERS WHERE INDICATED.

E. CLOCK AND SIGN HANGER - ARROW-HART #5708, BRYANT #2828-GS OR HUBBELL.

8. PLATES: PROVIDE FACEPLATES FOR ALL DEVICES INCLUDING WALL SWITCHES, RECEPTACLES, TELEPHONE OUTLETS AND ALL WALL OUTLETS. FACE PLATES SHALL BE SATIN FINISHED STAINLESS STEEL IN ALL FOOD PREPARATION AREAS, BAR, RESTROOMS, OFFICES AND COMMERCIAL GRADE SMOOTH UNBREAKABLE PLASTIC IN LOBBY/DINING, COLOR TO MATCH DEVICES AND WALLS.

9. LIGHT FIXTURES SHALL BE AS SCHEDULED ON DRAWINGS AND CONTRACTOR SHALL INSTALL ALL LIGHTING FIXTURES. ALL RECESSED LIGHTING FIXTURES SHALL BE THERMALLY PROTECTED AS REQUIRED BY CODE.

10. LAMPS:

A. CONTRACTOR SHALL FURNISH AND INSTALL ONE COMPLETE SET OF LAMPS FOR ALL LIGHTING FIXTURES PROVIDE LABEL IN EACH FIXTURE INDICATING SIZE AND TYPE OF LAMP CORRESPONDING WITH SCHEDULE ON DRAWING. SIZE SHALL BE WORKED “MAXIMUM WATTAGE”.

B. FLUORESCENT LAMPS SHALL BE STANDARD COOL WHITE, ENERGY EFFICIENT, MANUFACTURED BY GENERAL

C. ELECTRIC WATT MISER II UNLESS NOTED OTHERWISE.

D. INCANDESCENT LAMPS SHALL BE INSIDE FROSTED WITH 2500 HOUR LAMP LIFE RATED 130 VOLTS.

11. FLUORESCENT BALLASTS SHALL BE ELECTRONIC, ENERGY EFFICIENT, MANUFACTURED BY GENERAL ELECTRIC, MAXI-MISER II. CLASS “P” OR APPROVED EQUAL.

12. RACEWAY SYSTEM

A. ALL WIRE SHALL BE (INSTALLED IN A METAL RACEWAY AND SHALL BE) CONCEALED WHERE POSSIBLE. WHERE NECESSARY TO EXPOSE THE WIRING THE RACEWAY SHALL BE INSTALLED AS INCONSPICUOUSLY AS POSSIBLE AND IN STRAIGHT LINES WITH 90-

DEGREE BENDS, PARALLEL WITH BUILDING LINES. SQUARE RACEWAYS, REAM SMOOTH AND MAKE-UP TIGHT. PLUG ENDS OF RACEWAYS FURRING CONSTRUCTION AND SWAB CLEAN BEFORE PULLING WIRE OR CABLE. SUPPORT RACEWAYS FROM BUILDING STRUCTURE MEMBERS ONLY WITH APPROVED FASTENERS DESIGNED FOR THE PURPOSE.

B. RACEWAY SYSTEM SHALL BE INSTALLED TO MAINTAIN THE MAXIMUM HEADROOM WITH REQUIRED SUPPORTS FOR THE LOAD. ALL ANCHORS, STRAPS AND CLIPS SHALL BE THE TYPE DESIGNED FOR THE PURPOSE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. COMMON SUPPORTS MAY BE USED FOR MECHANICAL AND ELECTRICAL EQUIPMENT BY COORDINATING THE WORK WITH ALL TRADES.

C. ALL ELECTRICAL BOXES SHALL BE SUPPORTED FROM BUILDING STRUCTURAL MEMBERS INDEPENDENTLY OF THE CONDUIT RACEWAYS, MECHANICAL SYSTEMS OR SUSPENDED CEILING SUPPORTS. RECESSED BOXES SHALL BE FLUSH WITH SURROUNDING SURFACE. ALL BOXES AND CABINETS SHALL BE PROTECTED DURING CONSTRUCTION AND SHALL BE CLEANED BEFORE PULLING WIRE AND INSTALLING DEVICES.

D. SIZE OF CONDUIT SHALL NOT BE LESS THAN 3/4" AND NOT LESS THAN REQUIRED BY THE NATIONAL ELECTRICAL CODE.

13. WIRE: USE ONLY APPROVED TYPE WIRE-PULLING LUBRICANTS FOR WIRE PULLS. SPLICE WIRE ONLY IN ACCESSIBLE AND UL APPROVED JUNCTION BOXES. MAKE WIRE JOINTS MECHANICALLY STRONG BEFORE APPLYING THE CONNECTOR AND WHERE TAPE IS USED, WRAP EACH JOINT TO THE THICKNESS OF THE ORIGINAL INSULATION. CLEAN AND POLISH METALLIC SURFACES BEFORE INSTALLING CONDUCTORS. APPLY PRESSURE TYPE LUGS ON STRANDED CONDUCTORS CONNECTED TO SCREW OR BOLT TYPE CONNECTIONS

14. WIRING DEVICES: UNLESS NOTED OTHERWISE, RECEPTACLES SHALL BE INSTALLED 18" ABOVE THE FINISHED FLOOR, SWITCHES SHALL BE 48" AND CLOCK HANGERS 8'-0", RECEPTACLES NOTED ABOVE WORK COUNTERS AND CABINETS (AC) SHALL BE MOUNTED ABOVE THE BACKSPLASH. WEATHERPROOF RECEPTACLE COVERS SHALL BE WEATHERPROOF WHILE IN USE. PROVIDE A BONDING JUMPER BETWEEN THE BOX AND ALL RECEPTACLES.

15. EQUIPMENT CONNECTIONS: PROVIDE ALL NECESSARY MOTOR STARTERS (VERIFY HOOD FANS WITH SUPPLIER), DISCONNECT SWITCHES, CONTROLS, CONDUIT, BOXES, WIRE, ETC. AND CONNECT COMPLETE TO EACH PIECE OF EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS INDICATED .ON THE DRAWINGS. WHERE EQUIPMENT RATINGS DIFFERENT FROM THAT INDICATED, CONSULT OWNER. CONSULT WITH EQUIPMENT SUPPLIER TO DETERMINE ROUGH-IN REQUIREMENTS. WHERE EQUIPMENT IS NOTED AS FUTURE, TERMINATE CIRCUIT IN JUNCTION BOX AND INSTALL SPRING WIRE NUTS ON THE ENDS OF THE CONDUCTORS.

16. LIGHTING FIXTURES:

A. PROVIDE ALL NECESSARY MOUNTING HARDWARE AND RELATED ITEMS TO PROPERLY INSTALL THE LIGHTING FIXTURES. FIXTURES SUPPORTED IN EXPOSED OR CONCEALED GRID CEILINGS SHALL BE PROVIDED WITH CLIPS. FIXTURES MOUNTED IN OR ON TILE

CEILINGS SHALL BE ALIGNED WITH TILES. LIGHTING FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURAL MEMBERS EXCEPT FOR EXPOSED GRID CEILINGS WHERE A CEILING SUPPORTING WIRE SHALL BE PROVIDED AT EACH FIXTURE CORNER. DO NOT USE CEILING GRID CEILING SUPPORT WIRES FOR STRAPPING OR SUPPORT.

17. CLEANING: ALL EQUIPMENT INCLUDING PANELBOARDS, SWITCHES, WIRING DEVICES, LIGHTING FIXTURES, WALL PLATES, ETC. SHALL BE FREE OF CORROSION, DIRT, PAINT SPLATTER OR DAMAGE OF ANY SORT AT FINAL ACCEPTANCE OF THE WORK. CONTRACTOR SHALL CLEAN, REPAIR OR REPLACE SAME AS INSTRUCTED BY THE OWNER BEFORE FINAL PAYMENT.

18. POWER AND LIGHTING PANELS:

A. THE SERVICE ENTRANCE EQUIPMENT SHALL BE UL LISTED AND LABELED FOR THAT APPLICATION. BUSSING SHALL BE ALUMINUM, TIN-PLATED. BRACE BUSSING FOR 65,000 A.I.C. UNLESS NOTED OTHERWISE ON THE CONTRACT DRAWINGS.

B. LIGHTING AND POWER PANELBOARDS SHALL HAVE LOCKING DOOR AND FLUSH TRIM. BUSSING SHALL BE ALUMINUM, WITH BRACING TO SUIT INTERRUPTING RATING.

C. BREAKERS SHALL BE INDIVIDUAL MOLDED CASE, BOLT-IN STYLE, SIZED AS SCHEDULED. TWO POLE AND THREE POLE BREAKERS SHALL BE COMMON TRIP SINGLE POLE UNITS WITH HANDLETIES ARE NOT ACCEPTABLE.

D. PANELS SHALL BE CURB MOUNTED AS SHOWN ON PLANS.

E. CONTRACTOR TO VERIFY AVAILABLE FAULT CURRENT WITH UTILITY COMPANY FOR PROPER PANEL ASYMMETRICAL INTERRUPTING RATINGS. SUBMIT THIS INFORMATION WITH SHOP DRAWINGS AND PANELS, ALONG WITH LETTER FROM POWER COMPANY.

F. METER, C.T, CABINET, SERVICE CONDUCTORS AND CONDUIT, TRANSFORMER, ETC., SHALL BE PER LOCAL UTILITY REQUIREMENTS. COORDINATE SERVICE INSTALLATION WITH LOCAL UTILITY COMPANY, PROVIDING ALL NEEDED EQUIPMENT AND LABOR.

19. LIGHTING CONTROLS: FURNISH AS NOTED ON ELECTRICAL PLANS. UL LISTED.

20. GROUNDING:

A. EQUIPMENT GROUNDING

1. THE EQUIPMENT GROUNDING SYSTEM SHALL BE SUCH THAT ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS, JUNCTION BOXES, OUTLET BOXES, CABINETS, MACHINE FRAMES, PORTABLE EQUIPMENT AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH

ELECTRICAL CIRCUITS OPERATE CONTINUOUSLY AT GROUND POTENTIAL AND PROVIDE A LOW IMPEDANCE PATH FOR POSSIBLE GROUND FAULT CURRENTS.

2. WIREWAYS, SWITCHGEAR, PANELBOARDS AND MOTOR CONTROL PANELS SHALL BE PROVIDED WITH AN EQUIPMENT GROUND BUS (INCLUDING LUG OR SCREW TERMINALS) SECURELY BONDED TO THE ENCLOSURE. JUNCTION BOXES AND OTHER ENCLOSURES (SIZES ABOVE 5"X5" SHALL UTILIZE AN EQUIPMENT GROUND BUS OR LUG AS REQUIRED TO SECURELY BOND THE EQUIPMENT GROUND CONDUCTOR TO THE ENCLOSURE.

3. ALL BRANCH CIRCUITS FOR POWER AND LIGHT SHALL INCLUDE A GREEN INSULATED GROUNDING CONDUCTOR. THE EQUIPMENT GROUND CONDUCTOR SHALL BE ELECTRICALLY AND MECHANICALLY CONTINUOUS FROM THE SOURCE OF SUPPLY TO THE EQUIPMENT TO BE GROUNDED.

4. LIGHTING FIXTURES SHALL BE SECURELY CONNECTED TO THE EQUIPMENT GROUND CONDUCTOR.

5. MOTORS SHALL BE CONNECTED TO THE EQUIPMENT GROUND CONDUCTOR WITH A CONDUIT GROUNDING BUSHING AND WITH A BOLTED SOLDERLESS LUG CONNECTION ON THE METAL FRAME. BOLTS, NUTS AND WASHERS SHALL BE BRONZE, CADMIUM PLATED STEEL, OR OTHER NON-CORROSIVE MATERIAL.

6. ALL CONDUIT SHALL BE CONNECTED TO THE EQUIPMENT GROUND BUS BY MEANS OF A GROUNDING BUSHING,

7. E.C. SHALL COORDINATE WITH CASH REGISTER SYSTEM SUPPLIER TO CLARIFY ANY GROUNDING AND/OR WIRING REQUIREMENTS.

B. SYSTEM GROUND

1. THE SERVICE NEUTRAL SHALL BE SOLIDLY BONDED TO THE GROUNDING ELECTRODE AT THE SERVICE, WATERLINE, BUILDING STEEL AND FOOTER REBAR. IN COMPIANCE WITH N.E.C. ARTICAL 250.

21. INSTALLATION:

A. ALL GROUNDING CONDUCTORS SHALL BE SIZED AS PER THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.

B. GROUND RODS: GROUND RODS SHALL BE THE COPPER CLAD STEEL TYPE END SHALL BE A MINIMUM OF 8 FEET IN LENGTH AND 3/4 INCH IN DIAMETER. GROUND RODS SHALL BE AS MANUFACTURED BY COPPERWELD STEEL COMPANY, OR AND ACCEPTABLE EQUIVALENT.

C. GROUNDING ELECTRODE CONDUCTORS SHALL BE STRANDED COPPER. EQUIPMENT GROUND WIRE SHALL B THW INSULATED AND SHALL BE GREEN IN COLOR.

D. CONNECTIONS TO WATER SERVICE SHALL BE MADE WITH SUITABLE GROUND CLAMP OF LUG CONNECTION AHEAD OF THE BUILDING METER OR CUTOFF VALVE. VERIFY THE

EXISTENCE AND BURIAL OF 10' OF COPPER WATER PIPE AHEAD OF AND AFTER THE WATER METER. OTHERWISE, PROVIDE UFER GROUND PER NEC.

E. CONNECTIONS TO GROUND RODS SHALL BE MADE BY AN EXOTHERMAL WELD.

F. GROUNDING CABLES EMBEDDED IN THE FLOOR SHALL BE MADE IN RIGID CONDUIT.

G. GROUND RODS SHALL BE DRIVEN FULL LENGTH DIAGONALLY INTO THE EARTH AND HAVE A ONE (1) FOOT MINIMUM COVER.

H. ALL CONDUCTOR CONNECTIONS SHALL BE MADE UP TIGHT TO PROVIDE CONTINUITY OF METALLIC GROUND

I. GROUND WIRES NOT IN CONDUIT SHALL BE SUPPORTED EVERY FIVE (5) FEET.

22. TEST:

A. THE CONTRACTOR SHALL RUN A GROUND RESISTANCE TEST AND IF THE RESISTANCE TO GROUND IS GREATER THAN 25 OHMS, ADDITIONAL GROUND RODS SHALL BE INSTALLED. THE TEST SHALL NOT BE MADE WITHIN FIVE (5) DAYS AFTER A RAIN.

B. THE CONTRACTOR SHALL PROVIDE OWNER WITH A COPY OF THE TEST PROCEDURE AND RESULTS OF THE TEST.

C. THE GROUND TEST SHALL BE MEASURED IN THE PRESENCE OF AN AUTHORIZED REPRESENTATIVE OF THE ARCHITECT. NO EQUIPMENT SHALL BE OPERATED UNTIL GROUND POTENTIAL IS VERIFIED.

23. WORKMANSHIP:

A. ALL WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THEIR TRADES AND SHALL BE TYPICAL OF THE BEST TRADE PRACTICES.

END OF SECTION

SECTION 16163 - SERVICE AND DISTRIBUTION

1. GENERAL

A. SCOPE: SECTION APPLIES TO ALL WORKS HEREUNDER AND SHALL INCLUDE SERVICE, METERING AND DISTRIBUTION.

B. SERVICE: THE ELECTRICAL DISTRIBUTION IS SIZED AS INDICATED ON THE ELECTRICAL PLANS. CONTRACTOR SHALL VERIFY SERVICE VOLTAGE WITH UTILITY COMPANY AND PROVIDE NECESSARY REVISIONS AND MODIFICATIONS REQUIRED. ELECTRICAL CONTRACTOR IS TO REFER TO THE POWER RISER DIAGRAM FOR FURTHER INFORMATION.

C. METERING: CONTRACTOR SHALL PROVIDE MODIFICATIONS NECESSARY METERING FACILITIES INCLUDING METER SOCKET, CURRENT TRANSFORMER CABINET, CONDUIT AND OTHER WORK FOR METERING REQUIRED BY THE LOCAL UTILITY COMPANY.

2. MATERIALS

A. DISCONNECT SWITCHES: SHALL BE (HEAVY-DUTY TYPE, NEMA HD) FUSED UNLESS NOTED OTHERWISE, DESIGNED TO ACCEPT ONLY REJECTION TYPE FUSES AND OPERATOR INTERLOCKED WITH THE DOOR IN THE "OFF" POSITION. SWITCHES SHALL BE MANUFACTURED BY GENERAL ELECTRIC, SQUARE D OR CUTLER-HAMMER.

B. FUSES: SHALL BE CURRENT LIMITING WITH 200,000 AMPERES INTERRUPTING CAPACITY, UL INC. CLASS RK1 AND SHALL BE DUAL ELEMENT, TIME DELAY, CLASS R REJECTION TYPE. ONE SET OF SPARE FUSES SHALL BE PROVIDED FOR EACH SIZE AND MOUNTED IN "SPARE FUSE CABINET" LOCATED AT THE SERVICE ENTRANCE. FUSE IDENTIFICATION LABELS SHALL BE MANUFACTURED BY BUSSMAN OR SHAWMUT.

3. EXECUTION

A. DISCONNECT SWITCHES SHALL BE INSTALLED 4'-0”' ABOVE FINISHED FLOOR. ALL CABINETS SHALL BE VACUUM CLEANED BEFORE PULLING WIRE.

4. INSTALLATION OF EQUIPMENT AND FIXTURES

A. INSTALL ALL EQUIPMENT AND FIXTURES FORMING PART OF THE WORK OF THIS SECTION IN -COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ALL PERTINENT CODES AND REGULATIONS. MAKE ALL FINAL CONNECTIONS TO BAR AND KITCHEN EQUIPMENT.

5. LAMPING

A. LAMP ALL FIXTURES WITH LAMPS OF THE DESIGNED RATING AND PATTERN.

6. TESTING

A. GENERAL: UPON COMPLETION OF THIS PORTION AT THE WORK, FURNISH ALL EQUIPMENT AND PERSONNEL AND CONDUCT ALL TEST REQUIRED TO SECURE APPROVAL OF THE INSTALLATION FROM ALL AGENCIES HAVING JURISDICTION.

B. CRITERIA:

1. ALL SYSTEMS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS SHALL BE FREE FROM MECHANICAL AND ELECTRICAL DEFECTS AND SHALL SHOW AN INSULATION RESISTANCE BETWEEN PHASE CONDUCTORS AND GROUND OF NOT LESS THON THAT REQUIRED BY THE NATIONAL ELECTRICAL CODE.
2. ALL SYSTEMS SHALL SHOW PROPER NEUTRAL CONNECTIONS.

7. CLEANING UP

A. ALL EQUIPMENT AND EXPOSED SURFACES SHALL BE LEFT SMOOTH AND CLEAN. ALL PLATE WORK SHALL BE POLISHED AND THE ENTIRE PREMISES SHALL BE CLEANED OF UNUSED MATERIALS, RUBBISH, DEBRIS AND GREASE SPOTS.

END OF SECTION

Attachment 2.2

Plans

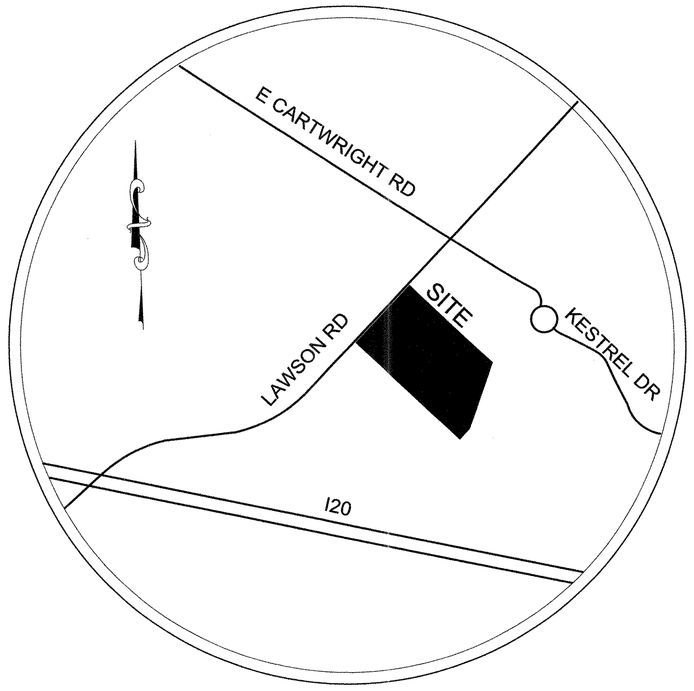
CONSTRUCTION PLANS

CAMP RORIE GALLOWAY IMPROVEMENTS

3100 LAWSON RD
MESQUITE
DALLAS COUNTY, TEXAS

MI PROJECT NO. 17029

1 INDEX OF SHEETS



LOCATION MAP

NOT TO SCALE

CITY OF MESQUITE RFP #2018-022

MI PROJECT NO. 17029

OCTOBER 31, 2017

1 ADDENDUM #1 ; NOVEMBER 27, 2017

OWNER

CITY OF MESQUITE
PARK & RECREATION DEPARTMENT
1515 N. GALLOWAY AVE.
MESQUITE, TX 75149

CONTACT:
ROBERT BLANKENSHIP
PARK PROJECT MANAGER
TEL: (972) 216-6413
CEL: (972) 740-7436
FAX: (972) 216-8102
EMAIL: RBLANKEN@CITYOFMESQUITE.COM

LAND SURVEYOR

JOHN TURNER
A&W SURVEYORS, INC.
P.O. BOX 870029
MESQUITE, TX 75187
TEL: (972) 681-4975
EMAIL: jturner@awsurvey.com

ENGINEER

LOUIS FRISBIE, P.E.
10925 ESTATE LN, SUITE W225
DALLAS, TEXAS 75238
TEL: (214) 341-1501
FAX: (214) 341-1640
EMAIL: Lrfrisbie@metroinfrastructure.com

METROPOLITAN INFRASTRUCTURE

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

CAMP RORIE

Model: Steelworx Stretched Hexagonal Shelter w/ Vented Top, 48' x 77'
Model # HXST-4877-SW-VT-TG-SS

Manufacturing Mission: To provide all prefabricated components and installation instructions for a 48' wide by 77' long (measured from eave to eave) free standing bolt together, tubular steel constructed shelter kit.

Design Criteria: Structure shall be designed to meet site specific snow and wind load design criteria using most current applicable building codes. All structural members are ASTM A-500 U.S. grade B steel. Welded connection plates shall be ASTM A-36 hot rolled steel. All fabrication performed to latest AISC standards by AWS Certified welders. All framing connections are done using A325 grade bolts within concealed access openings from above and will later be concealed by the roofing. All roof framing shall be flush against the roof decking to eliminate the possibility of bird nesting.

Tubular Steel Columns and Beams: Standard column dimension shall be 8" x 8" x 3/16" tubular steel welded to 5/8" base plates for surface mounting. Main support beams are 10" x 6" x 3/16" and purlins are 6" x 4" x 3/16". Steel sizes are preliminary and may change due to ongoing review and final engineering.

Roof Deck: 2" x 6" (nominal) #1 Grade, end matched, single tongue and groove with V-joint bottom face, kiln-dried to an average of 15% moisture content, Southern Yellow Pine. Staining shall be by ~~others if required~~ general contractor (on the lower roof section)) 1*

Roofing: Pre-cut 24 Ga. steel Medallion-Lok standing seam panels, 16" wide by 1 3/4" high, with Kynar 500 finish in a variety of colors with white underside. Roof slope is a 4/12 pitch with a eave height of 10'-0". Attached to structural framing with concealed fasteners. Matching 24 Ga. trim is included.

Frame Finish: All steel framework will receive a corrosion protective TGIC Polyester powder coat, electro-statically applied and cured at 400°F. A large selection of standard colors are available.

Foundation: All columns need to be anchored to concrete footings (footing design provided separately). Columns can be surface mounted with anchor bolts at or below finish slab elevation or they can be embedded directly into the footing. Optional base plate covers are available at an additional cost.

Hardware: All structural hardware and roofing fasteners shall be provided.

Warranty: 10 years against manufacturer defects.

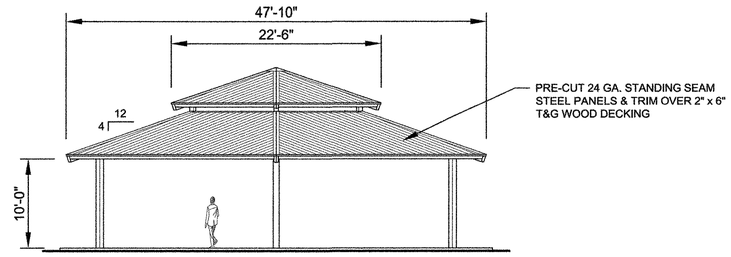
Not Included: Concrete work of any kind, unloading of product and installation.

Additional Options:

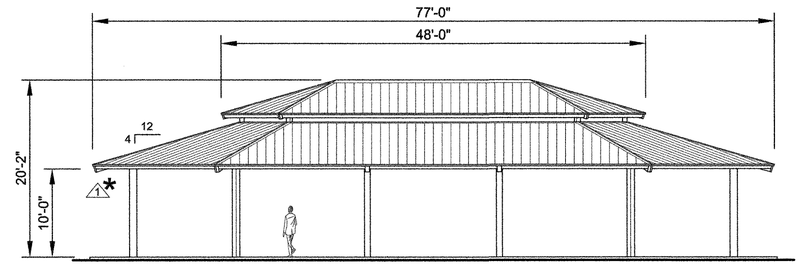
- Flexibility of Design Such as: Height and Pitch
- Additional Engineering
- Variety of Colors
- Decorative Railings, Lattice, Braces, Trim, etc.
- Cupolas and Rooftop Accs.
- Column Style Variations
- Provisions for Electrical
- Lexan Wind Screens
- Tongue & Groove Roof Decking
- Asphalt Shingles, Standing Seam, Cedar Shake, or Clay Tile Roofing
- Site Furnishings and Accs.

COVERWORX Recreational Architecture
A Division of Ross & Barr Inc.
11800 East 9 Mile Road
Warren, MI 48089
Office: (586) 759-5490
Fax: (586) 754-9130
Toll Free: (800) 657-6118
Email: info@coverworx.net
www.Coverworx.com

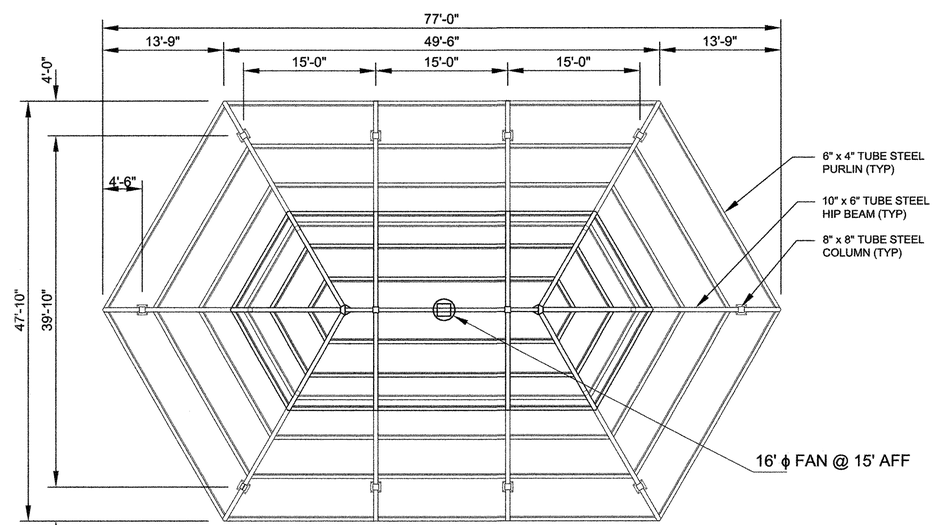
Stretched Hexagonal Shelter w/ Vented Top - 48' x 77'
Model: HXST-4877-SW-VT-TG-SS
DESIGN SPECIFICATIONS



SIDE ELEVATION
SCALE: NTS



FRONT ELEVATION
SCALE: NTS



FRAMING PLAN
SCALE: NTS

COVERWORX Recreational Architecture
A Division of Ross & Barr Inc.
11800 East 9 Mile Road
Warren, MI 48089
Office: (586) 759-5490
Fax: (586) 754-9130
Toll Free: (800) 657-6118
Email: info@coverworx.net
www.Coverworx.com

Stretched Hexagonal Shelter w/ Vented Top - 48' x 77'
Model: HXST-4877-SW-VT-TG-SS
DESIGN SPECIFICATIONS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	ROOF DECK NOTE

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

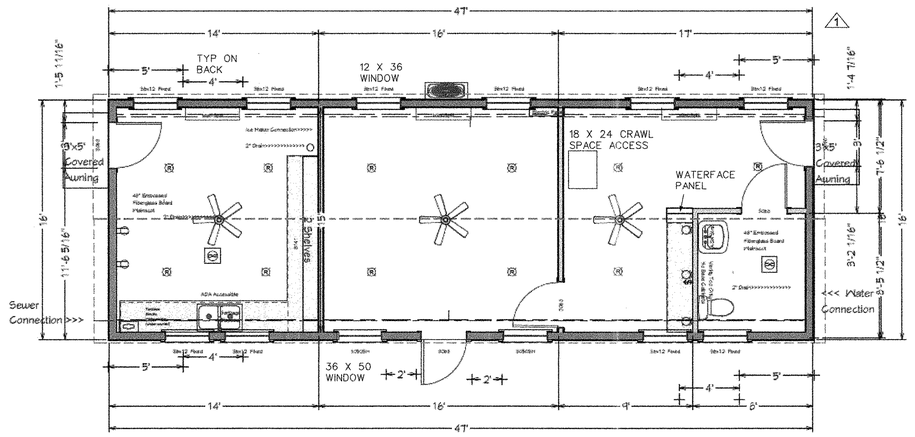
PAVILION BUILDING
PLAN & ELEVATIONS

Sheet No.

A1

SHEET 2 OF 35

CAMP RORIE GALLOWAY



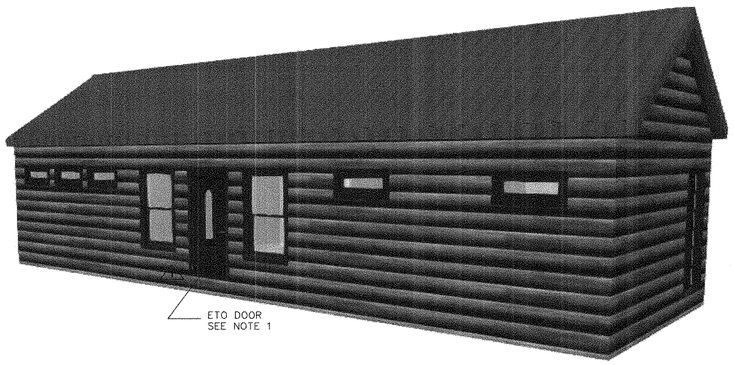
ALL STRIP WINDOWS ARE 36 x 12 FIXED FRONT GLASS

A FLOOR PLAN
NTS

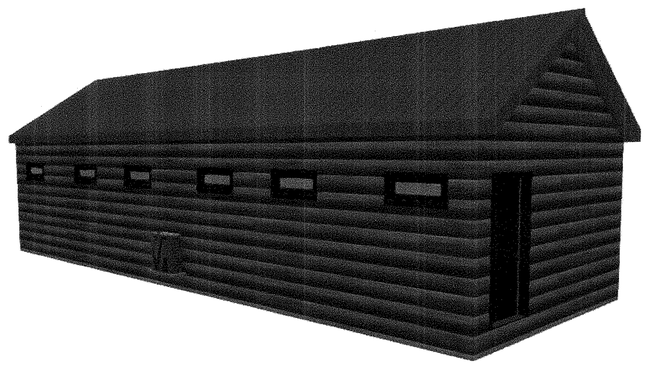
1

NOTES:

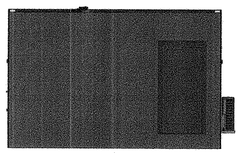
1) PROVIDE ETO MODERNO MAHOGANY DOOR AT FRONT ENTRANCE (OR EQUAL)
www.etodoors.com



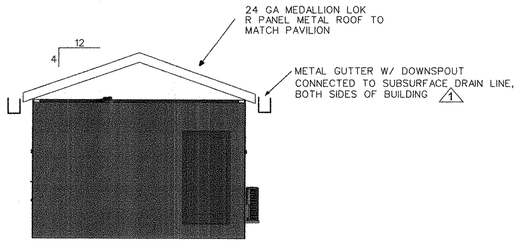
B FRONT
EAST ELEVATION
NTS



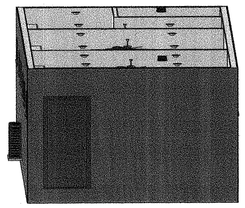
C REAR
WEST ELEVATION
NTS



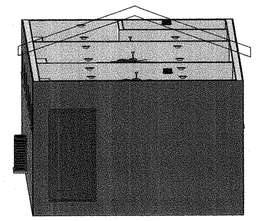
D1 RIGHT SIDE
NORTH ELEVATION
NTS



D2 RIGHT SIDE
NORTH ELEVATION
NTS



E1 LEFT SIDE
SOUTH ELEVATION
NTS



E2 LEFT SIDE
SOUTH ELEVATION
NTS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	MOD FLOOR PLAN ETO DOOR

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

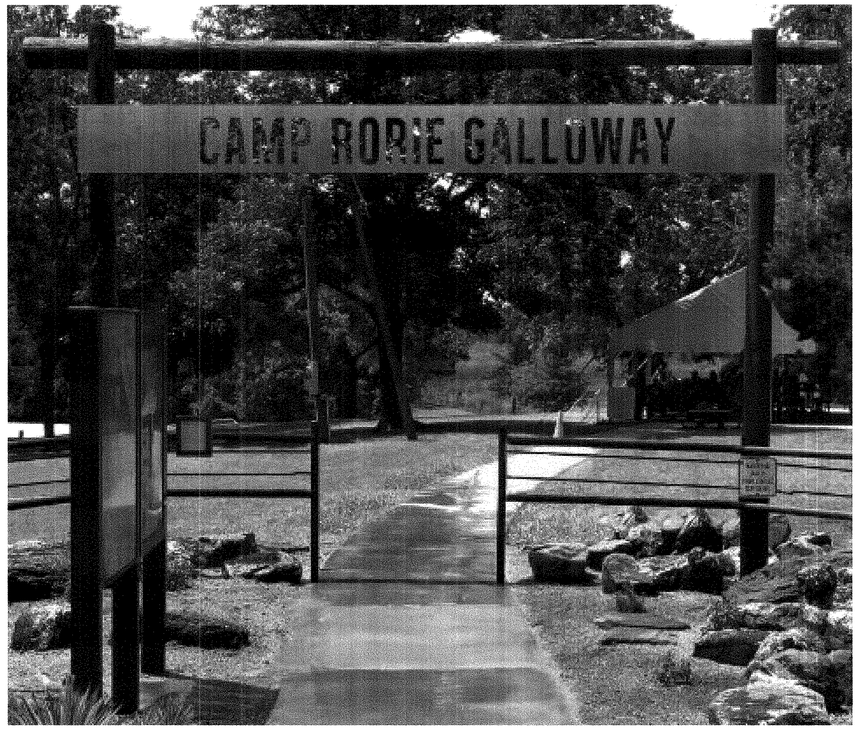
LOG CABIN FLOOR PLAN & ELEVATIONS

Sheet No.

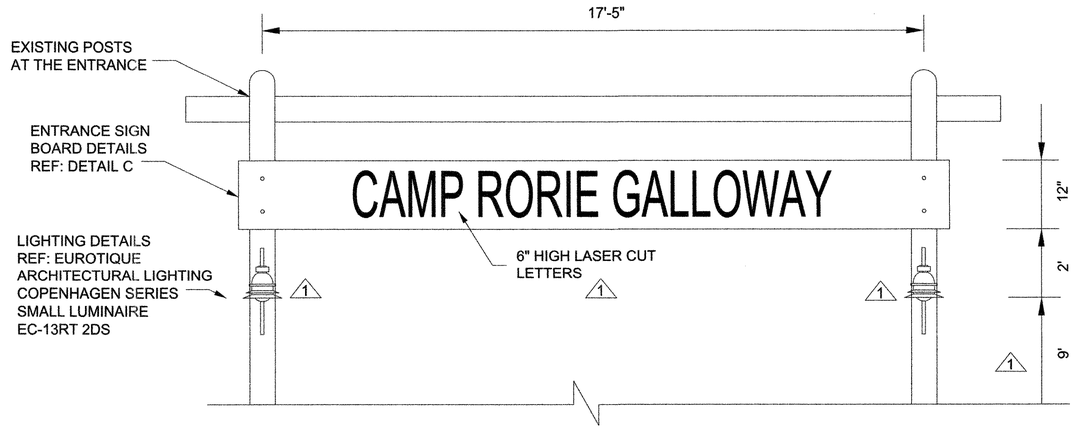
A2

SHEET 3 OF 35

CAMP RORIE GALLOWAY

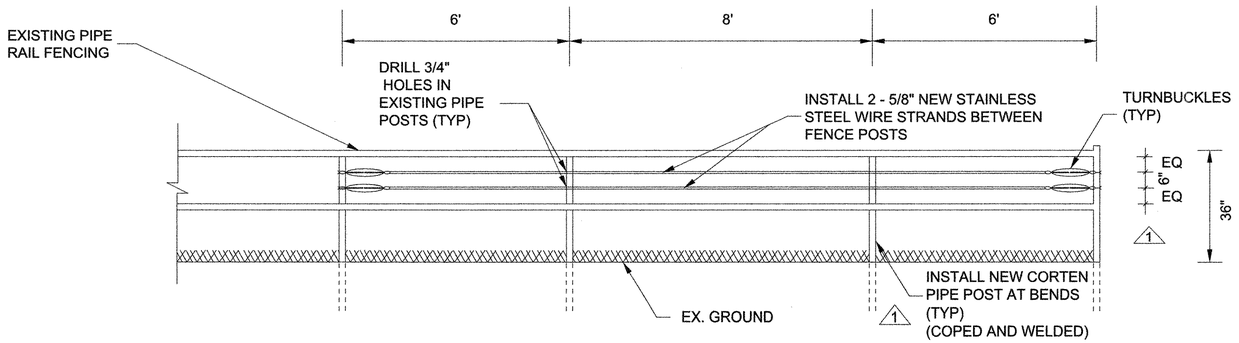


A ENTRANCE SIGN
NTS

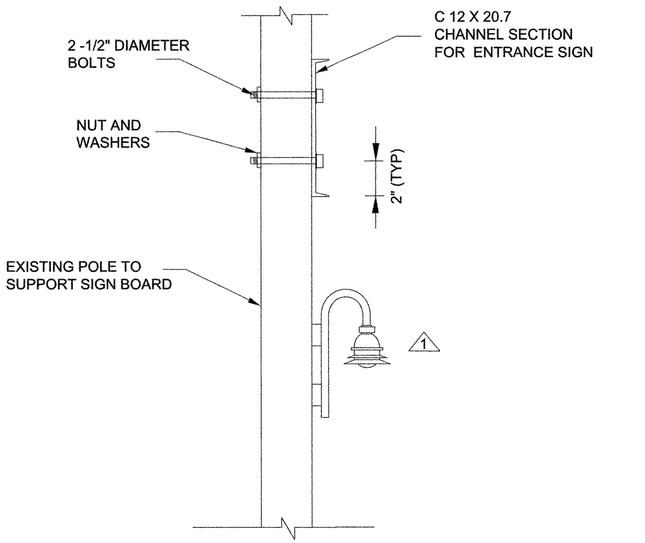


NOTE: FONT TO BE SELECTED BY MPAR PRIOR TO ORDERING SIGN

B ENTRANCE SIGN POLE DETAILS
NTS



D STEEL WIRE STRANDS BETWEEN RAIL FENCES
ELEVATION
NTS



C SIGN POLE CONNECTION DETAILS
NTS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 21, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
1 11/27/17 MOD LIGHT. RAIL

Date 10/31/2017
Drawn AP
Checked LF
MI Project No. 17029
City Project No.

Sheet Title
ENTRANCE RAILING AND SIGN POLE DETAILS

Sheet No.
A3
SHEET 4 OF 35

CAMP RORIE GALLOWAY

GENERAL NOTES FOR ALL CONSTRUCTION ACTIVITIES

1. All construction, testing, and materials shall be in accordance with the City's current standards, details, and specifications.
2. Testing and inspection of materials shall be performed by a commercial testing laboratory approved by the City. Contractor shall furnish materials or specimens for testing, and shall furnish suitable evidence that the materials proposed to be incorporated into the work are in accordance with the specifications.
3. Contractor shall notify the City at least 48 hours prior to beginning any construction.
4. Contractor is responsible for obtaining all necessary permits and approvals prior to beginning any construction. Contact ROW Inspection division of Public Works at 972-216-6301 for a permit to work within City ROW.
5. Contractor must keep available on-site at all times approved construction plans and copies of any required permits along with the current versions of the following references: City of Mesquite Engineering Standards, NCTCOG specifications.
6. All shop drawings, working drawings or other documents which require review by the City shall be submitted by the Contractor sufficiently in advance of scheduled construction to allow no less than 14 calendar days for review and response by the City.
7. The Contractor shall be responsible for all required construction surveying and staking and shall notify the City of any discrepancies prior to proceeding with any work.
8. Contractor shall be responsible for protecting all survey markers including iron rods, property corners, or survey monuments within the limits of construction and outside ROW during construction. Any survey markers disturbed during construction shall be replaced by the Contractor at no cost to the City.
9. Contractor shall provide a construction schedule with weekly progress reports.
10. Contractor is responsible for keeping streets and driveways adjacent to the project free of mud and debris at all times. Contractor shall clean up and remove all loose material resulting from construction operations. The Contractor shall take all available precautions to control dust.
11. The existence and locations of the public and franchise utilities shown on the drawings were obtained from available records and are approximate. The Contractor shall determine the depth and location of existing underground utilities prior to excavating, trenching, or drilling and shall be required to take any precautionary measures to protect all lines shown and / or any other underground utilities not of record or not shown on the plans. The Contractor shall be responsible for contacting all public agencies and franchise utilities 48 hours prior to construction. The Contractor may be required expose these facilities at no cost to the City. The Contractor will be responsible for damages to utilities if the damage is caused by negligence or failure to have locates performed.
12. The Contractor shall be responsible for any damage to existing facilities or adjacent properties during construction. Any removal or damage to existing facilities shall be replaced or repaired to equal or better condition by the Contractor.
13. Contractor shall be responsible for furnishing and installing all temporary and permanent traffic control in accordance with the minimum requirements of the latest revision of the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and TxDOT Barricade and Construction Standards.
14. Contractor shall not impede traffic on existing streets, driveways, alleys, or fire lanes open to the public. In the event the construction work requires the closure of an existing street, alley, or fire lane, the Contractor shall request the road closure through the City Traffic Division a minimum of 48 hours in advance of the requested closure. Closureswill not be allowed prior to 9:00 a.m. or after 3:30 p.m., Monday through Friday unless otherwise approved by the City.
15. Contractor shall not store materials, equipment or other construction items on adjacent properties or right-of-way without the prior written consent of the property owner and the City.
16. Temporary fencing shall be installed prior to the removal of existing fencing. Temporary fencing shall be removed after proposed fencing is approved by the City. All temporary and proposed fencing locations shall be subject to field revisions as directed by the City.
17. Unusable excavated material, or construction debris shall be removed and disposed of offsite at an approved disposal facility by the Contractor at his expense.
18. Contractor shall avoid damage to existing trees. When necessary, trees and shrub trimming for construction shall be performed by certified tree worker or under the direction of a registered landscape architect or certified arborist.
19. Erosion control devices shall be installed on all projects prior to beginning construction and shall be maintained throughout the project in a condition acceptable to the City.
20. Contractor shall locate and protect all existing landscape irrigation systems. Damage to existing irrigation systems and landscape materials shall be restored to equal or better condition at no cost to City.
21. It is the Contractor's responsibility to maintain a neat and accurate record of construction for the City's records.

GENERAL NOTES FOR PAVING

1. All paving construction, testing, and materials, including concrete, reinforcement, jointing, and subgrade preparation and treatment shall be in accordance with the City's current standards, details, and specifications unless otherwise noted.
2. Absolutely no earthwork, lime application, or other preparation of the subgrade for paving of streets, alleys, or fire lanes shall be initiated without authorization from the City. The City will authorize the subgrade work in preparation for paving after utility trench backfill testing has been completed and verified to meet the City requirements.
3. Contractor is responsible for ensuring all pedestrian work meets or exceeds the current American with Disabilities Act Accessibility Guidelines (ADAAG) and the Texas Accessibility Standards (TAS). The Contractor shall remove and replace any constructed or installed items not meeting the current ADAAG and TAS requirements at no additional cost to the City.

ADA REQUIREMENTS:

1. A wheelchair ramp must be constructed for all street intersections per TexDOT Roadway Standard Details PED-05 (four sheets).
2. No obstructions (fire hydrants, power poles, guy wires, etc.) shall be allowed in or over sidewalk paving.

GENERAL NOTES FOR WATER AND WASTEWATER

1. All water and wastewater construction, testing, and materials shall be in accordance with the City's current standards, details, and specifications unless otherwise noted.
2. Contractor shall submit a Trench Safety Plan prior to the Pre-Construction Meeting.
3. Contractor shall not operate existing valves. Contact the City's Public Works Department to request valve changes.

GENERAL NOTES FOR EROSION CONTROL & STORMWATER

1. Steel posts shall not be used to install erosion control measures within City ROW.
2. No equipment shall be cleaned on-site, or other liquids deposited and allowed to flow overland or subterranean within the limits of the critical root zone of trees that remain on site. This includes paint, oil, solvents, asphalt, concrete, concrete equipment wash water, mortar of similar materials.
3. Asphalt bags shall be placed at construction entrances to prevent curb damage.
4. Geotextile fabric shall be placed on subgrade prior to stone placement for construction entrances.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

GENERAL NOTES

Sheet No.

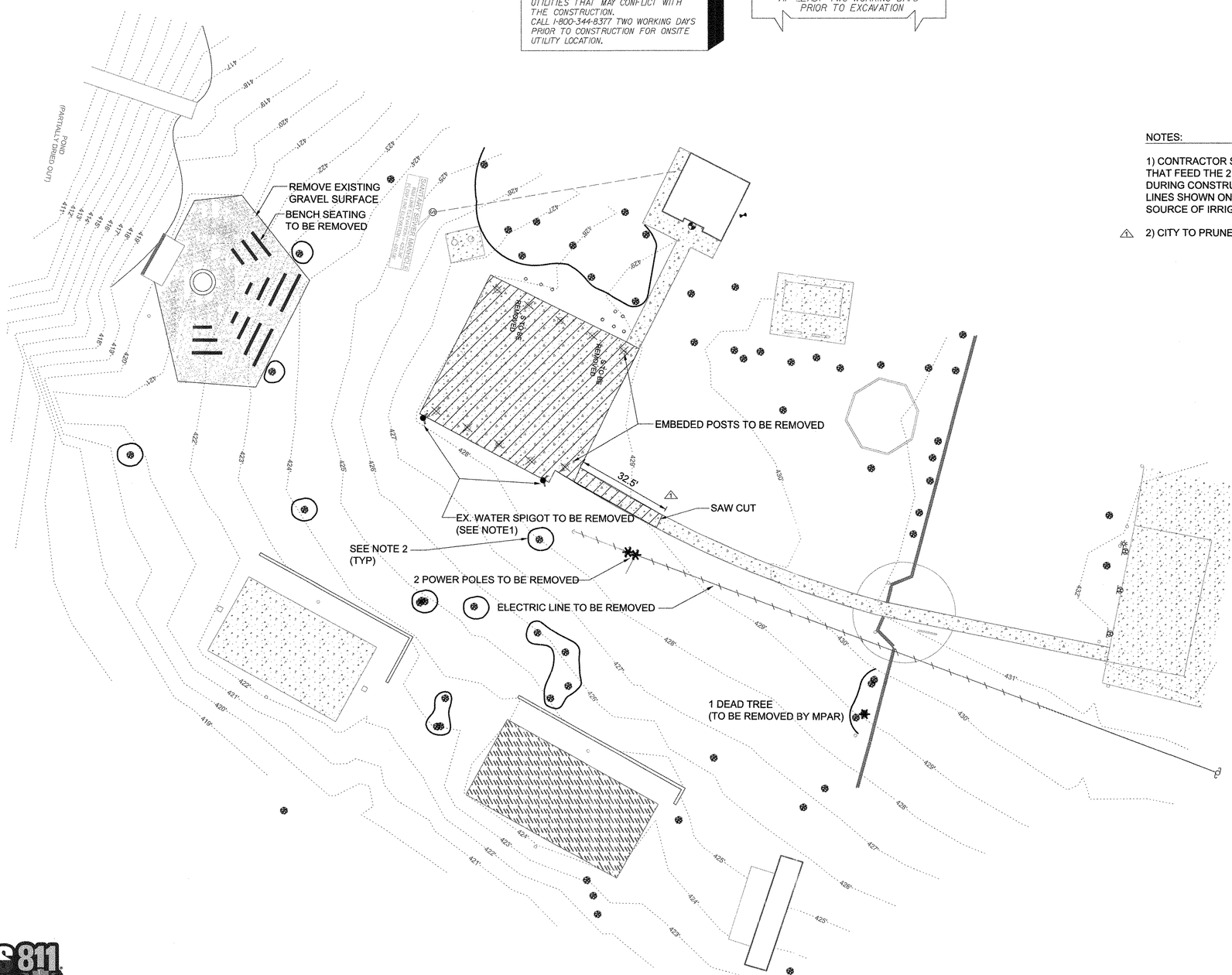
C1

SHEET 5 OF 35

CAMP RORIE GALLOWAY

UNDERGROUND UTILITIES
THE LOCATION OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE AND BASED ON DATA FURNISHED BY UTILITY COMPANIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND VERIFY ON-SITE UTILITIES THAT MAY CONFLICT WITH THE CONSTRUCTION.
CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE UTILITY LOCATION.

CAUTION
CONTACT CITY OF MESQUITE WATER DEPARTMENT TO LOCATE WATER & WASTER WATER LINES AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION



0 20 40
SCALE: 1" = 20'

NOTES:

1) CONTRACTOR SHALL DETERMINE SOURCE OF IRRIGATION WATER LINE THAT FEED THE 2 EXISTING SPIGOTS AND PROTECT THE REMAINING LINE DURING CONSTRUCTION. THE NEW IRRIGATION SPIGOTS AND IRRIGATION LINES SHOWN ON THE UTILITY PLAN SHEET SHALL BE CONNECTED TO THIS SOURCE OF IRRIGATION WATER.

⚠1 2) CITY TO PRUNE AND REMOVE TREES.

LEGEND

- CONCRETE TO BE REMOVED
- POWER POLE TO BE REMOVED
- FENCE
- WATER SPIGOT TO BE REMOVED
- GRAVEL TO BE REMOVED
- WATER VALVE
- TREE PROTECTION
- POSTS TO BE REMOVED
- EX. WW MAIN LINE
- EX. WW MANHOLE
- EX. TREE
- EX. POWER POLES
- EX. CONCRETE
- EX. CONTOUR LINE (429')
- EX. TURF

Texas 811
Know what's below. Call before you dig.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 21, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
⚠1 11/27/17 ADDED DIMENSION, NOTES

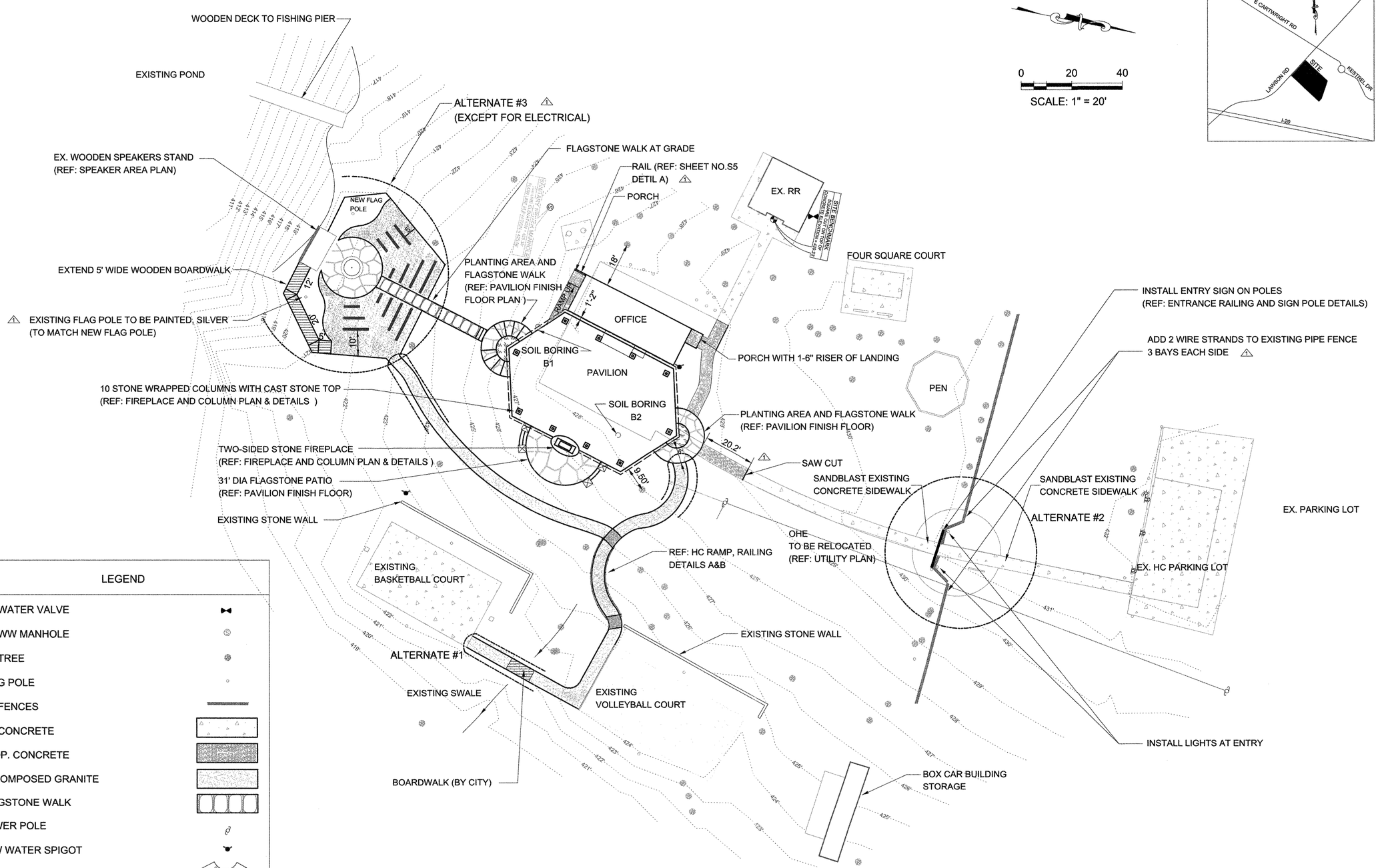
Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

DEMOLITION PLAN

Sheet No.
C2
SHEET 6 OF 35

CAMP RORIE GALLOWAY



LEGEND

- EX. WATER VALVE
- EX. WW MANHOLE
- EX. TREE
- FLAG POLE
- EX. FENCES
- EX. CONCRETE
- PROP. CONCRETE
- DECOMPOSED GRANITE
- FLAGSTONE WALK
- POWER POLE
- NEW WATER SPIGOT
- FLAGSTONE ON REINFORCED CONCRETE
- WOODEN BOARDWALK

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions		
No.	Date	Item
⚠1	11/27/17	EX SIDEWALK

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

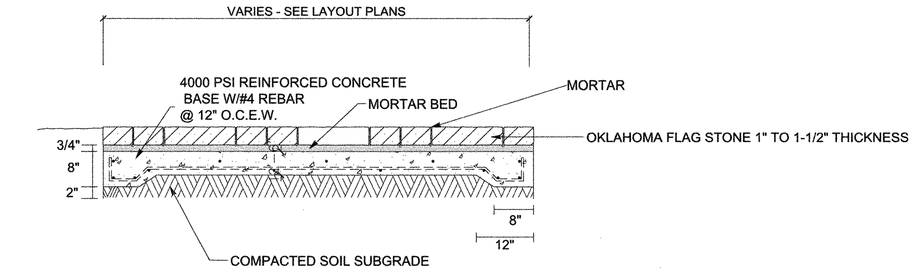
SITE PLAN

Sheet No.

C3

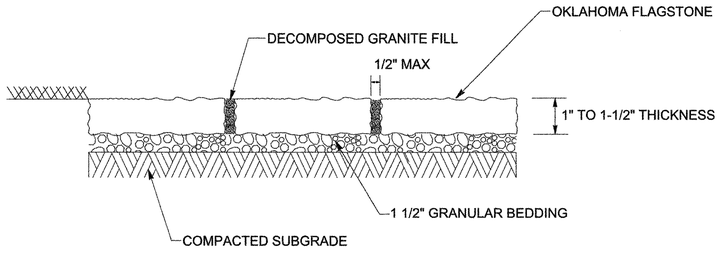
SHEET 7 OF 35

CAMP RORIE GALLOWAY



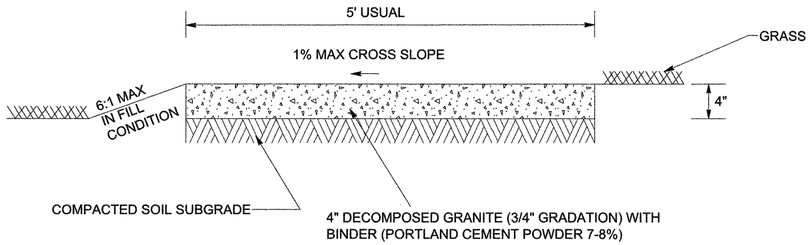
A FLAGSTONE DECK

NTS



B FLAGSTONE SIDEWALK

NTS

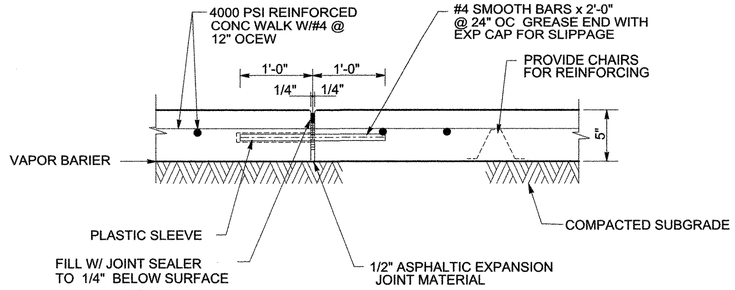


C DECOMPOSED GRANITE SIDEWALK

NTS

GENERAL NOTES

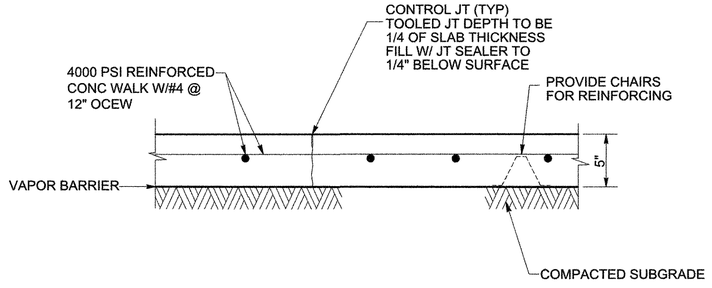
1. ALL SUBGRADE COMPACTION UNDER PAVEMENT SHALL BE 98% STANDARD PROCTOR DENSITY AT +2% OF OPTIMUM MOISTURE.
2. THE MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS INDICATED ON THE PLANS AND ON THE SPECIFICATIONS.
3. BARS SHALL BE GRADE 60 ksi DEFORMED REINFORCING BARS. SIZES AND SPACING SHALL BE AS INDICATED HEREIN.
4. DETAIL AND ARRANGEMENT OF JOINTS, ALL TYPES, SHALL BE AS SHOWN.
5. BAR LAPS SHALL BE 30 DIAMETERS.



D SIDEWALK EXPANSION JOINT

NOTE: WALK EXP JTS TO OCCUR AT 25'-0" EW MAX AND WHERE WALK CHANGES DIRECTION

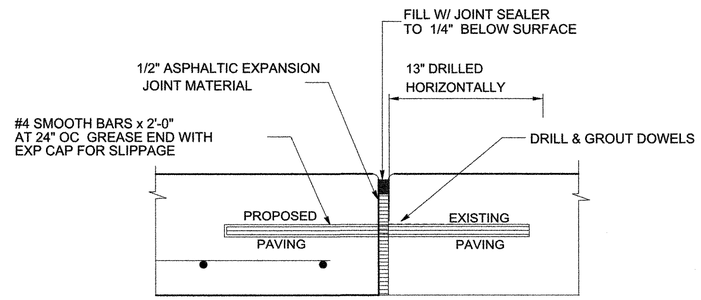
NTS



E SIDEWALK CONTROL JOINT

NOTE: WALK CONTROL JTS TO OCCUR AT 5'-0" MAX

NTS



F DOWEL JOINT

NTS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	MMS
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

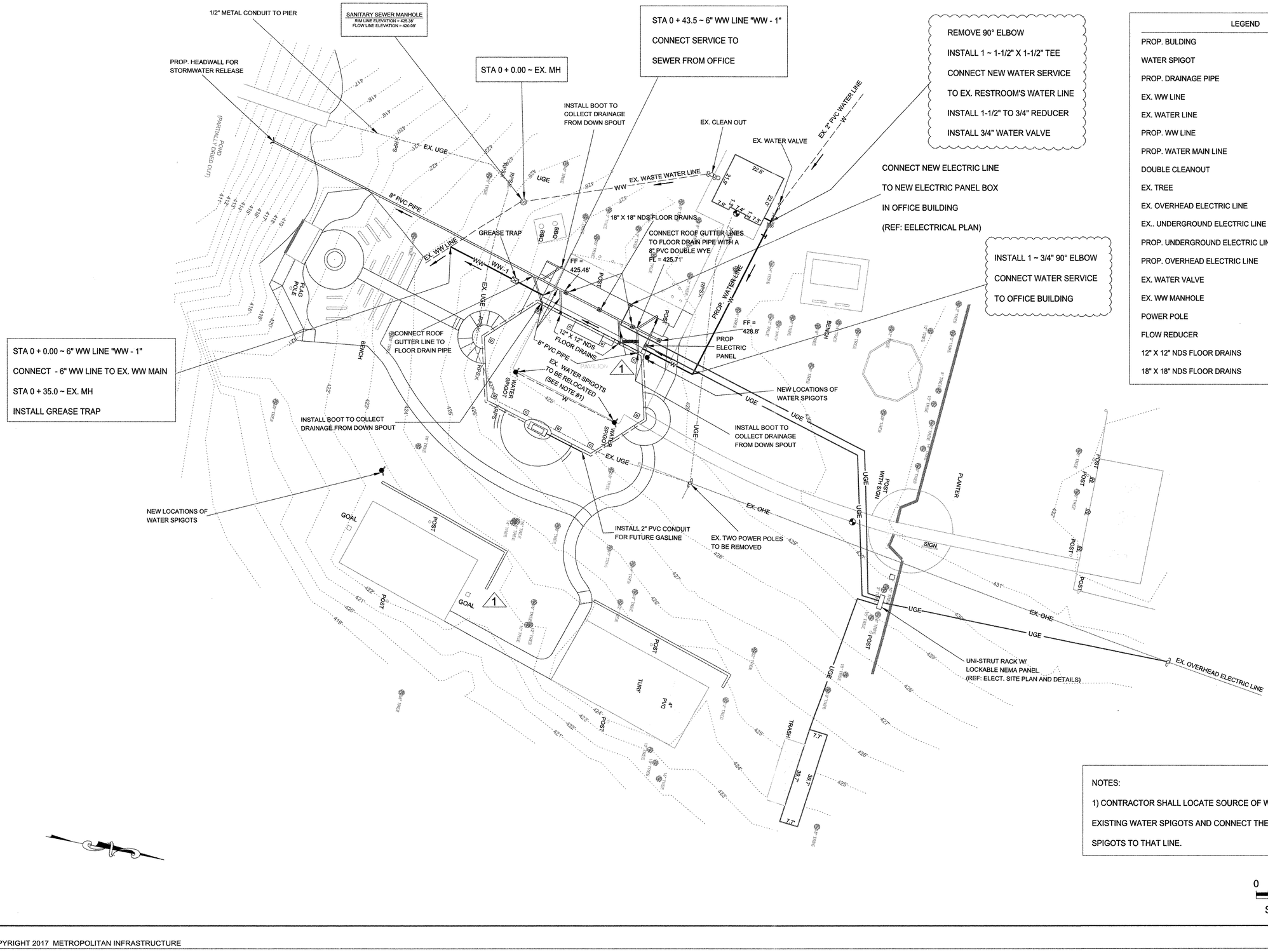
PAVING DETAILS

Sheet No.

C4

SHEET 8 OF 35

CAMP RORIE GALLOWAY



METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions		
No.	Date	Item
1	11/27/17	ADJ. ELEC. PANEL AND ROOF DRAINS

Date	10/31/2017
Drawn	MMS
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

UTILITY AND DRAINAGE PLAN

Sheet No.

C5

SHEET 9 OF 35

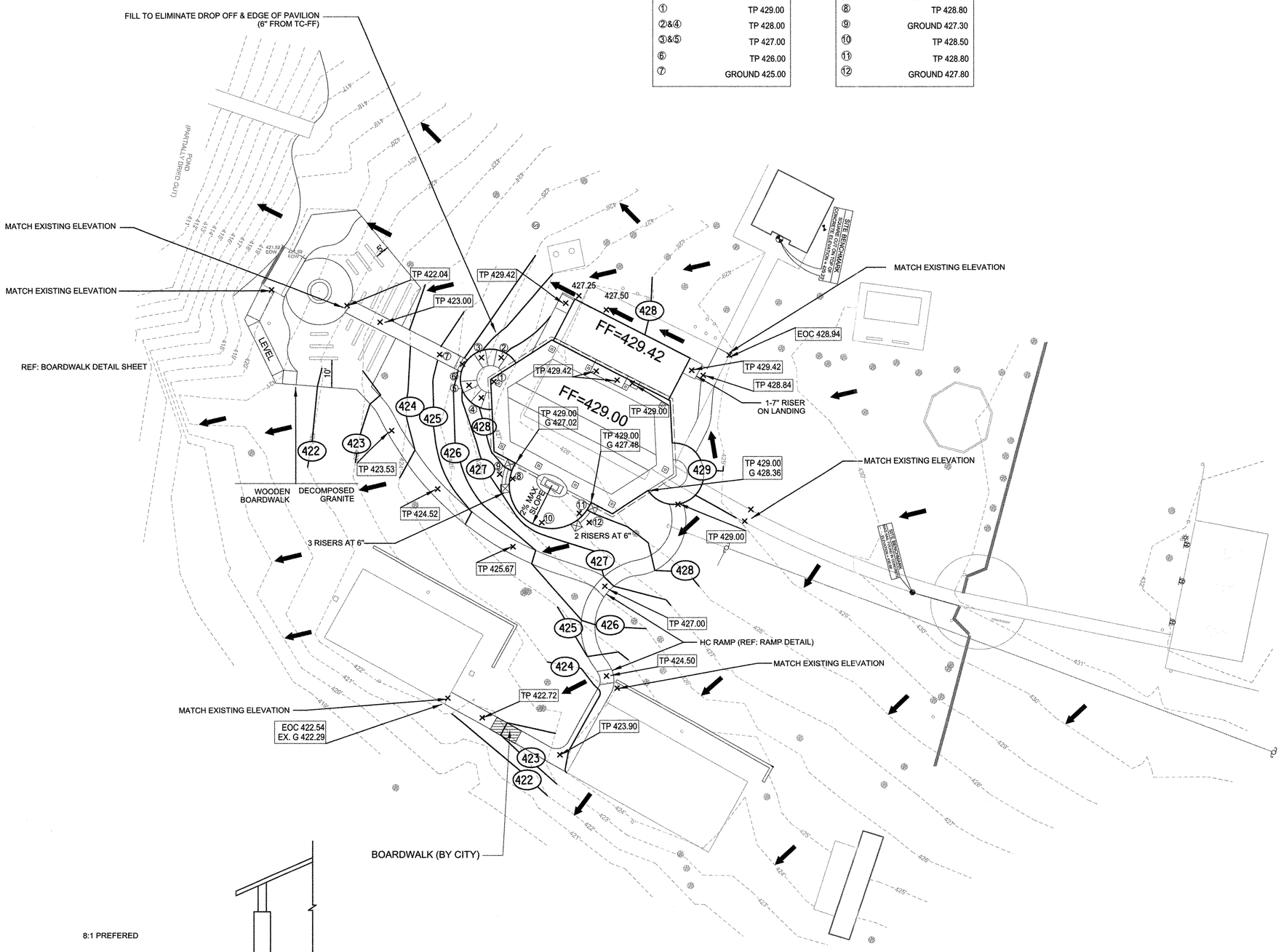
CAMP RORIE GALLOWAY

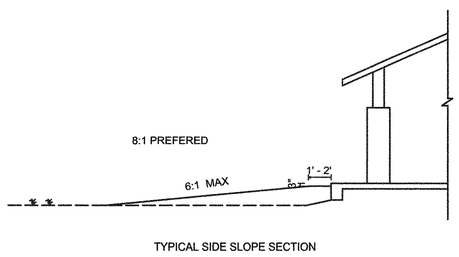
SPOT ELEVATIONS	
①	TP 429.00
②&④	TP 428.00
③&⑤	TP 427.00
⑥	TP 426.00
⑦	GROUND 425.00

SPOT ELEVATIONS ON PATIO	
⑧	TP 428.80
⑨	GROUND 427.30
⑩	TP 428.50
⑪	TP 428.80
⑫	GROUND 427.80

0 20 40

SCALE: 1" = 20'





TYPICAL SIDE SLOPE SECTION

LEGEND	
PROP. CONTOUR	429
EX. CONTOUR	429
EX. TREE	
FLOW DIRECTION	
WATER VALVE	
EX. WW MANHOLE	Ⓢ
POWER POLE	
NEW BUILDING LINE	
WATER SPIGOT	
TOP OF PAVEMENT	TP
GROUND	G
LOW POINT	LP

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

GRADING PLAN

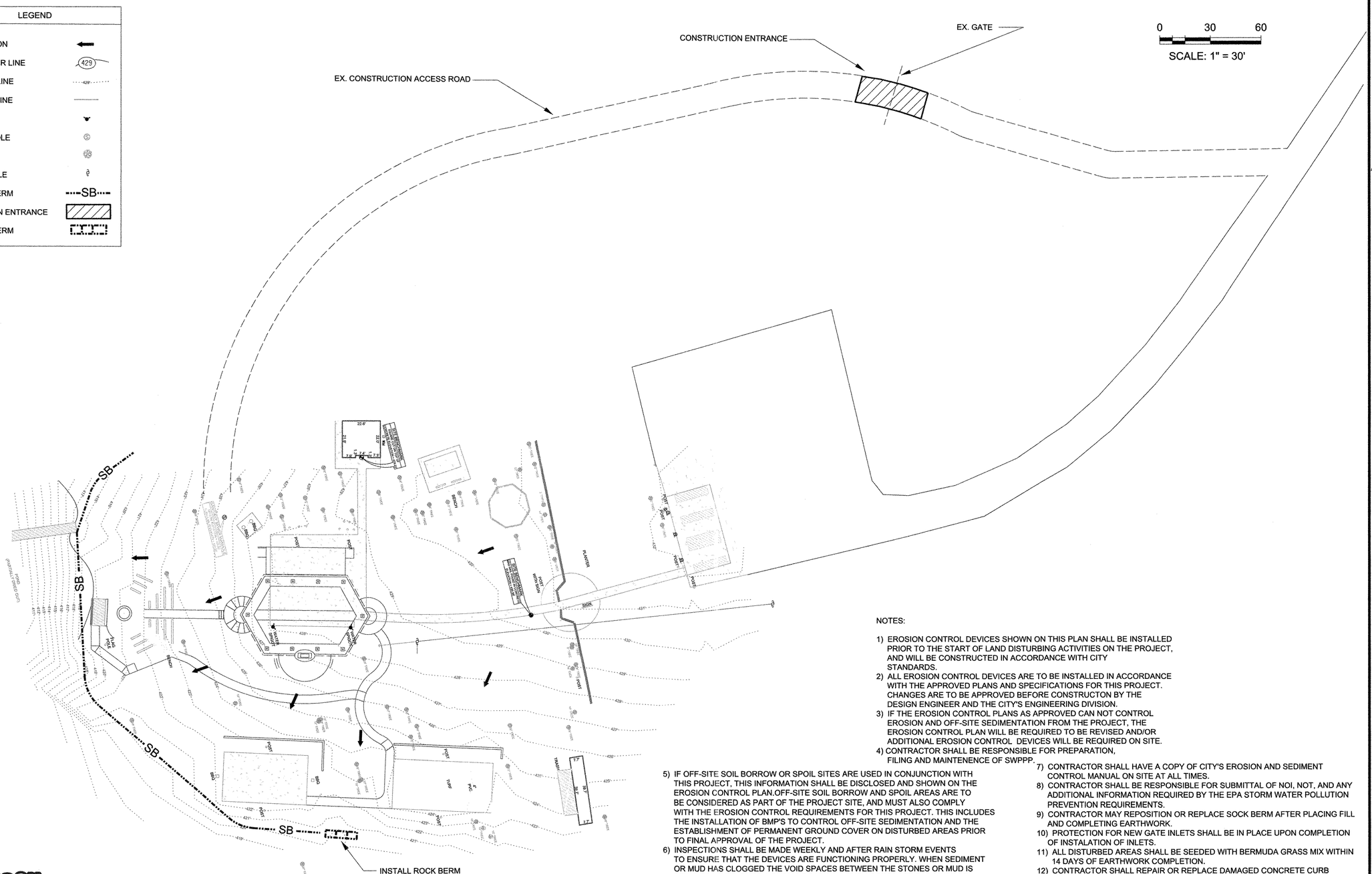
Sheet No.

C6

SHEET 10 OF 35

CAMP RORIE GALLOWAY

LEGEND	
FLOW DIRECTION	
PROP. CONTOUR LINE	429
EX. CONTOUR LINE	429
EX. ELECTRIC LINE	
WATER SPIGOT	
EX. WW MANHOLE	
EX. TREE	
EX. POWER POLE	
PROP. SOCK BERM	----SB----
CONSTRUCTION ENTRANCE	
PROP. ROCK BERM	



NOTES:

1) EROSION CONTROL DEVICES SHOWN ON THIS PLAN SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT, AND WILL BE CONSTRUCTED IN ACCORDANCE WITH CITY STANDARDS.
2) ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THIS PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTON BY THE DESIGN ENGINEER AND THE CITY'S ENGINEERING DIVISION.
3) IF THE EROSION CONTROL PLANS AS APPROVED CAN NOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT, THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE.
4) CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARATION, FILING AND MAINTENENCE OF SWPPP.
5) IF OFF-SITE SOIL BORROW OR SPOIL SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN.OFF-SITE SOIL BORROW AND SPOIL AREAS ARE TO BE CONSIDERED AS PART OF THE PROJECT SITE, AND MUST ALSO COMPLY WITH THE EROSION CONTROL REQUIREMENTS FOR THIS PROJECT. THIS INCLUDES THE INSTALLATION OF BMP'S TO CONTROL OFF-SITE SEDIMENTATION AND THE ESTABLISHMENT OF PERMANENT GROUND COVER ON DISTURBED AREAS PRIOR TO FINAL APPROVAL OF THE PROJECT.
6) INSPECTIONS SHALL BE MADE WEEKLY AND AFTER RAIN STORM EVENTS TO ENSURE THAT THE DEVICES ARE FUNCTIONING PROPERLY. WHEN SEDIMENT OR MUD HAS CLOGGED THE VOID SPACES BETWEEN THE STONES OR MUD IS BEING TRACKED ONTO A PUBLIC ROADWAY, THE AGGREGATE PAD MUST BE WASHED DOWN OR REPLACED. RUNOFF FROM THE WASHDOWN OPERATION SHALL NOT BE ALLOWED TO DRAIN DIRECTLY OFF SITE WITHOUT GOING THROUGH ANOTHER BMP TO CONTROL OFF SITE SEDIMENTATION. PERIODIC REGRADING OR ADDITION OF NEW STONE MAY BE REQUIRED TO MAINTAIN THE EFFICIENCY OF THE INSTALLATION.
7) CONTRACTOR SHALL HAVE A COPY OF CITY'S EROSION AND SEDIMENT CONTROL MANUAL ON SITE AT ALL TIMES.
8) CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTAL OF NOI, NOT, AND ANY ADDITIONAL INFORMATION REQUIRED BY THE EPA STORM WATER POLLUTION PREVENTION REQUIREMENTS.
9) CONTRACTOR MAY REPOSITION OR REPLACE SOCK BERM AFTER PLACING FILL AND COMPLETING EARTHWORK.
10) PROTECTION FOR NEW GATE INLETS SHALL BE IN PLACE UPON COMPLETION OF INSTALATION OF INLETS.
11) ALL DISTURBED AREAS SHALL BE SEEDED WITH BERMUDA GRASS MIX WITHIN 14 DAYS OF EARTHWORK COMPLETION.
12) CONTRACTOR SHALL REPAIR OR REPLACE DAMAGED CONCRETE CURB AT CONSTRUCTION ENTRANCES.
13) CONTRACTOR SHALL PLACE A SIGN BOARD IN COMPLIANCE WITH CURRENT NPDES REQUIREMENTS ON THE SITE. A COPY OF THE SWPPP SHALL BE AVAILABLE ON SITE FOR INSPECTION.
14) MAINTENANCE OF VEHICLES OR EQUIPMENT SHALL NOT BE PERMITTED ON SITE.

Texas 811 Know what's below. Call before you dig.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions		
No.	Date	Item

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

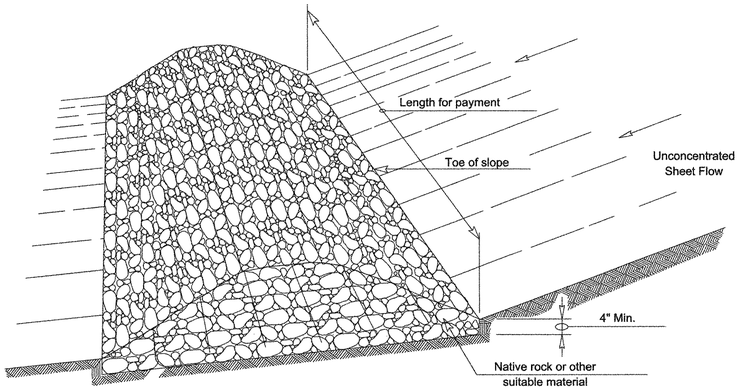
EROSION CONTROL PLAN

Sheet No.

C7

SHEET 11 OF 35

CAMP RORIE GALLOWAY



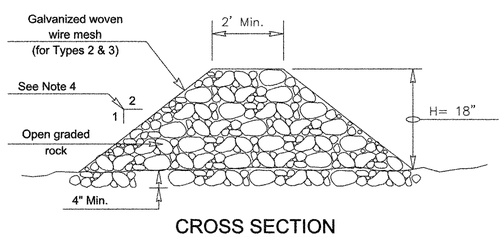
ROCK BERM AT TOE OF SLOPE

ROCK BERM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approx. 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh): Type 2 may be used in ditches and at dike or swale outlets.

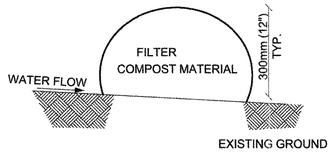


CROSS SECTION

A ROCK BERM
PLAN AND SECTION — SCALE: NTS

SOCK OPTION:

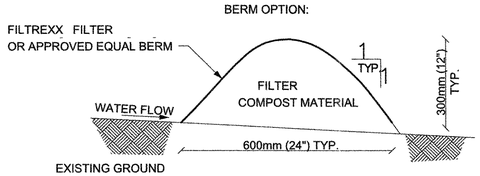
FILTER SOCK, SIZED TO SUIT CONDITIONS.
300mm TO 450mm (12" TO 18") TYPICAL.



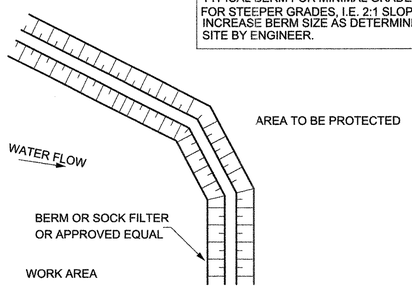
NOTES:

1. ALL MATERIAL TO MEET SPECIFICATIONS.
2. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTER BERM IN A FUNCTIONAL CONDITION AT ALL TIMES AND IT SHALL BE ROUTINELY INSPECTED.
3. WHERE THE BERM REQUIRES REPAIR, IT WILL BE ROUTINELY REPAIRED OR REPLACED.
4. THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE BERM WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE BERM, OR AS DIRECTED BY THE ENGINEER.
5. THE COMPOST FILTER BERM WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE ENGINEER.

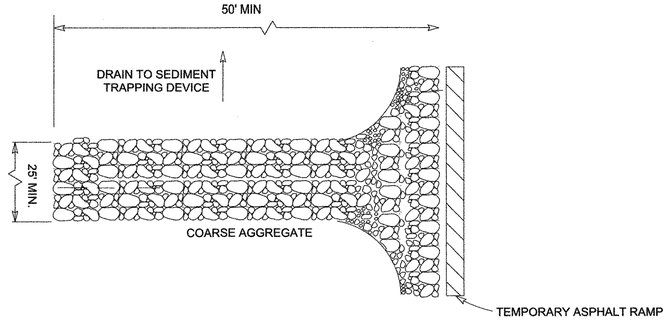
BERM OPTION:



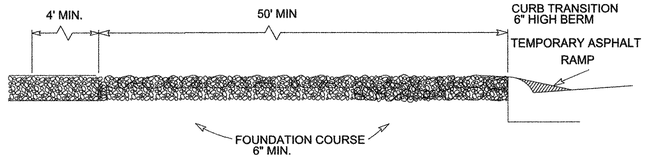
TYPICAL BERM FOR MINIMAL GRADES SHOWN.
FOR STEEPER GRADES, I.E. 2:1 SLOPES INCREASE BERM SIZE AS DETERMINED ON SITE BY ENGINEER.



B TEMPORARY COMPOST SOCK BERM
PLAN AND SECTION — SCALE: NTS



PLAN



PROFILE

GENERAL NOTES

1. THE LENGTH OF THE CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A SIZE OF 4" TO 8".
3. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6:1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
4. THE CONSTRUCTION EXIT FOUNDATION COURSE SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE.
6. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.
7. SIDEWALK SHALL REMAIN ACCESSIBLE DURING CONSTRUCTION AT CONSTRUCTION ENTRANCE.
   DAMAGE TO THE SIDEWALK SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

C CONSTRUCTION ENTRANCE /EXIT
PLAN AND PROFILE — SCALE: NTS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 29, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

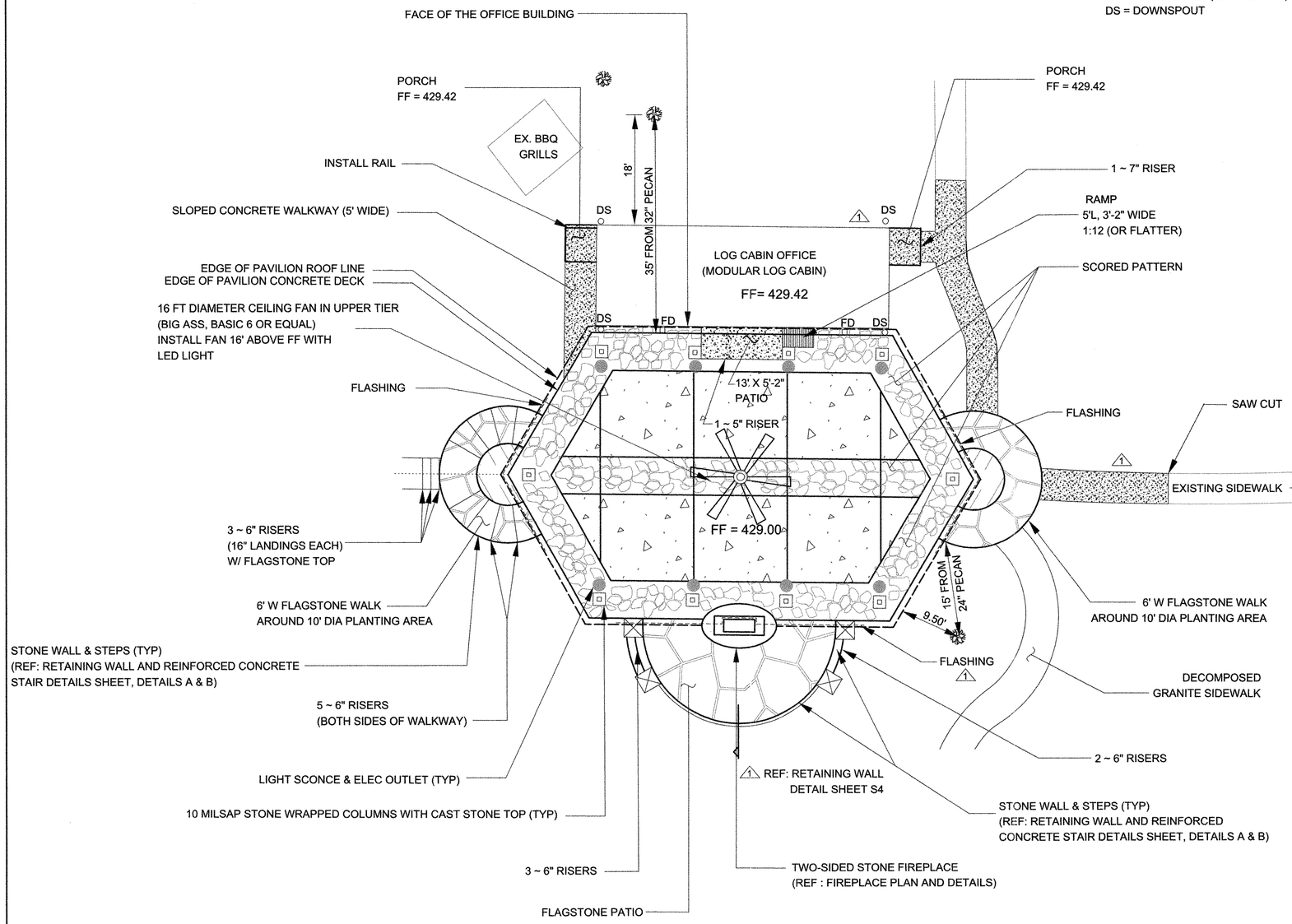
EROSION CONTROL DETAILS

Sheet No.
C8
SHEET 12 OF 35

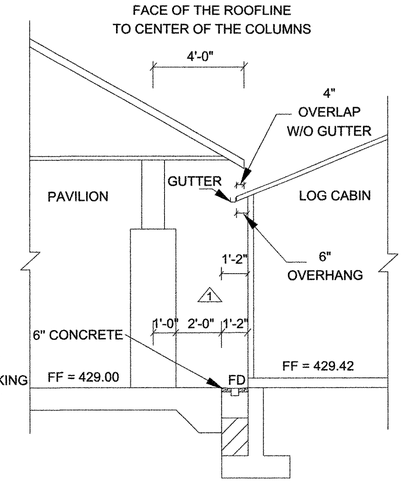
CAMP RORIE GALLOWAY

FD = FLOOR DRAIN (12" X 12" NDS)
DS = DOWNSPOUT

0 10 20
SCALE: 1" = 10'



A PAVILION AND OFFICE FINISH PLAN



B PAVILION AND OFFICE INTERFACE

NTS

LEGEND

- FLAGSTONE WALK
- PLANTING AREA
- ROCK SALT FINISH
- SANDBLASTED FINISH
- HANDICAP RAMP
- CONCRETE PAD OR SIDEWALKS (LIGHT BROOM FINISH)

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	ADDED NOTES

Date	10/31/2017
Drawn	MMS
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

PAVILION AND OFFICE
FINISH PLAN & DETAILS

Sheet No.

C9

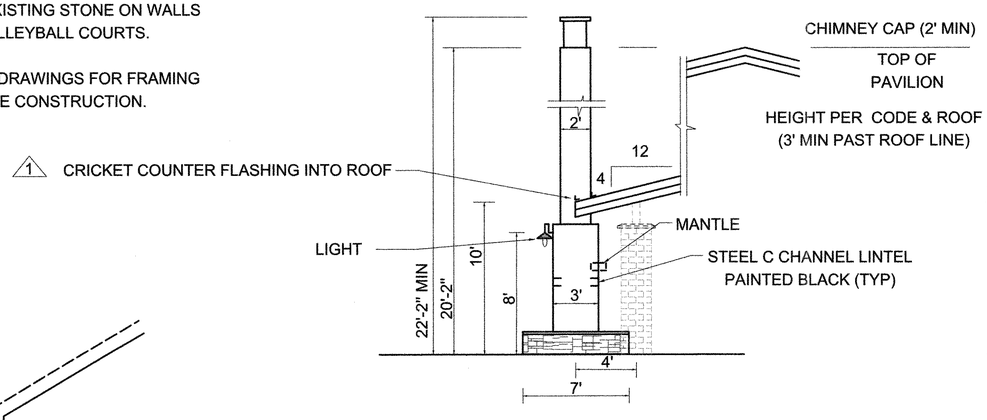
SHEET 13 OF 35

CAMP RORIE GALLOWAY

NOTE:

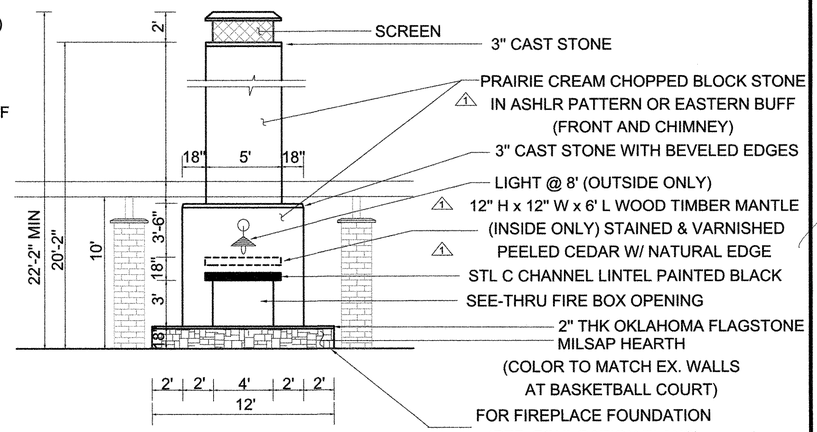
1) MILSAP STONE COLOR TO MATCH EXISTING STONE ON WALLS LOCATED AT BASKETBALL & VOLLEYBALL COURTS.

2) CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR FRAMING AND MATERIALS FOR FIREPLACE CONSTRUCTION.



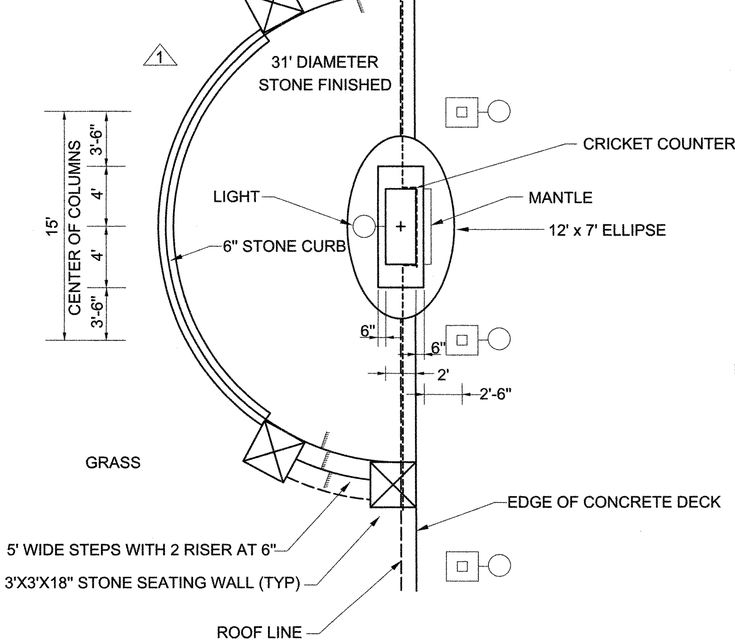
A FIRE PLACE

SCALE: NTS



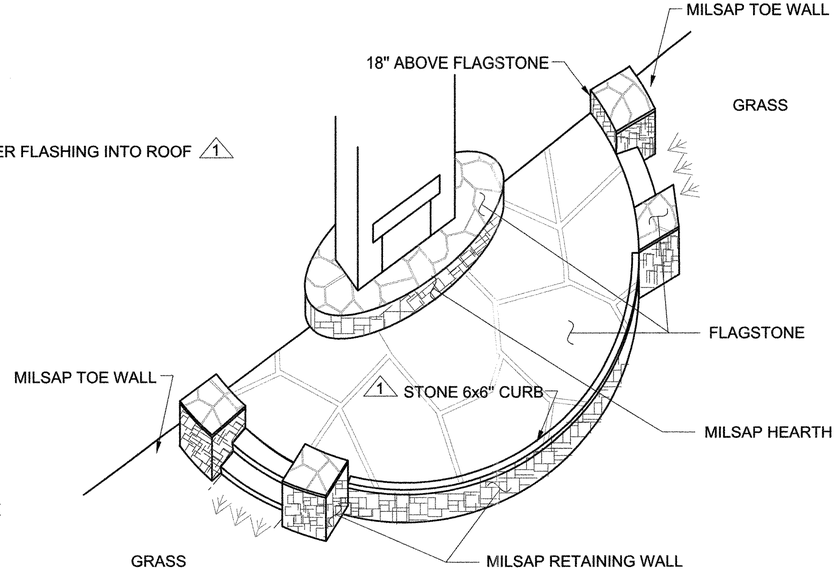
B FIRE PLACE

SCALE: NTS



C FIRE PLACE

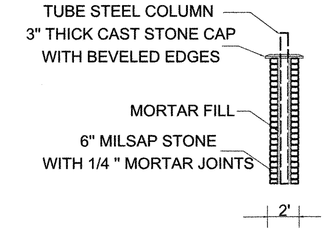
SCALE: NTS



D FIRE PLACE

ISOMETRIC

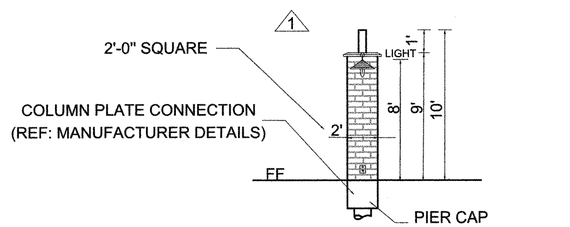
SCALE: NTS



E MILSAP STONE WRAPPED SHELTER COLUMNS

CROSS SECTION VIEW

SCALE: NTS



F MILSAP STONE WRAPPED SHELTER COLUMNS

ELEVATION VIEW

SCALE: NTS

1 * MODIFICATION SEATING TO 18" ABOVE FF, ADDED 6"x6" STONE CURB, ADDED CRICKET NOTES @ ROOFLINE FOR FIREPLACE

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 7, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	*

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

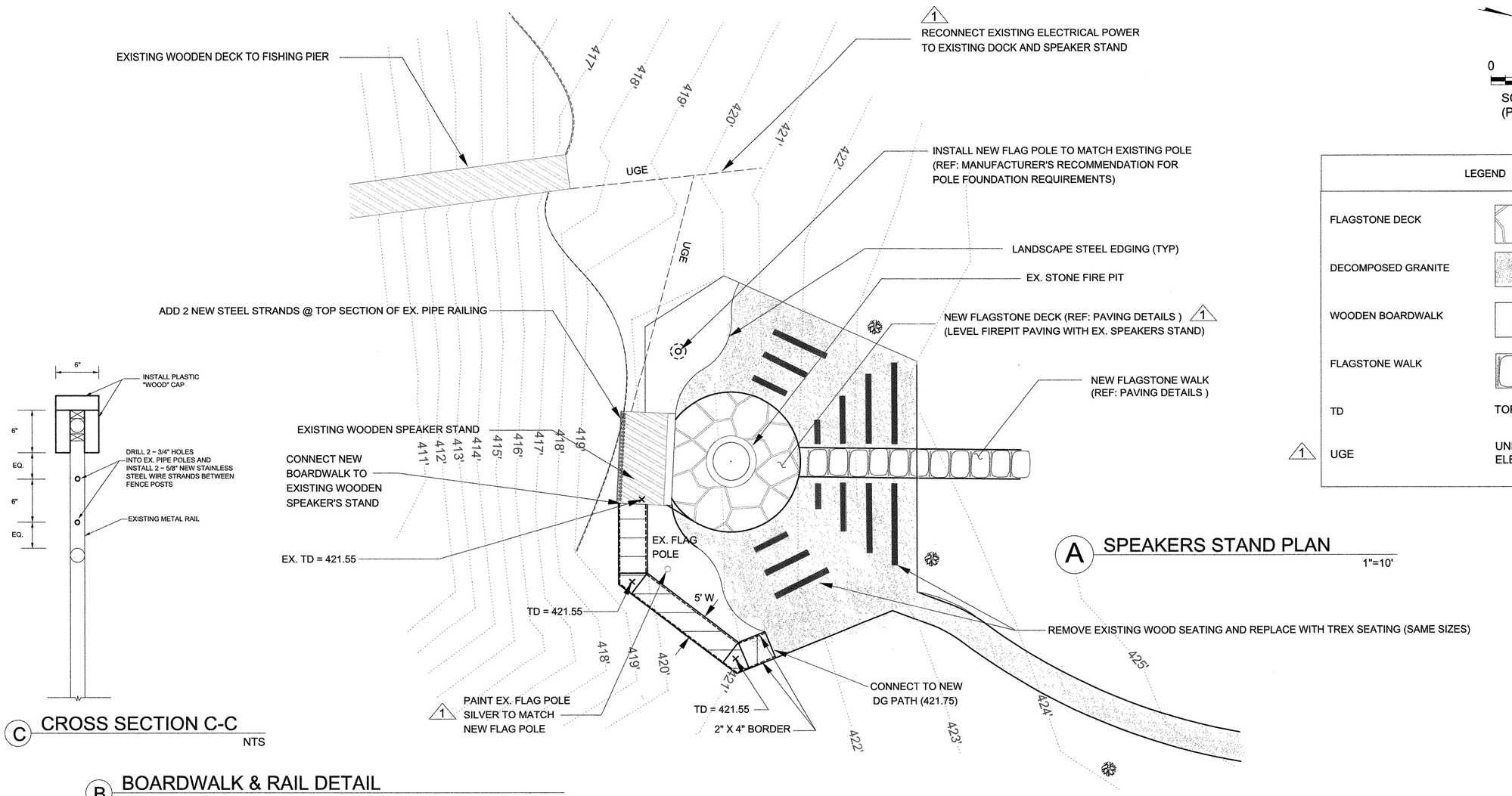
FIREPLACE PLAN & DETAILS

Sheet No.

C10

SHEET 14 OF 35

CAMP RORIE GALLOWAY



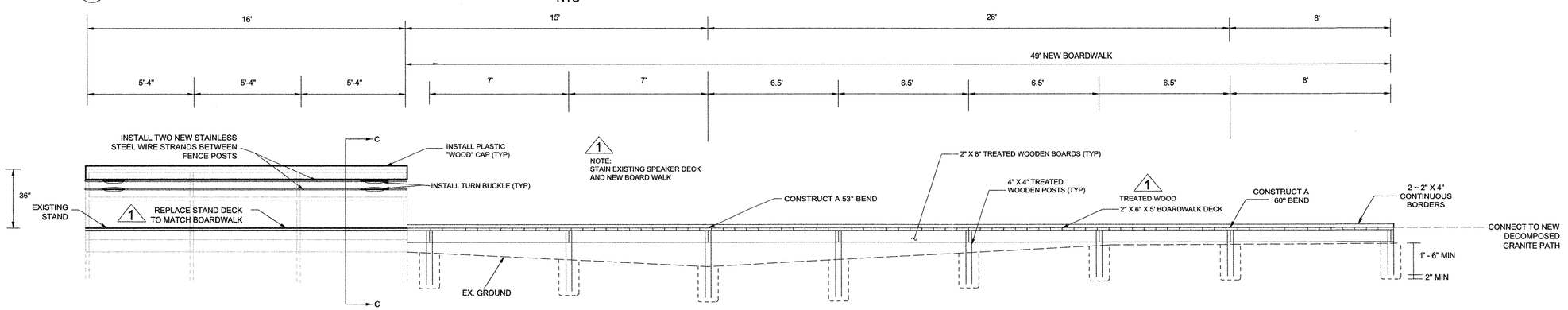
A SPEAKERS STAND PLAN
1"=10'

0 10 20
SCALE: 1" = 10'
(PLAN VIEW)

LEGEND	
FLAGSTONE DECK	
DECOMPOSED GRANITE	
WOODEN BOARDWALK	
FLAGSTONE WALK	
TD	TOP OF WOODEN DECK
1 UGE	UNDERGROUND ELECTRICAL

C CROSS SECTION C-C
NTS

B BOARDWALK & RAIL DETAIL
NTS



METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions		
No.	Date	Item
1	11/27/17	TREATED WOOD, NOTE EX. FLAG POLE, UGE, LEVEL FIREPIT PAVING

Date	10/31/2017
Drawn	MMS
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

SPEAKERS STAND AREA PLAN

Sheet No.
C11
SHEET 15 OF 35

CAMP RORIE GALLOWAY

PART III, SEC. A - SHARED SWPPP DEVELOPMENT

1. **CONTRACTOR** (Operator in charge of SWPPP day-to-day implementation)
   Name: _____
   Address: _____
   Contact: _____ Phone: _____
   Date NOI was submitted to TCEQ: _____
   TCEQ Authorization No.: _____
   OWNER
   Name: CITY OF MESQUITE (MPAR)
   Address: 1515 N. GALLOWAYAVE
   MESQUITE, TX 75149
   Contact: ROBERT BLANKENSHIP Phone: (972) 216-6413
   Date NOI was submitted to TCEQ: _____
   TCEQ Authorization No.: _____

2. **OPERATOR'S RESPONSIBILITIES:**

CONTRACTOR

- Submit Contractor's Notice of Intent (NOI) and appropriate fee to TCEQ.
- Submit a copy of Contractor's NOI to all receiving MS4 Operators.
- Post and maintain a copy of the Contractor's NOI and Construction Site Notice (CSN) plus the City's NOI and CSN on site.
- Update this SWPPP sheet to match contractor's means and methods by providing the following information on this page:
  - Contractor's name and contact information
  - Dates NOIs were submitted and TCEQ authorization numbers
  - Update the Description/Phasing of Land Disturbing Activity as needed
  - Complete the Construction Support Activities information
  - Complete inspectors' information and qualifications
  - Select and note the inspection day
- Install structural BMPs and implement SWPPP.
- Update SWPPP site maps to reflect contractor's daily operations including revisions, installation dates, grading operation dates, BMP maintenance performed, changes to devices, locations of concrete washout areas, etc.
- Perform SWPPP inspections in accordance with the TPDES General Permit and keep copies of inspection reports with SWPPP. List of qualifications for the inspectors are to be kept with the inspection reports. Provide a copy of weekly inspection reports to the owner.
- Maintain structural BMPs as necessary and provide additional BMPs if required to control erosion and sedimentation.
- Establish permanent ground cover on all disturbed areas related to the construction.
- Submit Contractor's Notice of Termination (NOT) to TCEQ and a copy to all receiving MS4 Operators at project completion.
- Maintain contractor's SWPPP records for three years in accordance with the TPDES General Permit.

OWNER

- Submit Owner's Notice of Intent (NOI) and appropriate fee to TCEQ.
- Provide Contractor with copy of Owner's NOI and CSN, and insert copy with SWPPP records.
- Submit a copy of Owner's NOI to all receiving MS4 Operators.
- Perform SWPPP inspections in accordance with the TPDES General Permit and keep copies of inspection reports with SWPPP. List of qualifications for the inspectors are to be kept with the inspection reports.
- Authorize changes to the SWPPP as necessary to control storm water pollutants.
- Submit Owner's Notice of Termination (NOT) to TCEQ and a copy to all receiving MS4 Operators at project completion.
- Maintain owner's SWPPP records for three years in accordance with TPDES General Permit.

PART III, SEC. F.1.a DESCRIPTION OF PROJECT : Provide 2 acres of site improvements, 2 new single story structures, pavement for parking and access, drainage, water utilities.

PART III, SEC. F.1.b POTENTIAL POLLUTANTS & SOURCES:

- ☒ Concrete Saw Water. Pavement removals and new paving joints.
- ☒ Sediment. Exposed ground areas without BMP coverage.
- ☒
- ☒ Fuels & Lubricants. Vehicle operations, refueling and maintenance.
- ☐ Floatable Debris. Improper disposal of construction materials, food & beverage containers, etc.
- ☒ Raw Sewage. Improper collection & disposal of human waste.
- ☒ Pesticides. Improper application or spills when used on seeded or sodded areas.
- ☒ Fertilizer. Improper application or spills when used on seeded or sodded areas.
- ☒ Hyperchlorinated Water. Improper discharge from new water lines.
- ☒ Hydrated Lime. Pavement sub-grade stabilization operations.
- ☒ Waste Concrete. Mixer or transport washouts.
- ☒ Concrete Curing Compound. Pavement finishing operations.
- ☐ Portland Cement. Stored on site for concrete batch plant operations.
- ☒ Fly Ash. Stored on site for concrete batch plant operations.
- ☐ Paints & Solvents. Exterior painting operations.
- ☒ Boring Mud. Waste from horizontal or vertical drilling operations.
- ☐ Sand Blasting Grit. Improper collection of waste from sand blasting.
- Others _____

PART III, SEC. F.1.c DESCRIPTION / PHASING OF LAND DISTURBING ACTIVITY

PHASE 1	Install Initial Erosion Control	Start Date: _____	Complete: _____
PHASE 2	Clearing and Grubbing	Start Date: _____	Complete: _____
PHASE 3	U.G. Utility Installation	Start Date: _____	Complete: _____
PHASE 4	Paving Operations	Start Date: _____	Complete: _____
PHASE 5	Building Construction	Start Date: _____	Complete: _____
PHASE 6	Landscaping & Cleanup	Start Date: _____	Complete: _____

PART III, SEC. F.1.d

DISTURBED AREA = 2.0 ac
DISTURBED AREA (TO DATE) = 0 ac
TOTAL SITE AREA = +80 ac

PART III, SEC. F.1.e SOIL TYPES ON SITE - Houston Black Clay

PART III, SEC. F.1.f GENERAL LOCATION MAP See cover sheet of construction plan set.

PART III, SEC. F.1.g DETAILED SITE MAPS See coversheet and C7 of the construction plan set for detailed erosion control plan requirements.

PART III, SEC. F.1.h CONSTRUCTION SUPPORT ACTIVITIES Discharges of storm water runoff from the following indicated construction support activities are included under this general permit provided that the following conditions are met: (a) the activity is located within one mile of the construction site; (b) the SWPPP includes provisions for controlling erosion and the discharge of pollutants from the support activity site(s); and (c) the support activities do not operate beyond the completion date of the construction activity.

- ☐ Rock Crushers Location: _____
- ☐ Equipment Staging Area Location: _____
- ☐ Material Storage Yard Location: _____
- ☐ Material Borrow Areas Location: _____
- ☐ Material Spoil Areas Location: _____
- ☒ None Applicable

PART III, SEC. F.1.i RECEIVING WATERS The following indicated streams receive storm water runoff from this construction site:

☐ Hickory Creek	☐ Prairie Creek	☐ Rowlett Creek
☐ Russell Creek	☐ Spring Creek	☐ White Rock Creek
☐ Young's Branch	☐ Indian Creek	☐ Brown Branch
☐ Furneaux Creek	☐ Stewart Creek	☐ Beck Branch
☐ Cottonwood Creek	☒ Other: Trinity River	

PART III, SEC. F.1.j TPDES GENERAL PERMIT A copy of the current TPDES General Permit is bound in the Contract Bid Manual, and/or is included by reference herewith.

PART III, SEC. F.1.k NOTICE OF INTENT A copy of the Notice of Intent for the owner and the project contractor are a part of the SWPPP and shall be kept with the site inspection reports for the project. Copies of both shall be posted and maintained at the construction site. A copy of the acknowledgement certificate when received by each Operator shall be kept with the inspection report records.

PART III, SEC. F.2 & 4 BEST MANAGEMENT PRACTICES (BMPs)
The BMPs indicated below are to be used on this project where shown on the Detailed Site Maps referenced above.

Erosion Prevention

☐ Interceptor Swale	☐ Diversion Dike
☐ Pipe Slope Drain	☐ Mulching
☐ Erosion Control Blankets	☐ Channel Protection

Sedimentation Control

☒ Silt Fence	☒ Organic Filter Berm
☐ Triangular Sediment Filter Dike	☐ Inlet Protection
☐ Stone Outlet Sediment Trap	☒ Organic Filter Tube
☒ Check Dams (Rock)	☐ Temporary Sediment Tank
☐ Depressed Grade Sediment Trap*	☐ Pipe Inlet Protection
*Sediment Basin	

* Note: Temporary sediment basins are required to be used for treatment of disturbed land area runoff from areas that are 10 acres or larger. See Part III, Sec. F.2(c)(i)(A) below.

Stabilization Practices

☐ Permanent Seeding	☐ Permanent Sodding
☐ Vegetative Buffer Strips	☐ Protection of Exist. Trees
☐ Temporary Vegetation	

Off-Site Tracking & Dust Control

☒ Stabilized Construction Entrance	☐ Wheel Wash
☐ Dust Control	

Velocity Control

☐ Pipe Outlet Velocity Control	☒ Permanent Sodding

Other Required Controls

☐ Perm. Pipe Outlet Velocity Controls	☒ Debris & Trash Management
☒ Concrete Waste Management	☒ Lime Stabilization Management
☒ Conc. Sawcutting Management	☒ Sanitary Facilities
☐ Sandblasting Waste Management	☐ Chemical Management

PART III, SEC. F.2(c)(i)(A) SEDIMENT BASIN(S) A sedimentation basin is required, where feasible, for a common drainage location that serves an area with ten (10) or more acres disturbed at one time.

- ☒ A sediment basin is not required on this project.
- ☐ A sediment basin(s) is used on this project with location(s), design calculations and capacity calculations provided on the detailed site maps of this SWPPP.
- ☐ A sediment basin(s) is not feasible for this project for the following reasons:
  - ☐ Highly Pervious Soils Soils do not exist on the site that are adequate for dam construction.
  - ☐ Excessively Flat Site Topography will not allow a basin to drain properly.
  - ☐ Trees to Remain Tree removal for basin construction would violate the City's Tree Protection Ordinance.
  - ☐ High Groundwater Elevation The normal groundwater elevation is above the bottom elevation of a basin.
  - ☐ Shallow Depth to Bedrock Bedrock would have to be removed to install a basin.

For each item selected the design engineer shall provide written documentation indicating why a sediment basin cannot be installed on the site and a copy of this documentation shall be included with the inspection report records for the project. Supporting documentation may include soils reports, topographic maps and approved site plans indicating protected tree areas.

PART III, SEC. F.3 PERMANENT STORM WATER CONTROLS _____
- Sodding and seeding _____

PART III, SEC. F.5 APPROVED STATE & LOCAL PLANS This SWPPP has been prepared in accordance with the City of Mesquite requirements. Any updates or revisions to the SWPPP must remain in compliance with federal, state or local approved plans applicable to protecting surface water resources.

PART III, SEC. F.6 MAINTENANCE REQUIREMENTS All erosion and sediment control measures and other protective measures identified in this SWPPP must be maintained in effective operating condition. If through inspections the Operator responsible for implementation of the devices determines that the BMPs are not operating effectively, or is directed by a representative of the operator of the MS4 to perform maintenance, the maintenance must be performed before the next anticipated storm event or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed, or otherwise rendered ineffective must be replaced or corrected immediately upon discovery.

PART III, SEC. F.7 INSPECTIONS OF CONTROLS

Personnel Each Operator shall provide inspection personnel that are knowledgeable of the TPDES General Permit, familiar with the construction site, and knowledgeable with the SWPPP for the site.

CONTRACTOR:

INSPECTOR(S): _____ _____

COMPANY: _____ _____

PHONE: _____ _____

QUALIFICATIONS: A document listing the qualifications of each named inspector shall be kept with the inspection reports for the project which are a part of this SWPPP.

Inspections Interval Each Operator shall have an inspector conduct an inspection of the construction site once every seven (7) calendar days on the following designated day:

CONTRACTOR:
Monday Tuesday Wednesday Thursday Friday

Inspections: Inspectors shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation, discharge locations, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be inspected to ensure that they are properly installed, operating correctly and have not been damaged or destroyed. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

Inspection Reports: A report summarizing the scope of the inspection, the date of the inspection, and major observations relating to the implementation of the SWPPP must be made and retained as part of the SWPPP. Major observations should include: The locations of discharges of sediment or other pollutants from the site; locations of BMPs that need to be maintained; locations of BMPs that failed to operate as designed or proved inadequate for a particular location; and locations where additional BMPs are needed

Actions taken as a result of inspections must be described within, and retained as a part of, the SWPPP. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the site is in compliance with SWPPP and the TPDES General Permit.

The certification on the inspection reports that are in full compliance shall be as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign this document and can provide documentation in proof of such authorization upon request. SIGNATURE _____ DATE _____

Certifications on inspection reports may be signed by an authorized inspector when the site is in full compliance with the TPDES General Permit.

Results of Inspections The SWPPP must be modified based on the results of inspections, as necessary to better control pollutants in runoff. Revisions to the SWPPP must be completed within seven (7) calendar days following the inspection or sooner if directed by the City. If existing BMPs are modified or if additional BMPs are necessary, these changes shall be implemented wherever possible, before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.

PART IV CONCRETE BATCH PLANTS Discharges of storm water runoff from concrete batch plants are not covered under this general permit. If used on this project, the Contractor must have discharges authorized under an alternative general permit or an individual permit for his concrete batch plant operations.

PART V CONCRETE TRUCK WASH OUTS The TPDES General Permit authorizes the wash out at the construction site of concrete trucks for this project that are associated with off-site production facilities. The direct discharge of wash out water to surface water in the State is prohibited. The Operator in charge of SWPPP day-to-day implementation shall indicate the location(s) of concrete wash out areas on the SWPPP site maps for this project.

WATER USE RESTRICTIONS Local water use restrictions in response to drought conditions can affect the ability of permittees to establish permanent ground cover which is required prior to their permit termination. The TPDES General Permit allows modifications to the BMPs used and the inspections interval under these circumstances.

- ☐ The City of Mesquite has not implemented water use restrictions prior to the start of construction on this project.
- ☐ The City of Mesquite implemented water use restrictions during the construction of this project.
  Date Restrictions Implemented:
  Inspections interval modified per General Permit.
  - ☐ BMPs modified on Site Map.
  - ☐ Date Restrictions were lifted:

- ☐ The City of Mesquite implemented water use restrictions prior to the start of construction on this project.
  Date Restrictions Implemented:
  Inspections interval modified per General Permit.
  - ☐ BMPs modified on Site Map.
  - ☐ Date Restrictions were lifted:

PART II, SEC. E.3(e) MS4 OPERATOR NOTIFICATIONS The following MS4 Operators indicated have received or will receive a copy of all Notices of Intent, Notices of Termination and any Notices of Change for this project, if required:
☒ City of Mesquite

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisble@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	NEW SHEET

Date	10/31/2017
Drawn	MJF
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

SWPPP

Sheet No.
C12
SHEET 16 OF 35

CAMP RORIE GALLOWAY

City of Mesquite - General Design Standards

Revision Date: 05-30-2012

C:\Documents and Settings\mrozalle\Local Settings\Temporary Internet Files\OLKA8\GDS-Sanitary Sewer(Primary).doc

Sanitary Sewer Improvements
(Public and Private)

Section 1 General Design & Notes

1.1 Standards

1.1.1 All sanitary sewer system improvements in the City of Mesquite, both privately and publicly maintained shall be designed and constructed in accordance with these general design standards and city standard specifications.

1.1.2 All sanitary sewer system design and construction shall conform to the most current Texas Commission on Environmental Quality (TCEQ) regulations. These regulations can be found in the Texas Administrative Code (TAC), Title 30, Chapter 217, Subchapter C (Design Criteria for Domestic Wastewater Systems).

1.1.3 Systems shall be designed to comply with City Policies Concerning Extension of Water and Sanitary Sewer Mains as listed in the Mesquite City Code of Ordinances Sections 16-31 to 16-46. Generally sanitary sewer mains will be extended across the frontage of a property to serve the upstream property.

1.1.4 Sanitary sewer systems shall be sized and designed according to most current version of the City of Mesquite ***"Wastewater Collection System Master Plan"*** and City Engineer requirements.

1.1.5 Sanitary sewer systems shall be design in accordance with the City of Mesquite Code of Ordinances - Chapter 16 (Water and Liquid Waste).

Section 2 Design Criteria

2.1 Sanitary Sewer Mains

2.1.1 Placement within the ROW or Easements: Sanitary Sewer mains are generally placed in the parkway, 6 feet back of curb, unless otherwise approved by the City Engineer. Sanitary sewer mains outside of street ROW shall be placed in Utility Easements a minimum of fifteen (15) feet wide, unless the easement is next to ROW, then the additional easement will be determined by the City Engineer. Sewer mains that are eight (8) feet deep or more (measured from the final grade to top of pipe) and/or mains larger than 12-inch diameter shall be within utility easements with a minimum width of twenty (20) feet. Additional sewer main clearance and utility easement width may be required by the City Engineer for sanitary sewer mains deeper than 12-feet. Additional utility easement width or clearance may be required by the City Engineer if the main or easement passes close to a primary structure. Utility easements shall be unencumbered with any structure (building, wall, etc.) or supporting auxiliary equipment (HVAC equipment, signs, dumpsters, etc.). Trench boxes shall be required for construction of mains where adequate clearance from streets or primary structures cannot be achieved. Adequate clearance is defined as a distance from the pavement / structure equal to the depth of the trench. Sanitary Sewer easements must be shown on the utility plans and on the approved plats.

2.1.2 Main Size: All sanitary sewer mains shall have a minimum size of eight (8) inches in diameter. Six (6) inch diameter mains may be allowed if serving sixteen (16) single family homes or less and must be approved by the City Engineer. Required size shall be determined by the design engineer and approved by the City Engineer after consulting the most current "the City of Mesquite ***"Wastewater Collection System Master Plan"*** and considering future extensions to serve the entire drainage basin. The City Engineer may require capacity calculations of the developer to verify main sizing and adequate capacity prior to approval of engineering plans or building permits.

2.1.3 Minimum and Maximum Velocity & Slopes: Sanitary sewer mains must obtain a minimum cleansing velocity of 2.0 feet per second with maximum design flows. Sanitary sewer mains maximum velocity shall not exceed 10.0 feet per second. Maximum design flow velocity shall be determined using the "Manning's Equation" with a minimum n value (Roughness Coefficient) of 0.013. Increasing pipe diameter to obtain a flatter slope will not be allowed unless the maximum design flows will fill the pipe greater than half-full.

Size of Pipe (inches)	Minimum Slope (Percent)	Maximum Slope (Percent)
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
Greater than 15	Use Manning's Equation with n=0.013	

2.1.4 Vertical and Horizontal Curves: Vertical curves are not allowed. Horizontal curves will be allowed as long as the curve does not exceed 70% of the manufactures recommendation for the pipe joint deflection. Slopes on curved sewers shall be a minimum of 3% greater than the corresponding minimum slope of sewers on a straight line. Manholes shall be located at the P.C. and P.T. of horizontal curves and a maximum spacing of 300 feet on a curve.

2.1.5 Minimum and Maximum Cover Over Mains: All sanitary sewer mains shall have a minimum cover of five (5) feet from the top of the pipe to the top of ground or proposed pavement top of curb. In all cases, the proposed main shall be deep enough to serve the surrounding property and upstream collection basin. This is accomplished by calculating a 2% grade for the lateral from the centerline of the collection main to the tract or parcel being served. The design engineer is responsible for insuring that sufficient depth and grade is maintained to serve all necessary tracts and parcels upstream in the drainage area. Any exception to minimum depths must be approved by the City Engineer. The design engineer shall also avoid excessive depths of cover. **Sanitary sewer main depths exceeding twelve (12) feet must receive approval by the City Engineer prior to design.**

2.1.6 Abandonment of Existing Mains: Any existing main being replaced or abandoned is to be cut and plugged or removed at the City Engineer's direction.

2.1.7 Spacing between mains: The spacing and separation of water mains from sanitary sewer mains shall follow the nine (9) foot rule as set forth in the TCEQ regulation (30 TAC 217.53). Water and sanitary sewer mains (including manholes) shall be separated by nine feet in all directions and installed in separate trenches. Where the nine foot separation cannot be achieved the following rules shall apply:

New Water & New Sanitary Sewer System						
Condition	**Location**	**Water Material**	**Sewer Material**	**Minimum Vertical Separation***	**Minimum Horizontal Separation***	**Comments**
Sewer Force Main or Gravity Sanitary Sewer Main Parallel to Water Main	Water above Sanitary Sewer Main	Class 200 PVC or DI	150 psi Pressure Rated PVC, HDPE	2.0 feet	4.0'	Separate Trenches
Gravity Sanitary Sewer Crossing Water main	Water above Sanitary Sewer	Class 200 PVC or DI	150 psi Pressure Rated PVC	0.5 feet	NA	Center one joint of sewer pipe on water main.
Gravity Sanitary Sewer Crossing Water main	Sanitary Sewer Main above Water Main	Class 200 PVC or DI	PVC	0.5 feet	NA	Backfill Sewer with Recycled Concrete Flexible Base for 9' of each side of crossing. Center one full joint of sewer pipe on water main.
New Water & Existing Sanitary Sewer System						
New Water Main Parallel to Existing Sanitary Sewer Main	Water above Sanitary Sewer Main	Class 200 PVC or DI	Clay, Concrete, ABS, CI, DI, PVC	2.0'	4.0'	If sewer shows no sign of leakage, then leave sewer alone. If sewer shows signs of leakage, then repair or replace.
New Water Main Crossing Existing Sewer Main	Water above Sanitary Sewer Main	Class 200 PVC or DI	ABS, Clay, Concrete or Composite	2.0'	NA	If sewer shows no sign of leakage, then leave sewer alone. If sewer shows signs of leakage, then repair or replace.
New Water Crossing Existing Sanitary Sewer Main	Sanitary Sewer above Water	Class 200 PVC or DI	ABS, Clay, Concrete or Composite	2.0'	NA	Replace Existing sewer with one joint of DI, or PVC 150 PSI centered over water main.
New Water Main Parallel to Existing Sanitary Sewer Main	Sanitary Sewer above Water	Class 200 PVC or DI	ABS, Clay, Concrete or Composite	2.0'	4.0'	Replace Existing sewer with one joint of DI, or PVC 150 PSI centered over water main. Or concrete encase where mains are closer than 9'.
Existing Water & New Sanitary Sewer System						
New Sanitary Sewer parallel to Existing Water Main	Water above Sanitary Sewer or Sewer above Water	PVC, DI, CI or RCCP	150 psi PVC	2.0'	4.0'	Separate Trenches.
New Sanitary Sewer Crossing Existing Water Main	Water above Sanitary Sewer or Sewer above Water	PVC, DI, CI or RCCP	150 psi PVC	0.5'	NA	Center one joint of sewer pipe on water main.
New Sanitary Sewer Crossing Existing Water Main	Water above Sanitary Sewer Main	PVC, DI, CI or RCCP	Concrete	2.0'	NA	Concrete encase for 9' of each side of crossing. Center one joint of sewer pipe on water main.

2.1.8 Warning Tape: Warning tape shall be installed 18 inches above the top of the embedment or as otherwise directed by the Public Works Construction Inspector. The tape shall be a plastic, high stretch, 4 inch width tape approved by the City Engineer. The tape shall be green in color and have the words "Caution - Sanitary Sewer Main Buried Below" imprinted on the tape.

2.1.9 Private Sanitary Sewer Mains and Services: Private sanitary sewer mains and laterals shall be designed, permitted and inspected per the International Plumbing Code; generally private systems are permitted and inspected by the City Building Inspection Division. Plans should delineate on the plan and profile of a sanitary sewer system the segments that will be City maintained and the segments that will be maintained by the private property owner.

2.2 Service Laterals:

2.2.1 Service Lateral Size: All single family residential service laterals shall have a minimum diameter of four (4) inches. Each residence shall be served by an individual service. For other structures, a minimum of one service per building is required. A six (6) inch lateral is required for non-single family structures with uses which include: school, hospital, washateria, restaurant/bar, manufacturing, food service, car wash, or public assembly. For non-single family structures, the City Engineer may require the design engineer to perform a fixture load calculation to confirm service sizing.

2.2.2 Service Lateral Location: Service laterals shall be located ten (10) feet downstream of the water service for the lot (water service generally to be located at the centerline of the lot), and plugged suitable for testing.

2.2.3 Service Lateral Cover: All sanitary sewer services are to have a minimum cover of three (3) feet and a maximum cover of five (5) feet as measured at the property line or easement line from the proposed grade to top of pipe. In general, the minimum depth for sewer to serve given property with a 4-inch lateral shall be 3-feet plus 2% times the length of the lateral to the middle of the structure. Services that are longer than 100 feet from the main and larger buildings may require a deeper service line and may request an exemption by the City Engineer from the maximum cover requirements. **No services shall be connected to mains over 15 feet deep as measured from the proposed ground elevation to the main flowline.**

2.2.4 Service Lateral Cleanouts - Contractor shall install a property line cleanout per the City of Mesquite General Design Details if required by the City Engineer. See GDS Details S-19 and S-20 for details on single and double property line cleanout assemblies. Contractor shall not install double service cleanouts in concrete paving.

2.2.5 Service Fittings: Service fittings shall be a tee or wye fitting to be installed on the main. Saddle services are not allowed for new construction.

2.2.6 Service Color: All PVC sanitary sewer service laterals shall be green in color.

2.2.7 Location Marking Each individual service location shall be marked on the face of the curb with a four (4) inch high and 1/8" deep double scribe mark "**II**" cut in the curb using an approved motor driven concrete saw. The double scribe mark "**II**" shall receive a coating of green paint, which shall coat the interior and exterior of the cut to a width of one (1) inch.

2.3 Manholes:

2.3.1 Manhole Spacing and Locations: Manholes shall be located at the intersection of all mains, changes in vertical grade or horizontal alignment. Manhole rings and covers should be designed so they do not project in to curb lines, sidewalks, retaining walls, guardrails or other facilities sharing the same rights-of-way or easement. Maximum manholes spacing shall conform to the following table

Largest Main Size at Manhole	Maximum Manhole Spacing
6 inches to 15 inches	500 feet
18 inches to 30 inches	800 feet
Greater than 30 inches	1,000 feet

2.3.2 Manhole Size: Manholes size shall conform to the following table:

Conditions	Minimum Manhole Diameter	Minimum Wall Thickness
Depth of Manhole less than 15 feet (top of ring to flow line of lowest main) with the largest main entering the manhole less than 15 inches diameter	4 feet	5-inches Pre-cast 6-inches Cast-in-place
Depth of Manhole greater than 15 feet (top of ring to flow line of lowest main) with the largest main entering the manhole less than 15 inches diameter	5 feet	6-inches - Pre-cast 8-inches Cast-in-place
All **Drop Manholes** (internal drop required) or **any manhole** with largest main entering 15-inches to 21-inches in diameter	5 feet	6-inches Pre-cast 8-inches Cast-in-place
Manholes with largest main entering 24-inches to 30-inches in diameter	6 feet	8-inches
Larger or deeper mains and other special conditions and situations not covered by above requirements	As Required by the City Engineer	As Required by the City Engineer
There shall be a minimum outside separation of 1-foot between pipes entering a manhole.		

2.3.3 Service Manholes: Manholes will be required for all services where they connect to the main for services receiving flow from food preparation establishments, health service facilities, vehicle maintenance or repair facilities, dry cleaning and laundromat facilities, printing facilities or any other use that the City Engineer determines to have a probability of significant impact on the sanitary sewer system. Manholes are required for any six inch service connection to the sanitary sewer main.

2.3.4 Drop Manholes: Drop Manholes shall be installed if there is an incoming line with a vertical drop of more than two (2) feet measured from flowline to flowline. All drops manholes shall be internal and conform to City of Mesquite standard details. Drop manholes shall have a minimum diameter of five (5) feet. Existing manholes that have drops installed may terminate the drop pipe at the invert ledge.

2.3.5 Manhole Elevation: The top of a manhole located in a floodplain area shall have a minimum elevation of the ultimate 100 year water surface elevation and shall be a minimum of 2-feet and a maximum of 3-feet above the adjacent grade. The tops of all other manholes shall be set to the grade of adjacent land or paving.

2.3.6 Manhole Backfill Material and Testing: The excavation within 6-feet of a manhole shall be backfilled with crushed concrete flexible base (TxDOT, Item 247, Grade 1, Type D) compacted to 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture

2.3.7 Manhole Materials:

2.3.7.1 General Loading: All portions of manholes including castings, lids, and flat top lids shall be designed to withstand an AASHTO HS-20 load.

2.3.7.2 Pre-Cast Manhole Construction Required: Pre-cast manholes shall be used on all new construction unless an alternate is approved by the City Engineer. Pre-cast concrete shall conform to current ASTM designation C 478 (C 478M). Lifting eyes are not allowed in pre-cast manholes. "T" base manholes may be substituted with the City Engineer's approval for pre-cast manholes for RCP mains larger than 36 inches in diameter. Shop drawing shall be submitted to the City Engineer for all pre-cast manholes.

2.3.7.3 Cast-in-Place Manholes: Cast-in-place concrete manholes shall only be allowed with special permission of the City Engineer. Generally the City Engineer will only grant permission for cast-in-place manholes for connections to existing mains carrying live sewer. When cast-in-place manholes are approved by the City Engineer, construction must conform to City of Mesquite General Design Standards S-9 and S-11. Manholes must have a concentric top cone section. Eccentric cone manholes may be used in situations where conflicts with other facilities warrant it.

2.3.7.4 Other Manhole Materials (Brick or Fiberglass Manholes): Brick or fiberglass manholes or any other type of manhole material other than concrete will not be allowed.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisble@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	CHANGED SHEET NO.

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

STANDARD DETAILS

Sheet No.
C13
SHEET 17 OF 35

CAMP RORIE GALLOWAY

2.3.8 Manhole Ring and Covers: New construction manhole ring and covers shall have a 30-inch clear opening and shall be constructed of Ductile Iron and hinged with elastomeric T-gasket in the lid and infiltration plugs at the hinges. The manhole shall be scribed with the words Sanitary Sewer, with the City of Mesquite Logo and with the warning "Confined Space - Entrance by Permit Only". The lid shall be equipped with a MPIC Pick Slot. All rings shall be bolted to the manhole cone section with a layer of mastic applied between the ring and cone section. Retrofit construction manhole ring and covers may have a 24-inch clear opening with other features the same as above. All manhole ring and covers on manholes with a connecting sanitary sewer main size of 15-inches or larger shall be coated with a City approved structural / high sulfide resistant coating (see **City of Mesquite Approved Sewer Materials List**).

2.3.9 Manhole Grade Rings: Manhole rings and covers shall be adjusted by the use of approved grade rings with butyl sealant between grade rings, cover ring and manhole. Maximum adjustment is eight (8) inches. Grade rings may be HDPE or Rubber as shown on the **City of Mesquite Approved Sewer Materials List** and in accordance with NCTCOG Public Works Construction Standard 502.1.2. Precast concrete grade rings, bricks, steel, iron or and broken concrete are not acceptable for adjustment.

2.3.10 Manhole Inverts: All manholes shall have full depth inverts to the depth of the largest entering main.

2.3.11 Manhole Ring Sealing to Manhole Cone/Flat Top: All manholes rings shall be sealed and contain an internal manhole chimney seal or approved external seal or wrap as shown on the **City of Mesquite Approved Sewer Materials List.**

2.3.12 False Bottoms: All manholes shall have a ¾ inch thick plywood false bottom installed prior to initiation of grading and/or liming operations.

2.3.13 Manhole Coatings: All manholes with a connecting pipe of fifteen (15) inches in diameter or larger shall be coated. Manholes shall be coated with a City approved structural/high sulfide resistant coating (see **City of Mesquite Approved Sewer Materials List).**. Coating application procedures shall conform to the recommendations of the coating manufacturer, including material handling, mixing, and environmental controls during application, safety, and equipment.

2.3.14 Manhole Testing: Manhole testing shall be in accordance with section 5.3.

2.3.15 Location Marking: Each manhole shall be marked on the face of the curb with a four (4) inch high and 1/8" deep mark "**MH**" cut in the curb using an approved motor driven concrete saw. The double mark "**MH**" shall receive a coating of green paint, which shall coat the interior and exterior of the cut to a width of one (1) inch.

2.3.16 Main Line Cleanouts: Main line cleanouts are to be located and installed as per approved drawings and City of Mesquite Standard Detail S-6. Each cleanout shall be marked on the face of the curb with a four (4) inch high and 1/8" deep mark "**CO**" cut in the curb using an approved motor driven concrete saw. The double mark "**CO**" shall receive a coating of green paint, which shall coat the interior and exterior of the cut to a width of one (1) inch.

2.3.17 Manhole Stub Outs: Stub outs from manholes shall be a minimum five (5) foot long and capped.

Section 3 Pipe Materials

3.1 Polyvinyl Chloride (PVC) Pipe:

3.1.1 Polyvinyl Chloride (PVC) Pipe (Mains 4-inch through 15-inch): Gravity mains from four (4) inches through fifteen (15) inches in diameter shall conform to current ASTM D 3034, **SDR 26**. All bells shall be formed integrally with the pipe and shall contain a factory installed elastomeric gasket of the "Rieber" style that is mechanically restrained using a steel band or ring. No solvent cement joints shall be permitted unless specifically authorized in writing by the City Engineer.

3.1.2 Polyvinyl Chloride (PVC) Pipe (Mains 18-inch through 27-inch): Gravity mains from eighteen (18) inches through twenty-seven (27) inches in diameter with burial depths less than fifteen (15) feet shall conform to current ASTM F 679, SDR 26, PS 115, manufactured with a **12364A resin (material PVC 1120)** and must have a **solid wall**. Pipe with corrugated interior or exterior walls or voids in the wall will not be accepted.

3.1.3 Color - Polyvinyl Chloride (PVC) Pipe: All PVC sanitary sewer pipes shall be green in color.

3.2 Ductile Iron Pipe: Ductile Iron Pipe shall only be used for sanitary sewer piping at aerial crossings and crossings where loading may be a concern. All Ductile Iron Pipe supplied for City sanitary sewer systems shall conform to AWWA C151, Thickness Class 54. All ductile iron pipe supplied for sanitary sewer shall be provided with a Protecto 401 by Induron Protective Coatings ceramic epoxy lined interior or a polylined interior. The dry coating thickness shall be a minimum of 40 mils. The interior coating shall be holiday tested and certified by a third party testing lab and any defects repaired. The exterior of the pipe shall have an asphaltic coating in accordance with AWWA C151 and AWWA C104.

3.3 Fiberglass Pipe: Fiberglass pipe shall be used for mains 30-inches and larger or as approved by the City Engineer. Fiberglass wastewater pipe shall conform to AWWA M45 and ASTM D3262-06. See the **City of Mesquite Approved Sewer Materials List** for approved manufacturers. Pipe shall have a minimum stiffness of 46 psi. The pipe manufacturer shall provide detailed design calculations sealed by a licensed professional engineer registered in the state of Texas in accordance with AWWA M45 and Appendix B Technical Memorandum for Pipe Loading showing the suitability of the pipe stiffness to the installation conditions specified and that the maximum specified pipe deflection is not exceeded. Direct buried pipe joints shall be either of the following: Integral Bell and spigot with rubber ring gasket or fiberglass coupling joints with two rubber seals. Joints shall be in accordance with AWWA M45 and ASTM D4161-01 (Renewed 2006)

Section 4 Installation & Construction

4.1 General: Open cut installation of all sanitary sewer shall conform to North Central Texas Council of Governments (NCTCOG) Standard Specifications for Public Works Construction Items 505.1 and 507 except as amended in these standards.

4.2 Excavation: Excavation in general, shall be made in open cut from the surface of the ground and shall be no greater in width and depth than is necessary to permit the proper construction of the work. When the trench depth exceeds five (5) feet, see Section 6.2 regarding "trench safety" requirements. The amount of trench excavation to grade shall not exceed one hundred (100) feet from the end of the pipe laying operations and no excavation shall be three hundred (300) feet in advance of the completed pipe operations (includes backfilling). At the end of the workday, all trench excavation shall be backfilled. Any landscaping and irrigation system within the City medians and right-of-ways that is disturbed, removed, or damaged during construction shall be replaced to original condition or better by a licensed irrigator.

4.3 Backfill and Compaction: For trenches not under paving, final backfill material shall be from the trench excavation placed in a maximum of 12 inch loose lifts and compacted to 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture. Under existing or proposed paving, backfill shall be crushed concrete flexible base (TxDOT, Item 247, Grade 1, Type D) compacted to 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture unless alternate material is approved by the City Engineer. The contractor shall take new proctors at each change in soil type. Water jetting will not be allowed for any trench.

Section 5 Testing Requirements

5.1 Notification of Testing: The Contractor shall notify the assigned City Public Works Construction Inspector of all testing 24 hours prior to the scheduled test. Copies of all test reports shall be sent to the City Public Works Construction Inspector for review and acceptance and inclusion in the City project file. Projects will not receive City acceptance until all test results are complete and satisfactory.

5.2 Compaction of Trenches and Excavations: The Contractor shall take nuclear gauge density tests per ASTM D2922 at a frequency of one test per lift, per 300 linear feet of trench (including services) at locations specified by the City Public Works Inspector. In addition to the above trench density tests, two nuclear gauge density tests per ASTM D2922 shall be taken of the manhole backfill within 4 foot of the manhole. Density tests must meet a minimum compaction of 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture.

5.3 Manhole Testing: All manholes shall be vacuum tested including grade rings and casting per NCTCOG Public Works Construction Standard 502.1.5.2 and meet TCEQ regulations 30 TAC 217 and ASTM C1244, "*Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill*". The time for the vacuum to drop from 10 inches of mercury to 9 inches shall not be less than two (2) minutes.

5.4 Sanitary Sewer Mains and Lateral Testing:

5.4.1 Deflection Testing: Mains less than thirty six (36) inches in diameter shall pass deflection mandrel test per NCTCOG Standard Specifications for Public Works Construction, Item 507.5.1.4 Flexible Pipe (Deflection) Testing and TCEQ regulations Chapter 217.57(b) Deflection Testing. Alternate methods for measuring deflection for pipes larger than thirty six (36) inches in diameter subject to City approval. Testing of mains thirty six (36) inches and larger shall occur at least 30 days after installation and backfill. Pipe with deflection exceeding the percentage allowed deflection per NCTCOG table 507.5.1.4.2(a) at the time of testing shall be uncovered and reinstalled. If deflection exceeds 7% at the time of testing, pipe shall be removed and replaced with new materials. All failed joints, pipes, sections or structures shall be retested upon completion of remedial actions. Failed sections shall be retested after the remedial construction has been in place for 30 days.

5.4.2 Air Testing: Mains less than thirty six (36) inches in diameter and laterals shall pass a Low Pressure Air Test per NCTCOG Standard Specifications for Public Works Construction, Item 507.5.1.3 Low Pressure Air Testing and TCEQ regulations 30 TAC Chapter 217.57(a)(1) Low Pressure Air Test. Pipes 36-inches and larger may be tested per NCTCOG item 507.5.1.3.3 (individual joint air test method). Testing of mains thirty six (36) inches and larger shall occur at least 30 days after installation and backfill. All failed joints, pipes, sections or structures shall be retested upon completion of remedial actions. Failed sections shall be retested after the remedial construction has been in place for 30 days.

5.4.3 TV Camera Inspection: After the deflection mandrel and air pressure test, the contractor shall conduct a color television camera inspection of the interior of the installed sanitary sewer system. The main must be laced with enough water to fill any low points. A copy of the recording in digital format and storage device (DVD disk, flash drive, etc.) as specified by the City, with written log of the inspection, shall be provided to the Public Works Construction Inspector prior to final acceptance of the project.

Section 6 Safety

6.1 General: All contractors and developers, with their employees and agents, shall comply with all applicable Federal, State and Local safety laws and regulations, including but not limited to the Occupational Safety and Health Act of 1970, and ordinances rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property to protect them from death, injury, damage or loss.

6.2 Trench Safety: All excavation and trench operations shall be conducted in accordance with 29 Code of Federal regulations (CFR), Part 1926, Subpart P and all other applicable State and City regulations. Prior to commencing any excavation or trenching operation for trenches greater than 20 feet in depth, the Contractor shall submit to the City Engineer a plan indicating the intended procedures to be used by the Contractor to comply with OSHA requirements. Such plan shall further identify the "Competent Person" as required by paragraph 1926.651(k)(1) that will work with each crew. An affidavit from the Contractor indicating the competent person must be submitted with the trench safety plan to the City Engineer. A copy of the trench safety plan must be on the job at all times. The City reserves the right to deny payment for any construction activities in excavations or trenches that are not in accordance with the submitted plan.

6.3 Confined Space Entry: All entry into confined spaces conducted in accordance with 29 Code of Federal regulations (CFR), Part 1910.147 P and all other applicable State and City regulations. Prior to commencing any confined space entry, the Contractor shall submit to the City Engineer a copy of the confined space entry plan with a completed permit.

6.4 Work Zone Traffic Control: Where work is to be carried out in or adjacent to any street, alley or public place, the Contractor shall design, furnish, erect and maintain such barricading, signage, barriers, markers, stripping or other traffic control devices as are necessary to alert, direct and protect the traveling public. These traffic control devices shall be designed, installed and maintained in accordance with the *City of Mesquite Work Zone Traffic Control Guidelines* and the most current edition of the *Texas Manual of Uniform Traffic Control Devices*. In addition, the Contractor shall provide and maintain such other barricades and signs as deemed necessary by the City Engineer. The Contractor's responsibility for the furnishing and maintenance of these traffic control devices shall not cease until the project is accepted by the City Engineer.

Section 7 Aerial Crossings

7.1 Aerial Crossing Design: Proposed sanitary sewer pipe crossing a channel or creek with less than three (3) feet of cover between the top of pipe and flow line of the channel or creek, shall be supported by a pier system as shown in the Aerial Crossing Details sheet.. The City Engineer reserves the right to require design and construction of a long span aerial crossing that minimizes the number of piers needed to support the pipe. The supported pier system shall span the entire floodplain to account for stream meander.

7.2 Site Specific Design: The notes and details for aerial crossings shown in the GDS represent the minimum standard of care desired by the City for aerial crossings. In all cases, the consulting engineer shall be responsible for obtaining sufficient subsurface investigations and performing all necessary structural and hydraulic calculations for the aerial crossing and associated piping, piers, and attachments. Final pier shape, bearing depth, reinforcing configuration, etc. shall be determined by the design engineer. Aerial Crossings should be designed in accordance with the ***AASHTO LRFD Bridge Design Specifications***. In addition the Ductile Iron Pipe Research Association (DIPRA) publication ***Design of Ductile Iron Pipe on Supports*** provides guidance on the design of aerial crossing pipe structures. Aerial crossing design and construction plans should be coordinated with appropriate erosion control plans for bank protection where the pipe enters and exits the creek.

7.3 Geotechnical Report Required: A geotechnical design report will be required of all aerial crossings to determine soil strata and design bearing loads for piers.

7.4 Flood Study Required: A flood study meeting FEMA technical requirements will be required if the aerial crossing is located on a creek or stream that is a mapped FEMA floodplain, or if in the opinion of the City Engineer the hydraulic impact of the aerial crossing may impact other property owners.

Section 8 Lift Stations

8.1 Lift Station Design: Lift Stations and force mains allowed only on approval of the City Engineer after all other design alternatives have been evaluated and determined to be unfeasible. They must be designed in accordance with TCEQ requirements and requirements as determined by the City of Mesquite City Engineer.

Section 9 Metering Stations

9.1 Metering Stations: Metering Stations allowed only on approval of the City Engineer after all other design alternatives have been evaluated and determined to be unfeasible. They must be designed in accordance with TCEQ requirements and requirements as determined by the City of Mesquite City Engineer.

Section 10 Siphons

10.1 Inverted Siphon or Sag pipes: Siphons or Sag pipes allowed only on approval of the City Engineer after all other design alternatives have been evaluated and determined to be unfeasible. A siphon or sag pipe must be designed in accordance with TCEQ requirements. The design must include:

- ☐ Two or more barrels
- ☐ Minimum 8-inch diameter pipe
- ☐ Two manholes with adequate clearance for cleaning.
- ☐ Sufficient head to achieve a velocity of at least 3.0 feet per second at initial and design flows. The arrangement of inlet and outlet works must divert the normal flow to one barrel and designed such that any barrel can be taken out of service for cleaning
- ☐ Provisions must be made to allow cleaning across each bend
- ☐ Designed to minimize nuisance odors.

Section 11 Odor Control Unit

11.1 Odor Control Unit: The City Engineer may require the installation of odor control unit at force mains, lift stations and siphons. Odor control units must be designed in accordance with requirements as determined by the City of Mesquite City Engineer and be compatible with existing odor control units within the City.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln. Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	CHANGED SHEET NO.

Date 10/31/2017
Drawn SH
Checked LF
MI Project No. 17029
City Project No.

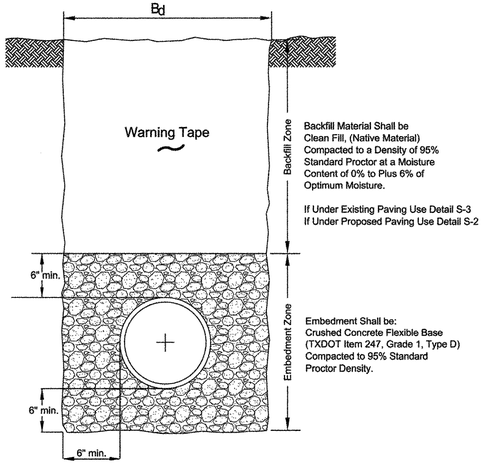
Sheet Title

STANDARD DETAILS

Sheet No. 1 C14

SHEET 18 OF 35

CAMP RORIE GALLOWAY



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

Notes:
1. See Sewer System Improvements Notes for Design & Construction Requirements.
2. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.

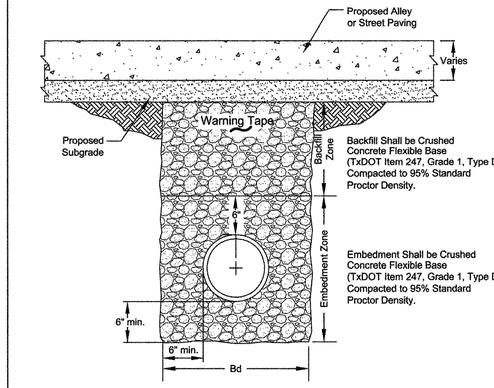
MESQUITE TEXAS Real. Texas. Service. Public Works

TYPICAL SEWER MAIN PIPE EMBEDMENT DETAIL NOT UNDER PAVEMENT

GENERAL DESIGN STANDARDS SANITARY SEWER COLLECTION SYSTEM

SCALE - N.T.S. | DRAWN BY: NCJ

APPROVAL DATE: 07/06/2015 - L | SHEET: S-1



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

Notes:
1. See Sewer System Improvements Notes for Design & Construction Requirements.
2. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.

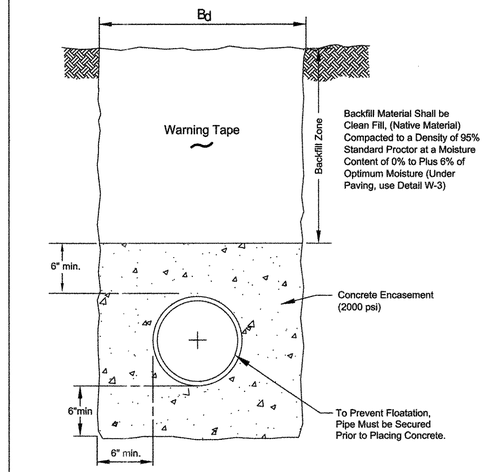
MESQUITE TEXAS Real. Texas. Service. Public Works

TYPICAL SEWER MAIN PIPE EMBEDMENT DETAIL UNDER NEW PAVING

GENERAL DESIGN STANDARDS SANITARY SEWER COLLECTION SYSTEM

SCALE - N.T.S. | DRAWN BY: NCR

APPROVAL DATE: 6/04/2012-L | SHEET: S-2



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

Notes:
1. See Sewer System Improvements Notes for Design & Construction Requirements.
2. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.

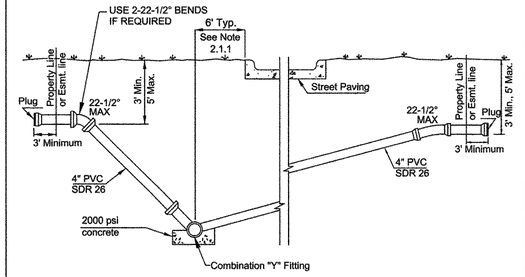
MESQUITE TEXAS Real. Texas. Service. Public Works

TYPICAL CONCRETE ENCASEMENT DETAIL

GENERAL DESIGN STANDARDS SANITARY SEWER COLLECTION SYSTEM

SCALE - N.T.S. | DRAWN BY: NCJ

APPROVAL DATE: 07/06/2015 - L | SHEET: S-4



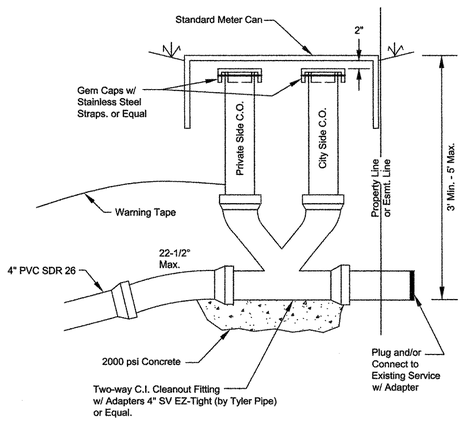
MESQUITE TEXAS Real. Texas. Service. Public Works

SANITARY SEWER LATERAL

GENERAL DESIGN STANDARDS SANITARY SEWER COLLECTION SYSTEM

SCALE - N.T.S. | DRAWN BY: NCR

APPROVAL DATE: 07/06/2015 - L | SHEET: S-5



Install only at the direction of the City Engineer.

MESQUITE TEXAS Real. Texas. Service. Public Works

SANITARY SEWER LATERAL WITH DOUBLE CLEANOUT

GENERAL DESIGN STANDARDS SANITARY SEWER COLLECTION SYSTEM

SCALE - N.T.S. | DRAWN BY: NCJ

APPROVAL DATE: 6/29/10-L | SHEET: S-19

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	1/27/17	CHANGED SHEET NO.

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

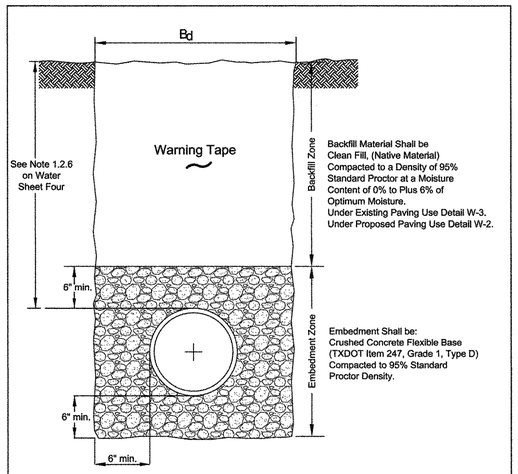
STANDARD DETAILS

Sheet No.

1 C15

SHEET 19 OF 35

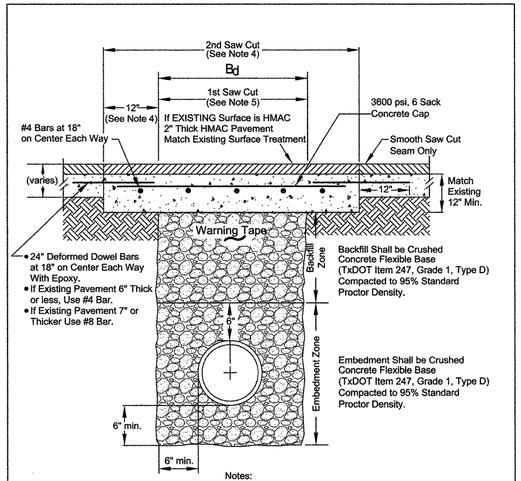
CAMP RORIE GALLOWAY



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

Notes:
1. Typical Cover Over Water Main is 42".
2. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.
2. Ductile Iron Pipe and all Fittings Shall Have Continuous Polyethylene Wrap. (Blue Color)

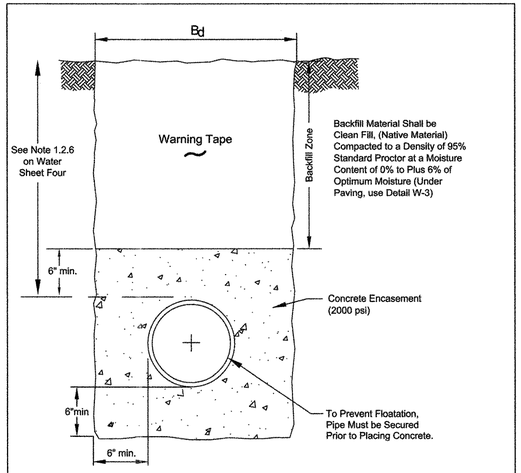
MESQUITE TEXAS Real. Texas. Service.	Public Works	TYPICAL WATER MAIN PIPE EMBEDMENT DETAIL NOT UNDER PAVEMENT	GENERAL DESIGN STANDARDS WATER UTILITIES	
			SCALE - N.T.S.	DRAWN BY: NCJ
			APPROVAL DATE: 07/06/2015 - L	SHEET: W-1



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

Notes:
1. Pavement Cuts Shall be Full Depth Saw Cuts.
2. Typical Cover Over Water Main is 42".
3. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.
4. Within 3' of an Existing Joint, Remove to Joint. City Public Works Inspector can Require Additional Pavement Removal and Replacement to an Adjacent Joint.
5. Make 1st Saw Cut when Beginning Pipe Installation. Make 2nd Cut after Pipe Installation, Test and Backfill to Bottom of Proposed Pavement Replacement.

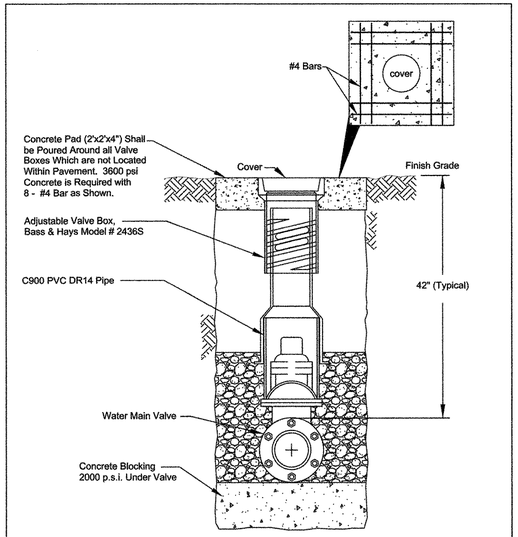
MESQUITE TEXAS Real. Texas. Service.	Public Works	TYPICAL PAVEMENT CUT DETAIL	GENERAL DESIGN STANDARDS WATER UTILITIES	
			SCALE - N.T.S.	DRAWN BY: NCJ
			APPROVAL DATE: 02/01/10-L	SHEET: W-3



Pipe Size	Max Bd
12" & Smaller	32"
12" to 24"	Outside Dia Pipe + 16"
24" to 72"	Outside Dia. Pipe + 24"

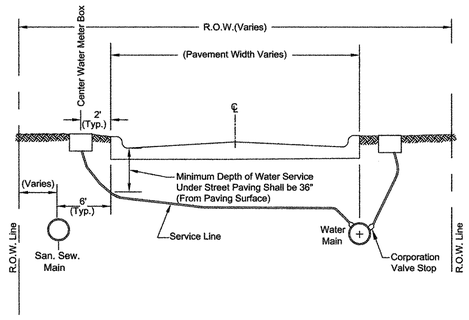
Notes:
1. Typical Cover Over Water Main is 42".
2. Warning Tape Shall be Placed Approximately 24" Above Top of Pipe.

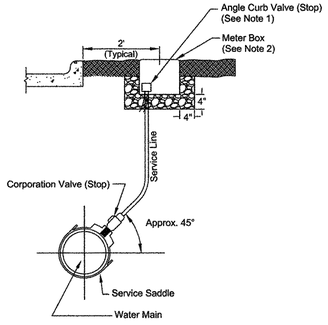
MESQUITE TEXAS Real. Texas. Service.	Public Works	TYPICAL CONCRETE ENCASEMENT DETAIL	GENERAL DESIGN STANDARDS WATER UTILITIES	
			SCALE - N.T.S.	DRAWN BY: NCJ
			APPROVAL DATE: 07/06/2015 - L	SHEET: W-4



Notes:
See Details W-1, W-2, W-3 or W-4 for Valve Embedment & Backfill Requirements.

MESQUITE TEXAS Real. Texas. Service.	Public Works	TYPICAL VALVE DETAIL	GENERAL DESIGN STANDARDS WATER UTILITIES	
			SCALE - N.T.S.	DRAWN BY: NCJ
			APPROVAL DATE: 02/01/10-L	SHEET: W-5





Notes:
1. Angle Meter Valve shall be Placed so that Top of the Water Meter is 6" - 10" Below Top of Meter Box.
2. New Meter Box Set in 3/4" to 1" Gravel or Stone Drain Base. Set Lid at 1/4" per Foot Above the Top of the Curb.
3. Do Not Set Water Meter Box in Sidewalk, Driveways or Other Paved Surfaces.
4. Water Service Taps Shall be Seperated by a Minimum 3' Space along the main.
5. See General Design Standards for Material Specifications.

MESQUITE TEXAS Real. Texas. Service.	Public Works	TYPICAL WATER SERVICE DETAILS	GENERAL DESIGN STANDARDS WATER UTILITIES	
			SCALE - N.T.S.	DRAWN BY: NCJ
			APPROVAL DATE: 07/06/2015 - L	SHEET: W-12

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
1 11/27/17 CHANGED SHEET NO.

Date 10/31/2017
Drawn SH
Checked LF
MI Project No. 17029
City Project No.

Sheet Title
STANDARD DETAILS

Sheet No.
1 C16
SHEET 20 OF 35

CAMP RORIE GALLOWAY

Water System Improvements
(Public and Private Systems)
Revised: 06-11-2015

Section 1 General Water System Standards

1.1 Design and Construction Standards

1.1.1 All water system improvements in the City of Mesquite, both privately and publicly maintained shall be designed and constructed in accordance with these general design standards and city standard specifications and construction details.

1.1.2 All water system design and construction shall conform to the current Texas Commission on Environmental Quality (TCEQ) regulations. These regulations can be found in the Texas Administrative Code (TAC), Title 30, Chapter 290, Subchapter D - (Rules and Regulations for Public Water Systems).

1.1.3 All water system design, construction and materials shall conform to current American Water Works Association (AWWA) standards.

1.1.4 All materials that will come into contact with potable water must be approved for use under National Sanitation Foundation (NSF) Standard 61 (Drinking Water System Components - Health Effects).

1.1.5 Water systems shall be designed to comply with City Policies Concerning Extension of Water and Sanitary Sewer Mains as stated in the Mesquite City Code Chapter 16.

1.1.6 Water systems shall be designed and installed in compliance with the latest version of the **City Water Distribution Master Plan**.

1.1.7 Water systems shall be designed to comply with the latest City adopted version of the ***International Fire Code*** with adopted City amendments.

1.1.8 Water systems shall be designed to comply with the current Insurance Services Office (ISO) Fire Suppression Rating Schedule (edition 02-03) - Section 600 - Water Supply.

1.2 General Requirements for Water System Design and Installation

1.2.1 System Design Pressure: All components of the water system (pipe, valves, fittings, restraints, blocking, services, and appurtenances) shall be designed for 200 psi working pressure and an AASHTO HS-20 live load except where loading conditions could exceed HS-20 live load limits in which case the City Engineer shall specify the appropriate design load.

1.2.2 Minimum Main Size and Fire-Flow Requirements: A minimum 8-inch diameter main is required for all water mains in residential and commercial areas, except 6-inch diameter will be accepted in residential cul-de-sac streets serving 16 homes or less. A minimum 12-inch main is required in or adjacent to all industrial zoned areas of the City. Larger main sizes may be required in compliance with the latest version of the ***City Water Distribution Master Plan***. Larger main sizes may be required if needed to produce the required fire flow. The design engineer will be required to demonstrate compliance with Fire-Flow Requirements for Buildings as required by the ***International Fire Code, Appendix D***, latest City adopted version with adopted City amendments.

1.2.3 Extension of Mains: Water mains will be extended across the street frontage of all property to allow service to adjacent property in accordance with the **Mesquite City Code, Chapter 16**.

1.2.4 Looped System Requirements: Water mains serving more than two fire hydrants must be a looped system. Looped water mains through the site should be connected to two different existing water mains to provide system redundancy.

1.2.5 Fire Hydrant Number and Spacing: Fire hydrants shall be spaced in accordance with the latest City adopted version of the **International Fire Code**, Appendix C: Fire Hydrant Locations and Distribution, with adopted City amendments.

1.2.6 Minimum Cover: Water mains with a nominal diameter less than 14-inches shall have a minimum cover of 42" and water mains with a nominal diameter 14" or greater shall have a minimum cover of 60-inches, unless otherwise approved by the City Engineer.

1.2.7 Profiles Required: A profile is required for all water mains twelve (12) inches or larger. A profile is required for all bores greater than 20-feet in length for mains larger than four (4) inches.

1.2.8 Utility Clearance: Water mains and sanitary sewer mains shall have a minimum clearance of nine (9) feet. If this clearance cannot be maintained, TCEQ alternate requirements shall be met.

1.2.9 Placement within the ROW or Easements: Water mains are generally placed to be centered under the back of curb, unless otherwise approved by the City Engineer. Water main easements must be a minimum of fifteen (15) feet wide, unless the easement is next to ROW, then the additional easement will be determined by the City Engineer. Water mains that are eight (8) feet deep or more (measured from the final grade to top of pipe) and/or mains larger than 12-inch diameter shall be within utility easements with a minimum width of twenty (20) feet. Additional utility easement width or clearance may be required by the City Engineer if the main or easement passes close to a primary structure. Utility easements shall be unencumbered with any structure (building, wall, etc.) or supporting auxiliary equipment (HVAC equipment, signs, dumpsters, etc.). Fire sprinkler lines are private maintenance and shall not be within a City easement. Water easements must be shown on the utility plans and on approved plats.

1.2.10 Construction Surveying and Staking: Storm Sewer Inlets shall be staked prior to water main placement so that the water main can be gradually deflected around and below the proposed inlets or other obstructions or conflicts in alignment. The Contractor shall stake the location of the back of curbs to ensure no valves fall within a curb.

1.2.11 Warning Tape: Warning tape shall be installed 24 inches above the top of pipe or as otherwise directed by the City Engineer. The tape shall be a plastic, high stretch, 4-inch width tape approved by the City Engineer. The tape shall be blue in color and have the words "Caution - Water Main Buried Below" imprinted on the tape.

1.2.12 Grading Operations: The Contractor shall complete all fill and cut operations in accordance with released engineering plans prior to installing any utilities (i.e. water, sanitary sewer, drainage).

1.2.13 Abandonment of Water Mains: Any existing water main being replaced shall be cut and plugged or removed as directed by the City Engineer. Valve stacks for abandoned mains shall be removed and/or filled with concrete as shown in the appropriate General Design Standard Detail.

1.2.14 Operation of Valves: The Contractor shall not operate any valves in the existing water system nor operate any new valves that would allow connection to the City water system. The Contractor shall coordinate and notify the City Public Works Construction Inspector 48-hours in advance to schedule a shut-down of the existing water system by City personnel. The City may require a night or weekend shut-down in order to maintain customer service.

1.2.15 Temporary Fire Hydrant Meters: The City of Mesquite requires portable fire hydrant meters for temporary and/or construction water use at construction sites. They are routinely used to account for water usage prior to installation of a permanent water meter. These meters have a backflow prevention device attached. The City requires support for this device to prevent excessive torque when attached to a fire hydrant. The City requires payment of a $700.00 deposit for each meter. An invoice for water use is rendered each month. Arrangements for portable fire hydrant meters are administered by the City of Mesquite Water & Sewer Accounting Division at 757 N. Galloway Avenue. Please coordinate meter usage through the Utilities Division - Meter Services Section.

Section 2 Water Pipe Materials

2.1 Polyvinyl Chloride (PVC) Pipe

2.1.1 Pipe: All PVC Pipe supplied for water systems sizes 4-inch diameter through 12-inch diameter shall conform to AWWA C900, Class 305 (DR14) and must be blue in color (per the American Public Works Association Uniform Color Code). Pipe shall be installed so that identification lettering for the DR class shall be face up in the trench. PVC pipe shall be designed for a minimum working pressure of 200 p.s.i. and minimum field test pressure of 200 p.s.i.

2.1.2 Fittings: See Section 3.

2.1.3 Joints: Push on joints, ASTM D-3139.

2.1.4 Gaskets: ASTM F477 Standards.

2.2 Ductile Iron

2.2.1 Pipe: All Ductile Iron (DI) Pipe supplied for City water systems shall conform to AWWA Standard C151, thickness Class 52 for all sizes, designed for a minimum working pressure of 200 p.s.i., minimum field test procedure of 200 p.s.i. and a HS-20 live load. All Ductile Iron Pipe shall be gauged pipe with consistent outside diameter.

2.2.2 Coatings: All DI pipe shall be provided with the standard interior cement mortar lining and exterior asphaltic coating in accordance with AWWA C104.

2.2.3 Fittings: See Section 3

2.2.4 Polyethylene Tube Wrap: All cast and ductile iron pipe, fittings and valves shall be wrapped with polyethylene tube wrap in accordance with AWWA C105. The polyethylene wrap must be blue in color. The wrap shall be installed in accordance with AWWA C105, Method A.

2.2.5 Joints: All joints & glands shall be ductile iron in accordance with AWWA C111 with a minimum pressure rating of 250 p.s.i. Bolts and Nuts for all joints and glands shall be ASTM A325 Type 3 Enhanced Corrosion Resistant steel, or stainless steel Grade 304 or 316

2.2.5.a Push-on Joint: AWWA C111

2.2.5.b Flanged Joint: AWWA C115

2.2.5.c Mechanical Joints: AWWA C111

2.3 Concrete Pressure Pipe

2.3.1 Pipe: Concrete Pressure Pipe may be supplied for water systems for pipe diameters 16" and larger and shall conform to AWWA C303 & AWWA C304, designed for a minimum working pressure of 200 p.s.i. minimum field test pressure of 200 p.s.i., and an HS-20 live load.

2.3.2 Fittings: All fittings and glands shall be designed and fabricated in accordance with AWWA C303 & AWWA C304 and shall be designed for a minimum working pressure of 200 p.s.i., minimum field test pressure of 200 p.s.i., and an HS-20 live load. All fittings and valves shall be mechanically restrained using full circle welds or equal as approved by the City Engineer. Bolts and Nuts for all fittings shall be ASTM A325 Type 3 Enhanced Corrosion Resistant steel, or stainless steel Grade 304 or 316.

Section 3 Fittings

3.1 General: All mechanical joint fittings, glands and restraints for Ductile Iron pipe or PVC pipe shall be Ductile Iron in accordance with AWWA C153 (compact fittings) & AWWA C111 with a minimum pressure rating of 350 p.s.i. Flange fittings shall be ductile iron in accordance with ANSI/AWWA C110/A21.10 and 125# ANSI B16.1 faced and drilled. Fitting interior shall be cement lined and seal coated. The outside coating shall be bituminous coating. Bolts and Nuts for all fittings shall be stainless steel Grade 304 or 316 or ASTM A325 Type 3 Enhanced Corrosion Resistant steel. Stainless steel all-thread may be used is some applications with the approval of the City Engineer.

3.2 Joint Restraint: All fittings shall be mechanically restrained using restrained fittings as shown on the **City of Mesquite Approved Water Materials List** and meeting requirements of ASTM F1674 (PVC) or U.L. Standard 194 (Ductile Iron). Restraint gland and body and wedge components shall be ductile iron material. For pipe diameters 12" or greater, waterline plan shall show length of joints to be restrained on each side of fittings. For pipe diameters less than 12", all joints within 15-feet of fitting shall be restrained.

3.3 Concrete Blocking: All fittings, valves, hydrants, etc. shall be blocked with 2,000 p.s.i. concrete, 4-sack minimum cement content. All blocking shall be poured to avoid nuts and bolts to allow easy access for maintenance. Excessive blocking shall not be allowed and shall be removed at the contractor's expense. Sizing and construction of blocking shall be as shown in standard drawings 4010A to 4040 of the **North Central Texas Council of Governments Public Works Construction Standards, Fourth Edition** (October 2004).

3.4 Polyethylene Tube Wrap: See section 2.2.4.

Section 4 Valves

4.1 General

4.1.1 Location: Valves shall be anchored to adjacent fittings at Tee and Cross fittings and on fire hydrant leads. Valves shall not be used at the dead end of mains as a plug. Contractors generally do not wish to pressure test against an old valve that may leak, therefore new mains shall start with a valve and end with a plug.

4.1.2 Location Marking: Valves located within a right-of-way shall be indicated on the face of the curb, or where curbs do not exist, on a conspicuous location adjacent to the valve location. Markings are to be the cutting of a four (4) inch high and 1/8" deep letter **"V"** with the point of the **"V"** pointing towards the valve location. The **"V"** shall be cut into the curb or paving using an approved motor driven concrete saw. The completed cut and valve riser lids shall receive a coating of blue paint if a main line valve or red if a fire hydrant valve. Contractor shall coat the interior, and exterior of the cut to a width of one (1) inch.

4.2 Gate Valves, 6-inch through 36-inch (resilient seated)

4.2.1 General Description: All valves 4-inch diameter through 36-inch diameter shall be **resilient seated** gate valves that comply with AWWA C509 or C515. The valves shall be designed and constructed to withstand a minimum working pressure of 200 psi. The valve shall be full opening, ductile iron body, non-rising stem, resilient seated wedge type so designed to have complete **ZERO** leakage with flow in either direction at pressures up to two hundred (200) psi. The valves shall be designed for throttling, if required. See the **City of Mesquite Approved Water Materials List** for approved manufacturers and models. Metal seated gate valves are not permitted.

4.2.2 Horizontal Valves: All valves over 24-inch in diameter shall be designated for horizontal installation unless otherwise shown on the plans.

4.2.3 Coating: Valves shall have all internal and external ferrous metal surfaces coated with an approved epoxy coating to provide a corrosion resistant barrier. The epoxy coating shall be holiday free with a minimum thickness of not less than ten (10) mils

4.2.4 Operating stems: Valves shall have two (2) "O" ring stem seals. Valves shall have the thrust collar and bearing surfaces isolated from the waterway and be provided with continuous lubrication, or they shall be provided with non-corrosive thrust bearings above and below the thrust collar. All valves shall open by turning to the left (counter clockwise) and shall have a two (2) inch-operating nut. Hand-wheel operated valves shall only be installed if specifically shown on the plans or related general details.

4.2.5 Valve Ends: In general, all in-line valves supplied shall have mechanical joint ends unless otherwise specified.

4.2.6 Joint Restraint: All valves shall be mechanically restrained per Section 3.2. Bolts and Nuts for all fittings shall be ASTM A325 Type 3 Enhanced Corrosion Resistant steel, or stainless steel A151 304 or 316.

4.2.7 Three-piece adjustable valve boxes: Adjustable valve boxes shall be furnished and set on each valve in accordance with the appropriate General Design Standards and the **City of Mesquite Approved Water Materials List**. After the final clean up and alignment has been completed, the Contractor shall cast in place a concrete block, 2-foot x 2-foot x 4-inch around all valve box tops at the finish grade.

4.3 Butterfly Valves

4.3.1 General Description: With the approval of the City Engineer, valves larger than 24-inch diameter may be butterfly valves. Butterfly valves must comply with AWWA C504 pressure class 250B or approved equal. **Seats must be in the valve body**.

4.3.2 Gear Boxes: Butterfly valves shall be supplied with worm gear operators manufactured of hardened steel with open/closed indicators. Gearboxes shall be supplied with an operating nut unless otherwise specified.

4.3.3 Bolts, Bolt-studs and "T" Head Bolts: Bolts and "T" head bolts shall be long enough so that the ends project ¼ to ½ inch beyond outside surface of nuts. The ends of all bolts shall be chamfered or rounded. The threads on all bolts, bolt-studs and "T" head bolts shall have ANSI B1.1 coarse thread series, class 2A Fit. Bolt-studs may be threaded full length. Studs for tapped holes shall be threaded to match threading in holes. All bolts, bolt-studs and "T" head bolts (AWWA C111) shall be either A242 high strength low alloy steel with enhanced atmospheric corrosion resistance (ASTM A325 Type III) or Stainless Steel A151 304 or 316 high strength bolts. All nuts are to be A563 carbon alloy steel with a C3 grade and finish. **Exception:** All-thread rod and nuts used in for joint restraint or thrust restraint shall be A151 304 or 316 stainless.

.

4.3.4 Butterfly Valve Vaults and Manholes: All butterfly valves must be enclosed in manholes or vaults. The size of the manhole or vault and lid should be adequate to access and remove or service the valve, gear box and sleeve from the enclosure. The valve must be installed with a sleeve to allow removal of the valve and must be mechanically thrust anchored with stainless all-thread or other approved system. Direct bury of butterfly valves may be allowed with the approval of the City Engineer.

4.4 Tapping Sleeves and Valves

4.4.1 General: Wet connections to existing water mains (6-inch through 12-inch in size), shall be made with a tapping sleeve and valve. **EXCEPTION:** In some cases where the size of the tap approaches the size of the main, as judged by the City Engineer, the use of a cut-in sleeve and tee will be required. Both the tapping sleeve and valve shall be rated for a minimum 200 psi service pressure. Size on size taps are prohibited.

4.4.2 Tapping Sleeve: Tapping sleeves shall be full body, and be completely constructed of type A151 304 stainless steel. The sleeve shall have a flange flat-faced outlet recessed for the tapping valve conforming to AWWA C207 Class D-ANSI 150 pound drilling and a ¾" inch N.P.T. test opening with plug for pressure test prior to tapping. All welds shall be fully passivated to restore the corrosion resistance of the stainless steel.

4.4.3 Tapping Valve: Tapping valves shall be a flange by MJ resilient seat gate valve unless otherwise specified. The gaskets shall be neoprene or other synthetic rubber, conforming to ASTM D2000 BA508.

4.4.4 Bolts and Nuts: All bolts shall be Grade 18-8, Type A151 304 Stainless steel with heavy hex nuts. Bolts will be fluorocarbon coated to prevent galling.

4.4.5 Gasket: Gasket shall be Buna-N rubber, conforming to ASTM D2000, BA508, with resistance to water, oil and hydrocarbon fluids. The gasket shall be of hydraulically loaded design to provide a positive seal against the pipe surface.

4.4.6 Testing: Prior to tapping, all tapping sleeves and valves shall be air tested at 120 psi for three (3) minutes, with no pressure loss.

4.4.7 Tapping: Tapping is to be accomplished with no interruption of service. Facilities shall be provided for proper dewatering and for disposal of water removed from the water mains and excavations without damage to adjacent property. Special care shall be taken to prevent contamination of the existing potable water line when dewatering, cutting, and making connections with existing pipe. No trench water, mud, or other contaminating substances shall be permitted to enter the existing lines. The interior of all tapping sleeves, tapping machine cutter assemblies, and tapping gate valves installed in such connections, and the surface of the existing pipe at these connections, shall be thoroughly cleaned and then swabbed with a solution having a chlorine content of 200 milligrams per liter.

4.5 Air Release Valves and Combination Valves: Refer to City of Mesquite Approved Water Materials List for approved manufacturers and models. All air release valves and combination valve components shall be insulated.

Section 5 Fire Hydrants

5.1 General: All fire hydrants supplied shall comply with AWWA C-502, with a minimum working pressure of 200 p.s.i.

5.2 Spacing and Location

5.2.1 Fire hydrants shall be located on public streets and required fire lanes as required by the adopted version of the ***International Fire Code, Appendix C: Fire Hydrant Locations and Distribution***. In no case shall the maximum spacing exceed 300 feet on center for commercial and/or industrial development and 500 feet on center for residential development. On-site water mains and hydrants shall be installed capable of supplying fire flow required by the adopted version of the ***International Fire Code, Appendix B: Fire-flow Requirements for Buildings*** as interpreted by the City of Mesquite Fire Marshal.

5.2.2 All fire sprinkler fire department connections (FDC) generally must be located near a fire hydrant. Consult with the City Fire Marshall and the ***International Fire Code*** concerning maximum distance from an FDC to a fire hydrant as measured along a route approved by the City Fire Marshall.

5.2.3 Fire hydrants shall be located to minimize interference with driveways and shall be located with sufficient clearance from drive and street radii to prevent the fire hydrant from being struck if a vehicle jumps the curb and/or takes a wide turn. Hydrants shall not be placed in intersection radii or other locations with a high probability of being damaged by traffic. A 3-foot clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

5.2.4 Mid-block fire hydrants shall be located on property lines (extended) to minimize interference with drives and on-street parking.

5.2.5 Hydrants shall be placed 2-feet to 10-feet from the back of curb and shall not interfere with sidewalks, driveways, etc. Hydrants shall be placed so the bury mark is at ground or paving level. Mounding of the ground or paving shall not be allowed to achieve this requirement. No more than one extension of 18 inches maximum will be allowed for grade adjustment. Hydrants shall have a barrel length of 4-feet to 6-feet unless approved by the City Engineer. All hydrants shall be surrounded by a 2 to 9 feet long x 3-feet wide x 4-inch thick concrete pad with 3,600 psi, 6 sack concrete and #4 reinforcing bars on 18" centers both ways placed to anchor the hydrant and to provide a splash pad between the hydrant and the curb for flushing operations.

5.2.6 Bollards shall only be used to protect fire hydrants in low speed areas where speed limit is 10 mph or lower, such as around loading docks and in parking lots. Bollards are not a substitute for proper traffic flow layout and should only be used after options for relocation of the fire hydrant have proved infeasible. Bollards shall not be used in City street or alley right-of-way. Bollards that are installed shall meet the requirements of the appropriate General Design Standard Detail.

5.3 Approved Manufacturers and models

Refer to the **City of Mesquite Approved Water Materials List** for approved fire hydrant manufacturers and models.

5.4 Model Specifications All fire hydrants shall include 1 - 4" steamer nozzle and 2 - 2-1/2" hose nozzles and a 1" pentagon operating nut which turns counter clockwise to open,

5.5 Caps and Chains: Fire hydrants shall be installed without chains.

5.6 Fire Hydrant Identification Tags: The City of Mesquite utilities division will install brass identification tags on all fire hydrants.

5.7 Installation: Installation shall be of a type as detailed in these standards. All fire hydrant leads shall be from an MJ to Flanged tee and all valves and fittings from the tee to hydrant shall be flanged.

5.8 Out of Service: If a fire hydrant is out of service, for any reason, the contractor shall bag the fire hydrant with a black trash bag secured with duct tape and report hydrant to the Utility Dispatch office with the reason why it is out of service. This includes, but is not limited to, hydrants that are out of service for the following reasons:

- Water main valved-off and being abandoned but connected hydrant is not yet removed.
- New hydrant recently installed but not yet ready for service
- Hydrant temporarily out of service due to main shut down

5.9 Valves: All valves shall be resilient seat gate valves (restrained) AWWA C509 or C515. Refer to Section 4 - Valves for additional details.

5.10 Fire Hydrant Markers: The contractor shall place a Stemsonite Model 88-SSA blue fire hydrant marker in the street adjacent to the hydrant. The marker shall be located perpendicular to the curb, at the center of the driving lane closest to the fire hydrant. The marker shall be installed with a two part epoxy adhesive per manufacturer's instructions.

5.11 Fire Hydrant Painting (color coding): All fire hydrants are to be painted with a base coat consisting of two (2) coats of aluminum paint as specified below. Refer to **City of Mesquite Approved Water Materials List** for approved paint. When a color code other than aluminum is required, the top bonnet (from operating nut to underneath the uppermost flange) shall be painted two coats of the appropriate color in accordance with the following color code. Nozzle caps are not to be color-coded.

5.11.1 Base undercoat: Two (2) coats of aluminum paint are required as a base coat on all hydrants.

5.11.2 Overcoats: Two (2) additional coats of paint are required over the base coat. The colors shall conform as follows:

Main Size	Color
6"	Aluminum - Top & Bottom
8"	Blue Top - Aluminum Bottom
10" or larger	Yellow Top - Aluminum Bottom

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	CHANGED SHEET NO.

Date 10/31/2017
Drawn SH
Checked LF
MI Project No. 17029
City Project No.

Sheet Title

STANDARD DETAILS

Sheet No. C17

SHEET 21 OF 35

CAMP RORIE GALLOWAY

Section 6 Services and Meters

6.1 General: All water service fittings shall be fabricated in accordance with AWWA C800 and shall be pressure rated for 200psi or greater. Manufacturers and models shall be in accordance with the **City of Mesquite Approved Water Materials List**.

6.2 Service Taps: Domestic water service taps shall be off a looped main. Domestic water service taps shall not be shared, split or bullheaded with an irrigation tap and shall not tap to a fire hydrant lead. Irrigation meters may tap a fire hydrant lead. A submittal for all taps on Asbestos Cement (AC) pipe shall be provided to the City Engineer for approval. Utility contractor shall make the tap and install the service.

6.3 Meter and Service Location: Meters and services must be located within R.O.W. or easements in accordance with City approved plans and details. In residential developments, residential water meters and services are generally placed at the center of the lot in the grassed parkway. Water meters shall not be located in proposed driveways, sidewalks, parking lots or other paved areas. For narrow lots or front entry lots, the designer must design the location of the meters to make sure they are placed in an unpaved area. Meters in conflict with this requirement will be relocated by the developer/builder at their expense. In non-residential developments, water meters shall be located in unpaved islands. Meters should be set so that the meter face is 6-inches to 10-inches below finished grade.

6.4 Meter Size: Bullheaded, "split" ganged, or manifold meters are not allowed in lieu of a larger meter. The City Engineer may require meter sizing calculations in accordance with the **International Plumbing Code or AWWA Manual of Water Supply Practices M22 "Sizing Water Service Lines and Meters"**. All residential water services shall be ¾ inch unless otherwise specified.

6.5 Water Service Line: All water service lines smaller than 1-inch shall be Type K copper and water service lines 1-inch, 1 ½ inch and 2-inch shall be either crosslinked polyethylene (PEX-A) or Type K Copper. All service line fittings shall be in accordance with AWWA C800.

All PEX-A water service lines shall be in accordance with ASTM F876 and AWWA C904 and the following procedures:

- For installation under a non-residential street, service line shall be installed with detectable tracing wire. Detectable tracing wire shall be a minimum 12 gauge with HDPE coating.
- A Plastic insert stiffener shall be used at all fittings.

All water services shall be continuous from the corporation valve at the water main to the angle meter valve in the meter box (No Couplings). Service line shall be "goose necked". Crimping or excessive bending of the service line shall not be allowed. Service lines shall be continuous and shall have no fittings under any paving, unless approved by the City Engineer. Long copper service lines that exceed the length of standard rolls of copper may be spliced in unpaved areas with a silver solder coupling. When installing a water main the Contractor shall furnish and install new meter boxes. Service lines shall be poly-wrapped for the first 5-feet of copper service from the main. Water service mains shall have a minimum depth under paving of 36-inches (measured from surface of paving).

6.6 Service Saddles: All service connections to the main for services 2-inch or smaller shall be made with service saddles. Service saddles shall meet requirements of AWWA C800 and be equipped with AWWA taper threads outlet. For ductile iron, cast iron and PVC water mains shall have a brass or bronze body with **two** bronze or 304L stainless steel straps. **Epoxy coated ductile iron service saddles will not be allowed.** Service saddles for AC water mains shall be a full body tapped stainless steel repair clamp. Service connections to the main for services larger than 2-inches shall use factory tee fittings.

6.7 Corporation Valves: All corporations shall meet requirements of AWWA C800 and be equipped with ball valve, AWWA taper threads inlet and a stainless steel grip ring compression outlet and be rated for 200 p.s.i. service pressure . For ductile iron pipe, use threaded corporation with Teflon tape wrap. Factory tees shall be installed for all services larger than 2-inches.

6.8 Angle Meter Valve (Angle Curb Stop): All angle meter valves shall meet requirements of AWWA C800 and be equipped with a ball valve with lock wing, rated for 200 p.s.i. service pressure. Angle meter valves of ¾-inch and 1-inch size shall be equipped with a stainless steel grip ring compression inlet connection x meter saddle-swivel nut outlet connection. Angle meter valves of 1-1/2-inch and 2-inch size shall be equipped with a stainless steel grip ring compression inlet connection and meter flange outlet connection.

6.9 Water Meter Box or Vault: A water meter box with locking lid shall be furnished and installed the Contractor after paving and fine grading is complete. When installing a water main, new meter boxes shall be furnished, installed and connected to the main. Meters larger than 2-inches in size shall be furnished and installed by the Contractor in concrete vaults in accordance with City details.

6.10 Meter Fees: For meters 2-inches in size and smaller, the City will furnish the meter upon payment of applicable fees to the Engineering Division. Owner's utility contractor shall install and set the meter. The contractor must directly purchase meters larger than 2-inches in size from a list approved by the City. Contact the City Meter Shop Supervisor for the list of approved meters and vendors for meters larger than 2-inches.

6.11 Meter and Service Location Marking: Each individual service location shall be marked on the face of the curb with a 4-inch high and 1/8 -inch deep scribe mark "I" cut in the curb using an approved motor driven concrete saw. The scribe mark "I" shall receive a coating of blue paint, which shall coat the interior and exterior of the cut to a width of 1-inch.

6.12 Blow-Off Valves: For 2-inch blow-off valves, use fittings for a standard 2-inch service configuration.

Section 7 Boring of Water Mains

Refer to General Design Standards Details B-1 through B-5.

Section 8 Backflow Prevention

Refer to Mesquite City Code Sections 5-281 to 5-290.1 for specific information.

Section 9 Fire Sprinkler Systems

9.1 General: All underground and exterior fire system piping must be reviewed, permitted and inspected through the Engineering Division. The civil plans must show fire lines up to a flange 1-foot above the building floor in the fire room. Any required backflow prevention devices shall be located on the riser in the fire room and not in an exterior vault. Refer to General Design Standard drawings W-14 through W-16 for typical applications. Design of the overall fire protection system shall be permitted through the City of Mesquite Fire Department and meet requirements of National Fire Protection Association (NFPA) standard 13. Maintenance of the fire line from the City main to the building is the responsibility of the property owner and shall not be in a public easement.

Section 10 Water System Installation

10.1 Excavation: Excavation in general, shall be made in open cut from the surface of the ground and shall be no greater in width and depth than is necessary to permit the proper construction of the work. When the trench depth exceeds five (5) feet, see Standard Procedures Section 12.2 regarding "Trench Safety" requirements. The amount of trench excavation to grade shall not exceed 100 (one hundred) feet from the end of the pipe laying operations and no excavation shall be 300 (three hundred) feet in advance of the completed pipe operations (includes backfilling). At the end of the workday, all trench excavation shall be backfilled. Any landscaping and irrigation system within the City medians and right-of-ways that are disturbed, removed, or damaged during construction shall be replaced to original condition or better by a licensed irrigator.

10.2 Minimum bury depth: Minimum bury depth shall be forty-two (42) inches from finished grade to the top of the pipe, unless otherwise directed by the City Engineer.

10.3 Sanitation: The inside of all pipe and fittings shall be kept clean during installation. The City Engineer may require swabbing or pigging of all new pipe if the pipe is installed in an unsanitary manor. See Section 11 TESTING PROCEDURES for more information.

10.4 Lifting Straps: All water pipe, valves, fire hydrants, and fittings shall be installed by the use of lifting straps. The use of chains is prohibited.

10.5 Backfill and Compaction: For trenches not under paving, final backfill material shall be from the trench excavation placed in a maximum of 12 inch loose lifts and compacted to 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture. Under existing or proposed paving, backfill shall be crushed concrete flexible base (TxDOT, Item 247, Grade 1, Type D) compacted to 95% of Standard Proctor Density (ASTM D698) at a moisture range of 0% to plus 6% of optimum moisture unless alternate material is approved by the City Engineer. The contractor shall take new proctors at each change in soil type. Water jetting will not be allowed for any trench.

Section 11 Testing Procedures

11.1 Notification of Testing: The Contractor shall hire an independent testing lab, subject to the approval of the City Engineer, for all material and acceptance testing at Contractors Expense. The Contractor shall notify the assigned City Public Works Construction Inspector of all density testing 24 hours prior to the scheduled test. Copies of all test reports shall be sent to the Public Works Inspector for review and acceptance and inclusion in the City project file. Projects will not receive City acceptance until all test results are complete and satisfactory.

11.2 Compaction of Trenches and Excavations: Density tests shall be performed at a frequency of one test per lift, per 300 linear feet of trench (including services) at locations specified by the City Public Works Construction Inspector. All nuclear gauge density tests shall be performed per ASTM D2922.

11.3 Pressure Testing and Disinfecting Water Mains:

The purpose of this specification is to define the minimum requirements for the pressure testing and disinfection of water mains, including the preparation of water mains, hydrostatic tests, flushing, application of chlorine, and sampling for the presence of coliform bacteria. Water mains, services and fire sprinkler systems shall be flushed and disinfected per the following requirements and in accordance with AWWA C651 "Disinfecting Water Mains".

11.3.1 Connection to Existing Water System:

Water required to fill the new main for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a temporary connection between the distribution system and the new main. The temporary connection shall include an appropriate cross-connection control device and shall be disconnected during the hydrostatic pressure test. As an alternate, a connection to the existing distribution system is permitted provided a new valve is placed at the connection point. **Do not test against an existing valve in the existing system.**

11.3.2 General Procedures and Precautions Taken During Construction:

- Inspect materials prior to installation to ensure their cleanliness and integrity.
- Keep interior of pipe dry and clean during storage and installation. Prevent contaminates from entering the water main during storage and construction.
- If dirt enters the pipe during storage or installation, it shall be removed and the interior surface swabbed with a 1 to 5 percent hypochlorite disinfecting solution.
- During construction openings in the pipe shall be closed with a watertight plug when pipe laying is stopped at the close of each day's work or for other reasons such as rest breaks and meals to prevent contaminants and animals from entering pipe
- Remove, by flushing or other means, those materials that may have entered the water main.
- Chlorinating any residual contamination that may remain, and flushing the chlorinated water from the main.
- Protecting the existing distribution system from backflow caused by hydrostatic test and disinfection procedure.
- Documenting that an adequate level of chlorine contacted each pipe to provide disinfection.
- Once the contractor has been notified by the City Public Works Construction Inspector of a successfully (negative result) laboratory bacteriological testing result, the contractor can make connection of the approved new water main to the active distribution system.

11.3.3 Hydrostatic (Pressure) Test:

All water mains, fittings and services shall be tested with a hydraulic test pressure of not less than 200 psi over a period of not less than 2 hours. The allowable leakage, in gallons, of all pipe tested shall be calculated per the following equation:

$$\text{Allowable Leakage} = \frac{28.28 * L * D}{148{,}000}$$ where L = Length of pipe (ft), D = Diameter of pipe (in)

For a two hour pressure test at a pressure of 200 psi. If the tests indicate a leakage in excess of the acceptable rate, the Contractor shall be required to find and repair the leak. Even if the test requirements are met, all apparent leaks shall be repaired and stopped.

The hydrostatic pump shall be connected to a system where the amount of leakage can be determined by measurement or gauge. The 200-psi pressure shall be maintained at the highest point of the main being tested over the entire 2-hour test period. The leakage shall be determined by comparing the quantity of water in the measuring system at the beginning of the test and quantity of water at the end of the test. The difference in these quantities shall be the leakage. An alternate method is to add water to the measuring system during the test. At the end of the 2-hour test, the quantity of water added shall be the leakage.

11.3.4 Flushing and Pigging the Main Prior to Disinfection / Chlorination

Flushing Method:

Before the main is chlorinated, it shall be filled to eliminate air pockets and flushed to remove particulates. The flushing velocity in the main shall not be less than 3.0 ft/sec. Below is the required flow and openings needed to flush pipelines with a pressure of 40 psi

Pipe	Flow (gpm)	1" Tap	1½" Tap	2" Tap	2½" Hydrant Outlets
4"	120	1			1
6"	260		1		1
8"	470		2		1
10"	730		3	2	1
12"	1060			3	2
16"	1880			5	2

Pigging Method:

- Pigging is accomplished by passing an appropriate sized pig through the pipe. A pig is a bullet-shaped, flexible sponge available in different sizes, densities, and degrees of roughness. **All mains 12-inch and larger must be pigged prior to flushing and disinfection with chlorine.**
- The pig shall be inserted in the new conduit at the location where the new conduit is connected to the active distribution system.
- Where expulsion of the pig is required through a dead-ended conduit, the Contractor shall make every effort to prevent back flow of the purged water into the conduit after passage of the pig. Backwater re-entry into the pipe can be prevented by the temporary installation of mechanical joint bends and pipe joints to provide a riser out of the trench.
- After passage of the pig, flushing of all backwater from the pipe, and satisfactory test results, the Contractor shall secure the test location openings and then proceed with disinfection.

11.3.5 Disinfection (Chlorination):

The Continuous-feed method must be used unless it is stated otherwise in the Contract Specifications.

The Contractor shall install and remove all pump-in, blow-off and sampling points.

Water from the existing system or other approved source shall be made to flow at a constant rate in the new main.

At a point no more than 10-ft downstream of the beginning of the new conduit, water entering the new conduit shall receive a dose of chlorine such that the water shall have not less than 100-mg/L (ppm) free chlorine. Chlorine application shall not cease until the entire conduit is filled with heavily chlorinated water. 125 lbs of Calcium Hypochlorite (65% available chlorine) is required in 100,000 gal of water to produce 100 mg/L (ppm) Chlorine concentration.

The chlorinated water shall be retained in the conduit for at least 24 hours, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. Every effort shall be made to prevent the flow of chlorinated water into conduits in active service. At the end of the 24-hour period, the treated water in all portions of the conduit shall have a residual of at least 10-mg/L (ppm) free chlorine.

Chlorine for Disinfection:

Calcium Hypochlorite in granular form conforming to ANSI/AWWA B300 must be used and must contain approximately 65 percent available chlorine by weight. The material should be stored in a cool, dry, and dark environment to minimize deterioration.

The heavily chlorinated water shall then be flushed from the conduit and disposed in a manner meeting the requirements set out below.

The chlorine residual shall be tested prior to flushing operations.

11.3.6 Disposal of Hyper-Chlorinated Water:

If the chlorine residual exceeds 4-mg/L (ppm) the water shall remain in the new water conduit until the chlorine residual is less than 4-mg/L (ppm). As an alternate, the Contractor may choose to evacuate the water into water trucks, or an approved storage facility (such as a detention pond until the chlorine residual is 4-mg/L (ppm) or less), or treat the water with Sodium Bisulfite or another dechlorination chemical (Sulfur Dioxide, Sodium Sulfite, Sodium Thiosulfate, or Ascorbic Acid) or method appropriate for potable water and approved by the Owner until the chlorine residual is reduced to 4-mg/L (ppm) or less. **The heavily chlorinated water shall not be disposed of into the storm sewer system.** After the specified chlorine residual is obtained, less than 4-mg/L (ppm), the water may then be discharged into the storm sewer system or utilized by the Contractor.

The requirement for discharge of heavily chlorinated water is found in the TPDES General Permit to Authorize the Discharge of Storm Water and Certain Non-Storm Water Discharges from Regulated Construction Activities Within the State of Texas.

The Contractor shall prepare the conduit for disinfection activities and secure same after chlorination is complete.

This shall consist of furnishing all equipment, material and labor to satisfactorily prepare the conduit for disinfection. The Contractor shall also be required to provide adequate provisions for sampling.

The Contractor shall make all necessary taps into the pipe to accomplish chlorination of a new line.

After satisfactory completion of the disinfection operation, the Contractor shall remove surplus pipe at the chlorination and sampling points, plug the remaining pipe, backfill, and complete all appurtenant work necessary to secure the conduit.

11.3.7 Bacterial Sampling:

Unless otherwise specified, the Contractor shall inject chlorine disinfectant into the conduit and monitor the solution.

The City Public Works Construction Inspector shall supervise the taking of water samples from a suitable tap (not through a fire hydrant) for analysis by the North Texas Municipal Water District laboratory. The sample(s) shall be transported by City staff to the laboratory at 9:00 AM on Tuesdays and Thursdays. Samples may not be taken earlier than 3:00 PM on the day prior to delivery. The City Public Works Construction Inspector shall notify the Contractor of the results.

Microbiological sampling shall be done prior to connecting the new conduit into the existing distribution system in accordance with AWWA C651 Disinfecting Water Mains. Samples shall be tested in accordance with ***Standard Methods for the Examination of Water and Wastewater***. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate. At least one sample shall be collected from every 1,000-linear-feet of new water conduit, plus one set from the end of the line and at least one set from each branch. If trench water has entered the new conduit during construction or, if in the opinion of the City inspector, excessive quantities of dirt or debris have entered the new conduit, samples shall be taken at intervals of approximately 200-linear-feet. Samples shall be taken of water that has been in the new conduit for at least 16-hours.

Unsatisfactory test results shall require a repeat of the disinfection process and resampling as required above until a satisfactory sample is obtained.

In the event there are two unsatisfactory test results from the same sampling point, the Contractor must "poly-pig" the new water main and samples taken again until a satisfactory sample is obtained.

11.4 Tapping Sleeve and Valve Air Test: Prior to tapping, all tapping sleeves and valves shall be air tested at 120 psi for three (3) minutes, with no pressure loss.

Section 12 Safety

12.1 General: All contractors and developers, with their employees and agents, shall comply with all applicable Federal, State and Local safety laws and regulations, including but not limited to the Occupational Safety and Health act of 1970, and ordinances rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property to protect them from death, injury, damage or loss.

12.2 Trench Safety: All excavation and trench operations shall be conducted in accordance with **29 Code of Federal regulations (CFR), Part 1926, Subpart P** and all other applicable State and City regulations. Prior to commencing any excavation or trenching operation, the Contractor shall submit to the City Engineer a plan sealed by a Texas Licensed Professional Engineer indicating the intended procedures to be used by the Contractor to comply with OSHA requirements. Such plan shall further identify the "Competent Person" as required by paragraph 1926.651(k)(1) that will work with each crew. An affidavit from the Contractor indicating the competent person must be submitted with the trench safety plan to the City Engineer. A copy of the trench safety plan must be on the job at all times. The City reserves the right to deny payment for any construction activities in excavations or trenches that are not in accordance with the submitted plan. The City does not approve or disapprove Trench Safety Plans, but will retain a file copy.

12.3 Confined Space Entry: All entry into confined spaces conducted in accordance with **29 Code of Federal regulations (CFR), Part 1910.147 P** and all other applicable State and City regulations. Prior to commencing any confined space entry, the Contractor shall submit to the City Engineer a copy of the confined space entry plan with a completed permit.

12.4 Work Zone Traffic Control: Where work is to be carried out in or adjacent to any street, alley or public place, the Contractor shall design, furnish, erect and maintain such barricading, signage, barriers, markers, stripping or other traffic control devices as are necessary to alert, direct and protect the traveling public. These traffic control devices shall be designed, installed and maintained in accordance with the ***City of Mesquite Work Zone Traffic Control Guidelines*** and the most current edition of the ***Texas Manual of Uniform Traffic Control Devices***. In addition, the Contractor shall provide and maintain such other barricades and signs as deemed necessary by the City Engineer. The Contractor's responsibility for the furnishing and maintenance of these traffic control devices shall not cease until the project is accepted by the City Engineer.

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	CHANGED SHEET NO.

Date	10/31/2017
Drawn	SH
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

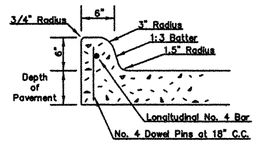
STANDARD DETAILS

Sheet No.

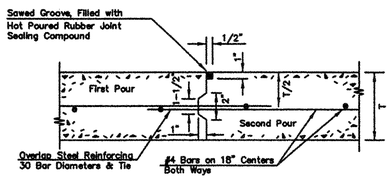
1 C18

SHEET 22 OF 35

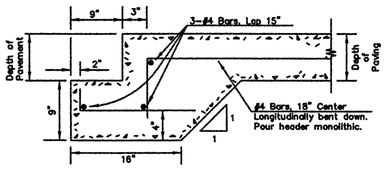
CAMP RORIE GALLOWAY



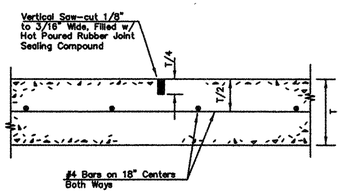
MONOLITHIC CURB DETAIL
NOT TO SCALE



CONSTRUCTION JOINT
NOT TO SCALE

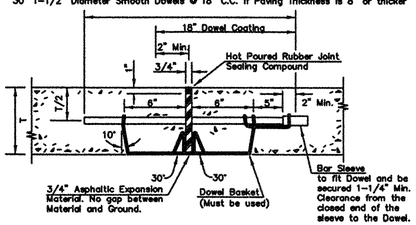


CONCRETE HEADER
NOT TO SCALE



SAWED CONTRACTION JOINT
NOT TO SCALE

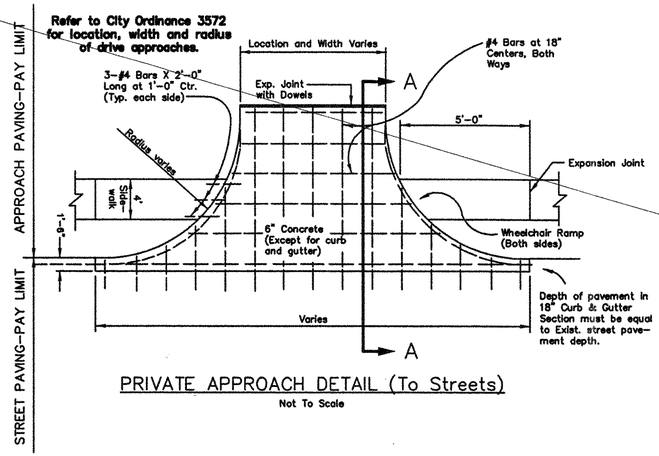
30" 1" Diameter Smooth Dowels @ 18" C.C. if Paving Thickness is less than 8" thick
30" 1-1/2" Diameter Smooth Dowels @ 18" C.C. if Paving Thickness is 8" or thicker



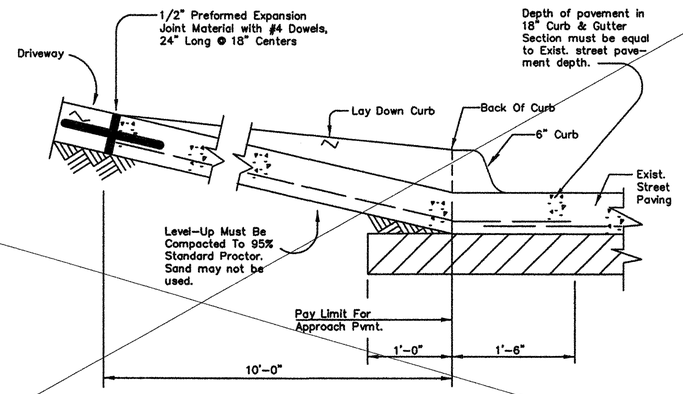
Note: Sleeve for dowels shall have an inside diameter of 1/16" greater that that of dowel & be of quality and design as to provide free movement of the dowel bar.

EXPANSION JOINT
NOT TO SCALE

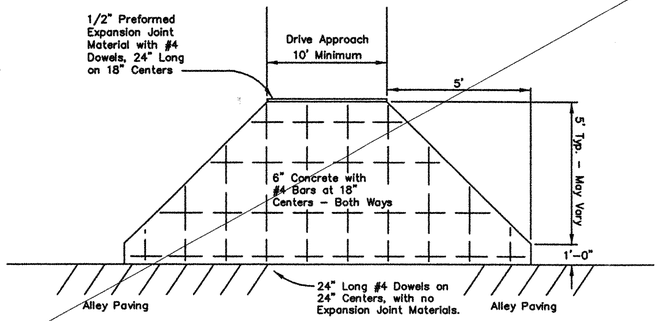
Note: Provide expansion joint at each end of alley approach and at each street intersection, and spaced at a maximum of 600', such that no joint shall fall in a driveway approach.



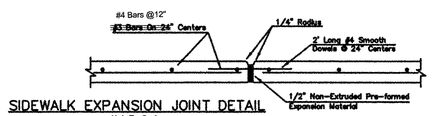
PRIVATE APPROACH DETAIL (To Streets)
Not To Scale



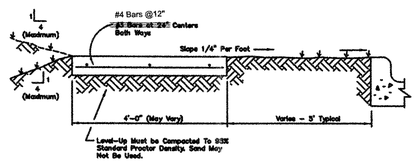
SECTION A-A
Not To Scale



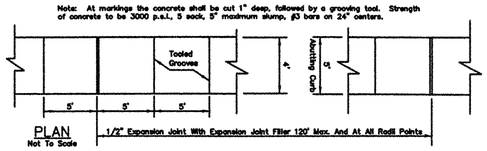
PRIVATE APPROACH DETAIL (To Alleys)
Not To Scale



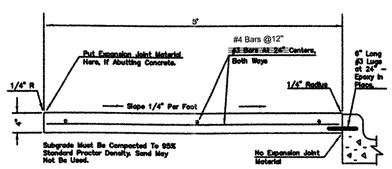
SIDEWALK EXPANSION JOINT DETAIL
Not To Scale



TYPICAL SECTION (4' Sidewalk Away From Curb)
Not To Scale



PLAN
Not To Scale



TYPICAL SECTION (5' Sidewalk Next To Curb)
Not To Scale

GENERAL NOTES

SUBGRADE AND FILL

1. All fill and lime subgrades shall be placed in 8" compacted lifts and be compacted to 95% of Standard Proctor at a moisture range of 0% to plus 6% of optimum moisture. Moisture level must be maintained, by wetting or application of asphalt emulsion prime coat (0.25 to 0.50 gal/S.Y.) if necessary, until placing of concrete paving. All fill and lime subgrade for streets shall have densities taken at a rate of one density per 300 L.F. of street. Gradations shall be at a rate of one per 300 L.F.minimum of 60% passing #4 Sieve and 100% passing 1½" Sieve. Locations of densities and gradations shall be determined by the City Public Works Construction inspector.
2. For L1 and L2 streets, 6" Lime stabilized subgrade shall be constructed using Type "A" Hydrated Lime at an application rate of 33 lbs./ S.Y., per NCTCOG Section 2.5.2. All other streets shall have 8" Lime at an application rate of 44 lbs./S.Y., per NCTCOG Section 2.5.2.
3. Final backfill of medians not to be covered with concrete or pavestone shall be sandy loam or topsoil approved by the City Engineer.
4. Slopes from back of sidewalk to property line are to be a maximum of 4:1, and slopes from curb to sidewalk are to be 1/4" per foot towards curb. Sidewalk cross-slope may be tilted toward or away from street in order to eliminate standing water and maintain natural drainage patterns.
5. **Sand may not be used for level-up under paving.**

PAVING

1. Concrete pavement, curb & gutter, sidewalks and driveways are to be 3600 P.S.I., 28-day strength, 6 sacks cement per cu. yd. minimum, with 1" to 3" slump for machine pours and 3" to 5" slump for hand pours. Fly ash may be substituted for up to 20% of the cement content requirement at a 1 to 1.25 cement to fly ash substitution rate.
2. Reinforcing shall be #4 bars at 18" C.C. each way. Reinforcing shall conform to ASTM A-615 and be a minimum grade of 60 per ASTM A-370. Reinforcing steel bar laps are to be 30 bar diameters or 15" per ACI 318, section 12.15, whichever is greater. 50% of intersections are to be secured with tie wire and supported with chairs.
3. All concrete must be mechanically vibrated.
4. All concrete is to be membrane cured for 72 hours minimum. White curing compound is to be applied, per manufacturer's recommendations, to all exposed concrete surfaces (including backs-of-curb) immediately after completion of paving operations, per ASTM C-309, Type 2, NCTCOG Section 2.2.1(b)(1).
5. Finish all concrete street paving wider than 37' with a tine finish (1"), perpendicular to traffic flow, broom curb and gutter parallel to traffic 12" from curb. Broom finish median paving.
6. No vehicle traffic shall be permitted on newly paved areas for seven days after pour or until 3000 P.S.I. is achieved.
7. Extend all sawed contraction joints in streets and alleys through private drive approaches to the first expansion joint.
8. Joint sealer is to be a hot-poured, rubber base compound, ASTM D-3406, per NCTCOG 2.2.10(b).
9. If lime subgrade is not installed under left turn lane, increase paving depth to 12".
10. Medians under 7' in width, from back-of-curb to back-of-curb, shall be covered with 4" concrete median pavement or 4" concrete slab with 3.5" Pavestone (Holland Stone Antique Red).
11. Divided paving sections may vary depending on adopted City Thoroughfare Plan classification and City Engineer.
12. Divided streets require continuous 2" PVC street lighting conduit and irrigation systems. Consult the City Engineer for details (Ord. No. 2617).
13. Maximum allowable driveway approach slopes are as follows:

	Street	Alley
Com.	7%	11%
Res.	10%	14%

TRAFFIC CONTROL

1. Contractor shall provide traffic control plan at least 48 hours prior to any work in a city street. Traffic control measures shall conform to the Texas Manual on Uniform Traffic Control Devices and the City Work Zone Traffic Control Guidelines. Traffic control measures shall be installed for any work activity that takes place on or adjacent to any city street or roadway. The City Engineer may require the traffic control plan to be designed and sealed by an engineer licensed in the State of Texas.
2. Contractor shall contact the Traffic Engineering Division, (972) 216-6917, at least 48 hours prior to work requiring the removal or relocation of traffic signs, traffic control equipment or other traffic control appurtenances.

ADA REQUIREMENTS

1. A wheelchair ramp must be constructed for all street intersections per TxDOT Roadway Standard Details PED-05 (four sheets).
2. No obstructions (fire hydrants, power poles, guy wires, etc.) shall be allowed in or over sidewalk paving.

⚠ NOTE
#4@12" OCEW ALL PAVING, SIDEWALK, SLABS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

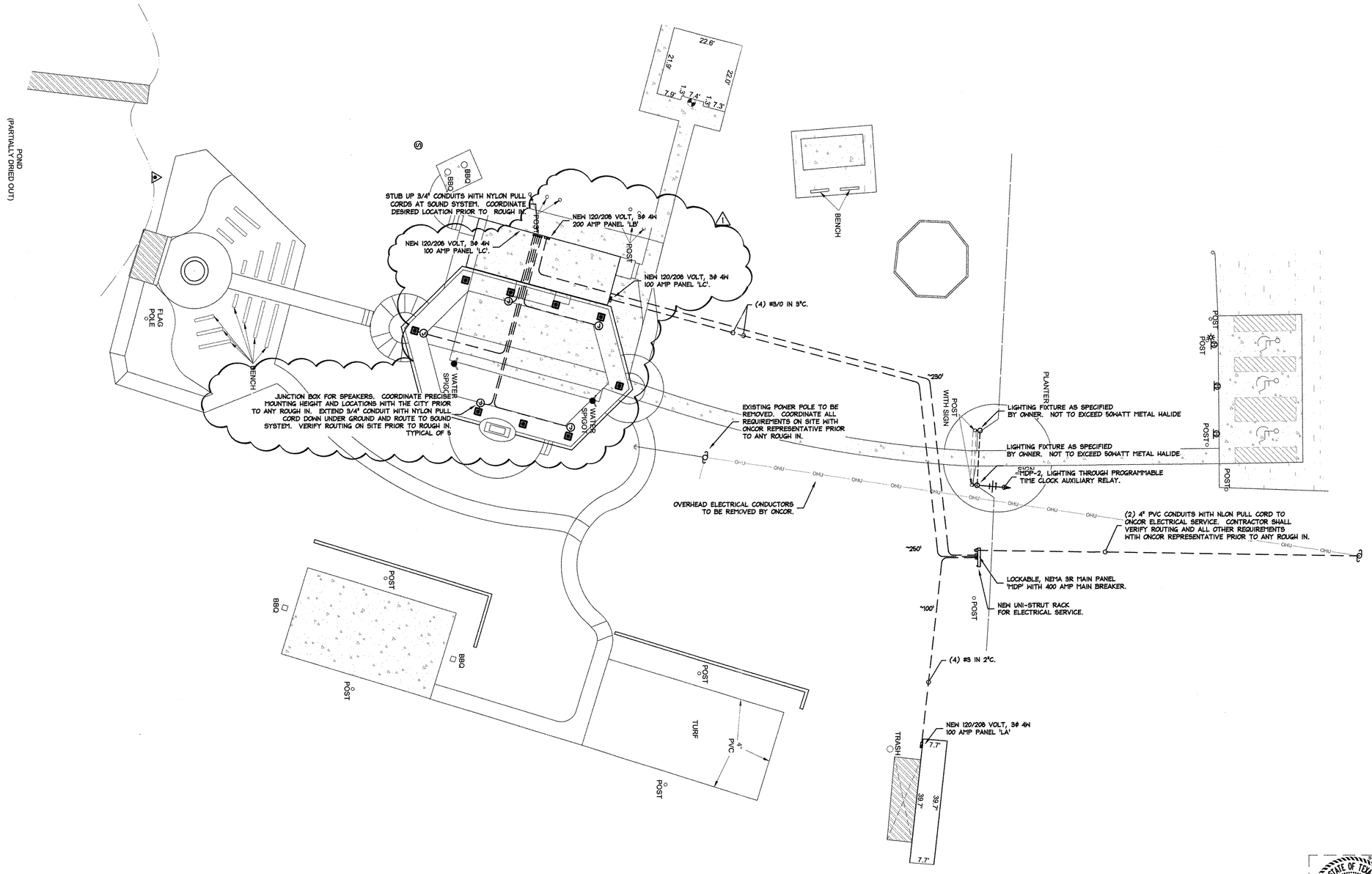
Revisions
No. Date Item
⚠1 1/27/17 CHANGED SHEET NO.

Date 10/31/2017
Drawn SH
Checked LF
MI Project No. 17029
City Project No.

Sheet Title
STANDARD DETAILS

Sheet No.
⚠1 C19
SHEET 23 OF 35

CAMP RORIE GALLOWAY



01 SITE PLAN

SCALE: 1/16"=1'-0"

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
1 11.22.17 ELECTRICAL REV.

Date	10.30.2017
Drawn	RLN
Checked	RLN
MI Project No.	17029
City Project No.	

Sheet Title

SITE PLAN

Sheet No.

E1

SHEET 29 OF 35

STATE OF TEXAS Seal
Richard L. Norris
100089
REGISTERED PROFESSIONAL ENGINEER

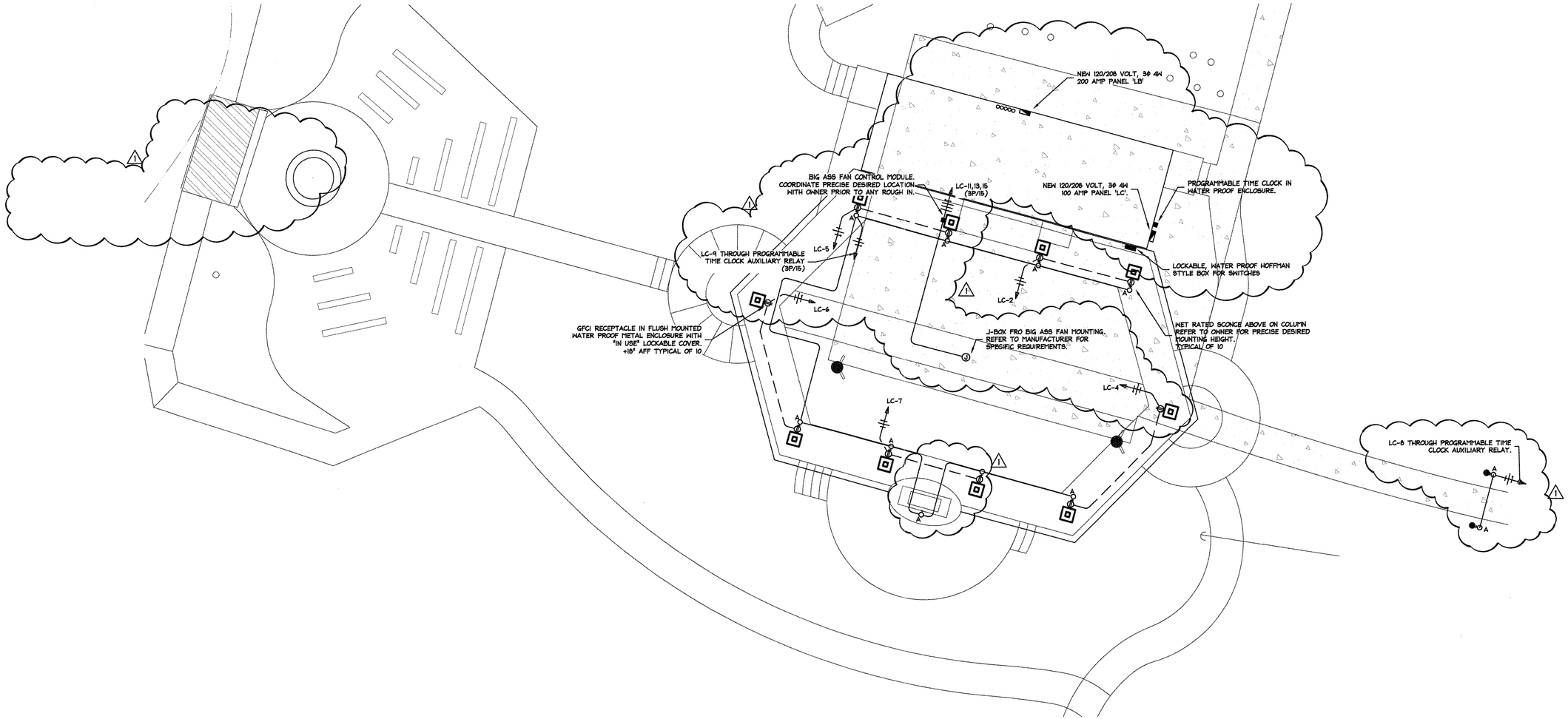
The seal on this document was authorized by Richard L. Norris, P.E. 100089 on the date shown below.

Richard L Norris

RSCE Project #1483

R Squared Consulting Engineers, Inc.
Firm Registration: F-15033
4720 Worchester Lane
McKinney, Texas 75070
972-814-5067

CAMP RORIE GALLOWAY



01 PAVILION ELECTRICAL PLAN

SCALE: 1/8"=1'-0"

LIGHT FIXTURE SCHEDULE

MARK	DESCRIPTION	LENS / LAMPS	REMARKS
A	COPENHAGEN SERIES SMALL LUMINAIRE. REFER TO OWNER FOR FINISH	ACRYLIC	
		METAL HALIDE	
	COPENHAGEN: ECT13RT-50MED-AS-BS SERIES		

Seal
STATE OF TEXAS
Richard L. Norris
100089
REGISTERED
PROFESSIONAL ENGINEER

The seal on this document was authorized by Richard L. Norris, P.E. 100089 on the date shown below.

Richard L Norris

RSCE Project #1483

R Squared Consulting Engineers, Inc.
Firm Registration: F-15033
4700 Worchester Lane
McKinney, Texas 75070
972-814-5007

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrifrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
1 11.22.17 ELECTRICAL REV.

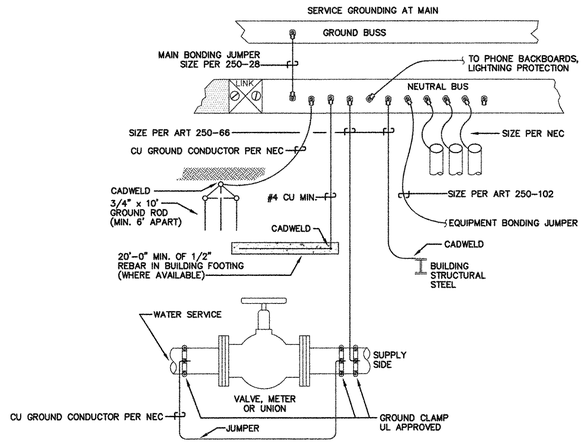
Date 10.30.2017
Drawn RLN
Checked RLN
MI Project No. 17029
City Project No.

Sheet Title

PAVILION ELECTRICAL PLAN

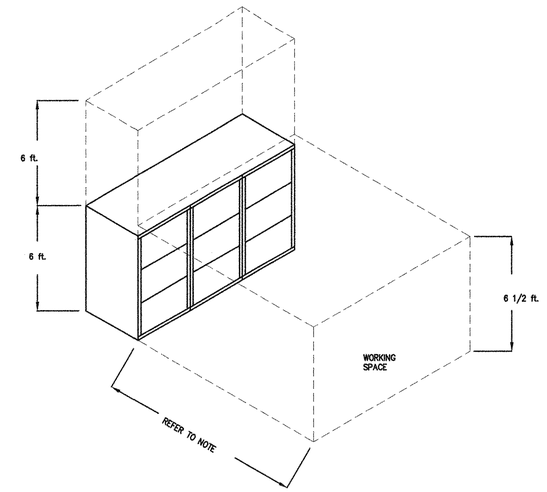
Sheet No.
E2
SHEET 25 OF 35

CAMP RORIE GALLOWAY



02 NEUTRAL GROUNDING DETAIL

SCALE: NONE



NOMINAL VOLTAGE	MINIMAL CLEAR DISTANCE		
	CONDITION 1	CONDITION 2	CONDITION 3
0 – 150	900 mm (3 FT)	900 mm (3 FT)	900 mm (3 FT)
151 – 600	900 mm (3 FT)	1 mm (3 1/2 FT.)	1.2 m (4 FT.)

NOTE: WHERE THE CONDITIONS ARE AS FOLLOWS:

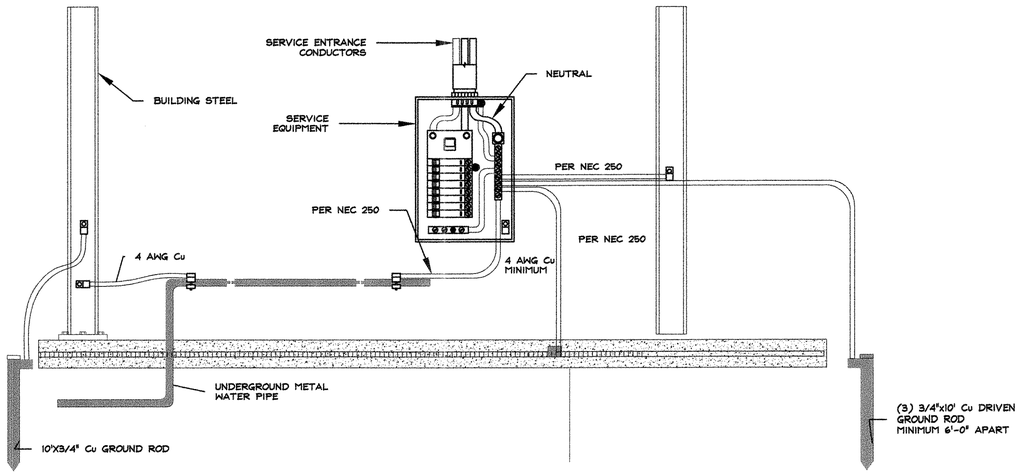
CONDITION 1 – EXPOSED LIVE PARTS ON ONE SIDE AND NO LIVE GROUNDED PARTS ON THE OTHER SIDE OF THE WORKING SPACE, OR EXPOSED LIVE PARTS ON BOTH SIDES EFFECTIVELY GUARDED BY SUITABLE WOOD OR OTHER INSULATING MATERIALS. INSULATED WIRE OR INSULATED BUSBARS OPERATING AT NOT OVER 300 VOLTS TO GROUND SHALL NOT BE CONSIDERED LIVE PARTS.

CONDITION 2 – EXPOSED LIVE PARTS ON ONE SIDE AND GROUNDED PARTS ON THE OTHER SIDE. CONCRETE, BRICK, OR TILE WALLS SHALL BE CONSIDERED AS GROUNDED.

CONDITION 3 – EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORK SPACE (NOT GROUNDED AS PROVIDED IN CONDITION 1) WITH THE OPERATOR BETWEEN.

01 PANEL WORK SPACE DETAIL

SCALE: NONE



03 GROUNDING AND BONDING DETAIL

SCALE: NO SCALE

Seal
STATE OF TEXAS
Richard L. Norris
100089
REGISTERED PROFESSIONAL ENGINEER

The seal on this document was authorized by Richard L. Norris, P.E. 100089 on the date shown below.

Richard L. Norris

RSCE Project #1483

R Squared Consulting Engineers, Inc.

Firm Registration: F-15033
4720 Worchester Lane
McKinney, Texas 75070
972-814-5007

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrifrsbe@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11.22.17	ELECTRICAL REV.

Date	10.30.2017
Drawn	RLN
Checked	RLN
MI Project No.	17029
City Project No.	

Sheet Title

ELECTRICAL DETAILS

Sheet No.

E3

SHEET 26 OF 35

CAMP RORIE GALLOWAY

PANEL 'LC' PAVILION PANEL

DESCRIPTION	POLES	TRIP	CIRCUIT	LIGHTING	POWER	POWER	LIGHTING	CIRCUIT	TRIP	POLES	DESCRIPTION
	1P	20	1			1500		2	20	1P	PAVILION RECEPTACLES
	1P	20	3			1500		4	20	1P	PAVILION RECEPTACLES
PAVILION RECEPTACLES	1P	20	5		1500	1500		6	20	1P	PAVILION RECEPTACLES
PAVILION RECEPTACLES	1P	20	7		1500		120	8	20	1P	PATH WAY LIGHTING
PAVILION LIGHTING	1P	20	9	700				10	20	1P	
	3P		11		901			12	20	1P	
BIG ASS FAN			13		901			14	20	1P	
		15	15		901			16	20	1P	
	1P	20	17					18	20	1P	
	1P	20	19					20	20	1P	
	1P	20	21					22	20	1P	
	1P	20	23					24	20	1P	
	1P	20	25					26	20	1P	
	1P	20	27					28	20	1P	
	1P	20	29					30	20	1P	
	1P	20	31					32	20	1P	
	1P	20	33					34	20	1P	
	1P	20	35					36	20	1P	
	1P	20	37					38	20	1P	
	1P	20	39					40	20	1P	
	1P	20	41					42	20	1P	

GROUND BUS			
10K AIC RATED, NEMA 3R			
CONNECTED LIGHTING	820	X 1.25	1025
CONNECTED POWER			10203
TOTAL DESIGN LOAD			11228
TOTAL CONNECTED AMPS			31.20

DESIGNATION	PANEL 'LC' PAVILION PANEL			
MOUNTING	SURFACE			
VOLTAGE-PHASE-WIRE	120	208	3 PH	4 WIRE
MAINS TYPE	MCB			
MAINS AMPS	100			

PANEL 'LB' OFFICE PANEL

DESCRIPTION	POLES	TRIP	CIRCUIT	LIGHTING	POWER	POWER	LIGHTING	CIRCUIT	TRIP	POLES	DESCRIPTION
	1P	20	1					2	20	1P	
	1P	20	3					4	20	1P	
	1P	20	5					6	20	1P	
	1P	20	7					8	20	1P	
	1P	20	9					10	20	1P	
	1P	20	11					12	20	1P	
	1P	20	13					14	20	1P	
	1P	20	15					16	20	1P	
	1P	20	17					18	20	1P	
	1P	20	19					20	20	1P	
	1P	20	21					22	20	1P	
	1P	20	23					24	20	1P	
	1P	20	25					26	20	1P	
	1P	20	27					28	20	1P	
	1P	20	29					30	20	1P	
	1P	20	31					32	20	1P	
	1P	20	33					34	20	1P	
	1P	20	35					36	20	1P	
	1P	20	37					38	20	1P	
	1P	20	39					40	20	1P	
	1P	20	41					42	20	1P	

GROUND BUS			
10K AIC RATED			
CONNECTED LIGHTING	0	X 1.25	0
CONNECTED POWER			0
TOTAL DESIGN LOAD			0
TOTAL CONNECTED AMPS			0.00

DESIGNATION	PANEL 'LB' OFFICE PANEL			
MOUNTING	SURFACE			
VOLTAGE-PHASE-WIRE	120	208	3 PH	4 WIRE
MAINS TYPE	MCB			
MAINS AMPS	200			

MAIN PANEL 'MDP'

DESCRIPTION	POLES	TRIP	CIRCUIT	LIGHTING	POWER	POWER	LIGHTING	CIRCUIT	TRIP	POLES	DESCRIPTION
RECEPACLE	1P	20	1		200		120	2	20	1P	FRONT GATE LIGHTING
	3P		3		12000	20000		4		3P	
PANEL 'LA' AT SHOP			5		12000	20000		6			PANEL 'LC' AT OFFICE
		100	7		12000	20000		8	200		
	3P		9		12000			10	20	1P	
PANEL 'LC' AT PAVILION			11		12000			12	20	1P	
		100	13		12000			14	20	1P	
	1P	20	15					16	20	1P	
	1P	20	17					18	20	1P	

GROUND BUS			
35K AIC RATED, NEMA 3R			
CONNECTED LIGHTING	120	X 1.25	150
CONNECTED POWER			132200
TOTAL DESIGN LOAD			132350
TOTAL CONNECTED AMPS			367.80

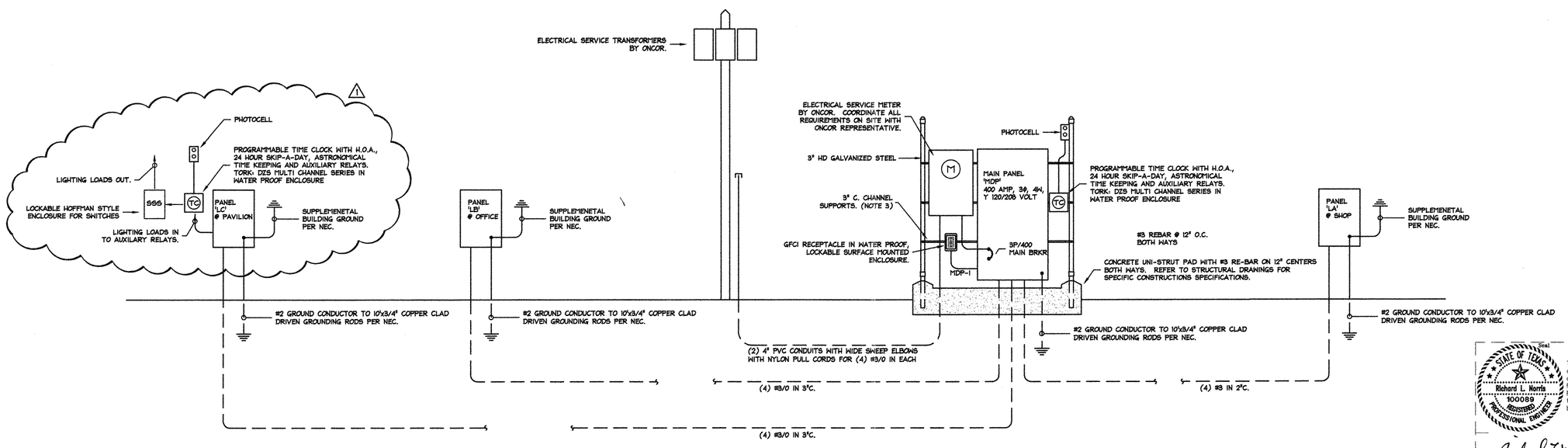
DESIGNATION	MAIN PANEL 'MDP'			
MOUNTING	SURFACE			
VOLTAGE-PHASE-WIRE	120	208	3 PH	4 WIRE
MAINS TYPE	MCB			
MAINS AMPS	400			

PANEL 'LA' SHOP PANEL

DESCRIPTION	POLES	TRIP	CIRCUIT	LIGHTING	POWER	POWER	LIGHTING	CIRCUIT	TRIP	POLES	DESCRIPTION
	1P	20	1					2	20	1P	
	1P	20	3					4	20	1P	
	1P	20	5					6	20	1P	
	1P	20	7					8	20	1P	
	1P	20	9					10	20	1P	
	1P	20	11					12	20	1P	
	1P	20	13					14	20	1P	
	1P	20	15					16	20	1P	
	1P	20	17					18	20	1P	
	1P	20	19					20	20	1P	
	1P	20	21					22	20	1P	
	1P	20	23					24	20	1P	
	1P	20	25					26	20	1P	
	1P	20	27					28	20	1P	
	1P	20	29					30	20	1P	
	1P	20	31					32	20	1P	
	1P	20	33					34	20	1P	
	1P	20	35					36	20	1P	
	1P	20	37					38	20	1P	
	1P	20	39					40	20	1P	
	1P	20	41					42	20	1P	

GROUND BUS			
10K AIC RATED, NEMA 3R			
CONNECTED LIGHTING	0	X 1.25	0
CONNECTED POWER			0
TOTAL DESIGN LOAD			0
TOTAL CONNECTED AMPS			0.00

DESIGNATION	PANEL 'LA' SHOP PANEL			
MOUNTING	SURFACE			
VOLTAGE-PHASE-WIRE	120	208	3 PH	4 WIRE
MAINS TYPE	MCB			
MAINS AMPS	100			



01 ELECTRICAL RISER DIAGRAM

SCALE: NONE

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #8939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11.22.17	ELECTRICAL REV.

Date	10.30.2017
Drawn	RLN
Checked	RLN
MI Project No.	17029
City Project No.	

Sheet Title

ELECTRICAL SCHEDULES & RISER DIAGRAM

Sheet No.

E4

SHEET 27 OF 35

Seal

STATE OF TEXAS
Richard L. Norris
100089
REGISTERED PROFESSIONAL ENGINEER

The seal on this document was authorized by Richard L. Norris, P.E. 100089 on the date shown below.

RSCE Project #1483

R Squared Consulting Engineers, Inc.
Firm Registration: F-15033
4720 Worchester Lane
McKinney, Texas 75070
972-814-5057

CAMP RORIE GALLOWAY

DIVISION 16 - ELECTRICAL

SECTION 16050 - GENERAL NOTES AND SPECIFICATION

1. GENERAL:
   - A. CONTRACTOR SHALL PROVIDE ALL NECESSARY MATERIALS, LABOR, TOOLS, TRANSPORTATION, SUPERINTENDENCE AND RELATED ITEMS TO INSTALL A COMPLETE AND FULLY OPERATIVE INTERIOR AND EXTERIOR ELECTRICAL SYSTEM AS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS AND ELSEWHERE REQUIRED.
   - B. ALL OUTLETS, FIXTURES AND EQUIPMENTS SHALL BE FULLY CONNECTED TO PROPER SOURCES OF POWER SUPPLY AND LEFT READY FOR USE.
   - C. PROVIDE ALL EXCAVATION AND TAMP-BACKFILL AS REQUIRED TO COMPLETE WORK, CORRECT ANY SETTLING DURING GUARANTEE PERIOD TO OWNER'S SATISFACTION.
   - D. PROVIDE ALL NECESSARY CUTTING AND PATCHING AS REQUIRED TO COMPLETE WORK. PATCHING SHALL BE DONE BY MECHANICS SKILLED AT THEIR WORK. ALL OPENINGS SHALL BE FILLED AND PATCHED TO CONFORM TO FIRE REGULATIONS.
   - E. COOPERATE WITH OTHER TRADES: MAKE KNOWN TO OTHER TRADES ARRANGEMENT OF ELECTRICAL WORK AND EXAMINE WORK OF OTHER TRADES TO AVOID CONFLICTS. EXAMINE DRAWINGS OF OTHER TRADES TO DETERMINE EXACT EQUIPMENT LOCATIONS OF POWER REQUIREMENTS AND CONTROLS. EXAMINE MANUFACTURERS' SHOP DRAWINGS TO DETERMINE ROUGHING-IN REQUIREMENTS.
   - F. PERMITS, FEES & CODES. PAY ALL COST FOR PERMITS, FEES AND INSPECTIONS REQUIRED BY AUTHORIZED AGENCIES HAVING JURISDICTION OVER ELECTRICAL WORK ELECTRICAL SYSTEM SHALL CONFORM TO REQUIREMENTS OF THE MOST CURRENT NATIONAL, STATE AND LOCAL ELECTRIC CODES, LOCAL AUTHORITIES AND UTILITY COMPANY.
   - G. ALL ELECTRICAL MATERIALS SHALL BE NEW, LISTED AND LABELED BY UL AND SHALL CONFORM TO INDUSTRY STANDARDS, PARTICULARLY NEMA, NFPA, N.E.C. & OTHERS.
   - H. PROVIDE TYPEWRITTEN DIRECTORIES IN PANEL BOARD WITH CLEAR PLASTIC SHIELD, PROVIDE ENGRAVED PLASTIC LOAD NAMEPLATES ON ALL DISCONNECT SWITCHES, MOTOR STARTERS AND CONTROL DEVICES.
   - I. TESTS: ENTIRE ELECTRICAL SYSTEM SHALL BE FULLY TESTED AND CORRECTED OF ANY SHORT CIRCUITS, OPEN GROUNDS, FAULTY WIRING AND INCORRECT CONNECTIONS.
   - J. GUARANTEE: COMPLETE ELECTRICAL SYSTEM INCLUDING ALL MATERIALS, EQUIPMENT AND LABOR SHALL BE GUARANTEED FOR A: PERIOD OF ONE YEAR BEGINNING WITH DATE OF ACCEPTANCE OF BUILDING BY OWNER.
   - K. EACH BIDDER SHALL BEFORE SUBMITTING A PROPOSAL, VISIT AND EXAMINE THE SITE IN ACCORDANCE WITH DIVISION 1 TO SATISFY HIMSELF AS TO MATERIALS AND SCOPE OF THE NEW CONSTRUCTION AND ANY DIFFICULTY ATTENDING THE PERFORMANCE OF THE WORK.
   - L. THE SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. CLAIMS MADE SUBSEQUENT TO THE TIME OF SUBMISSION OF THE PROPOSAL FOR LABOR, EQUIPMENT AND MATERIAL REQUIRED FOR DIFFICULTIES ENCOUNTER, WHICH COULD HAVE BEEN FORESEEN HAD AN EXAMINATION BEEN MADE, WILL NOT BE RECOGNIZED.
   - M. WORKMANSHIP: ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN NEAT, WORKMANLIKE MANNER. UNSIGHTLY INSTALLATIONS SHALL BE REMOVED OR REWORKED AT NO ADDITIONAL EXPENSE TO THE OWNER.

SECTION 16121 - BASIC MATERIALS AND METHODS

1. GENERAL:
   - A. SECTION 16A APPLIES TO ALL WORKS HEREUNDER AND SHALL INCLUDE CONDUIT, BOXES, WIRE, WIRING DEVICES, LIGHTING FIXTURES AND RELATED MATERIALS.

2. CONDUIT:
   - A. CONNECTIONS TO EQUIPMENT, WHICH SHALL BE MADE WITH THREE FEET FLEXIBLE LIQUID-TIGHT CONDUIT WITH LIQUID-TIGHT CONNECTORS.
   - B. CONNECTIONS TO RECESSED LIGHTING FIXTURES SHALL BE MADE WITH SIX FEET OF FLEXIBLE CONDUIT FROM A JUNCTION BOX. LOCATE JUNCTION BOX TO PREVENT RELOCATION OF THE LIGHT FIXTURE.
   - C. INTERMEDIATE GRADE CONDUIT WITH THREADED FITTING
   - D. SHALL BE PROVIDED IN SLAB-ON-GRADE, OUTSIDE BUILDING, BURIAL BELOW GRADE AND IN WET LOCATIONS.
   - E. ALL OTHER CONDUIT SHALL BE ELECTRIC METALLIC TUBING WITH COMPRESSION TYPE FITTINGS, EXCEPT EXTERIOR EXPOSED CONDUIT SHALL BE RIGID GALVANIZED CONDUIT.

3. BOXES:
   - A. CONCEALED BOXES SHALL BE 4-INCH SQUARE GALVANIZED STEEL WITH GALVANIZED EXTENSION RINGS, TOTAL DEPTH OF NOT LESS THAN 2-1/2 INCHES.
   - B. SURFACE MOUNTED BOXES SHALL BE PRESSED GALVANIZED STEEL, UTILITY TYPE.
   - C. GANGABLE SECTIONAL SWITCH BOXES ARE SPECIFICALLY NOT ALLOWED.

4. WIRE & CABLE (600V AND LESS):
   - A. THE WIRE MEETING REQUIREMENTS BELOW SHALL BE SUITABLE FOR SECONDARY POWER AND LIGHT CIRCUITS AND CONTROL CIRCUITS WITHIN THE LIMITATIONS OF THESE SPECIFICATIONS.
   - C. INSULATED WIRE NO. 8 AWG AND LARGER SHALL BE STRANDED.
   - D. ALL WIRE SHALL BE BROUGHT TO THE JOB IN UNBROKEN PACKAGES, AND SHALL BEAR THE DATE OF MANUFACTURING AND SHALL NOT BE OLDER THAN TWELVE MONTHS.
   - E. TYPE OF WIRE SHALL BE AS FOLLOWS:
     1. UNLESS OTHERWISE SPECIFIED OR INDICATED OTHERWISE ON DRAWINGS, ALL #12 AND #10 WIRE SHALL BE THHN AND ALL WIRE #8 AND LARGER SHALL BE THHN-THWN TYPE.
     2. WIRING ADJACENT TO HEAT PRODUCING EQUIPMENT SHALL BE TYPE AVA.
     3. NO WIRE SMALLER THAN #12 GAUGE SHALL BE USED, EXCEPT FOR SIGNAL OR CONTROL SYSTEMS OR WHERE OTHERWISE INDICATED. WIRE SHALL BE COPPER, 600 VOLT MINIMUM RATING, EXCEPT FOR SPECIAL SYSTEMS.
     4. UNLESS NOTED OTHERWISE, ALL CONDUCTORS SHALL BE SOFT DRAWN COPPER CONFORMING TO THE LATEST ASTM SPECIFICATIONS AND THE LATEST REQUIREMENTS OF NEC. UNLESS OTHERWISE NOTED OR SPECIFIED, ALL INSULATION SHALL BE RATED 600 VOLT.
     5. ALL WIRE SHALL BE AS MANUFACTURED BY GENERAL CABLE CO., PHELPS DODGE, ANACONDA, OR A CABLE EQUIVALENT.
     6. ALL WIRE SHALL BE INSTALLED IN CONDUIT ANDCOLOR-CODED. ALL WIRE SHALL BE 98% CONDUCTIVE COPPER, RATED FOR MAXIMUM OF 600 VOLTS.
     7. WIRE CONNECTORS: WIRE CONNECTORS FOR SIZED #10 AWG AND LESS SHALL BE "PRESS-SNURE", IDEAL "WRAP-CAP", T&B "STAKONS" OR 3M "SCOTCHLOK". CONNECTORS FOR WIRE SIZE #8 AND LARGER SHALL BE T&B OR BURNDY METHODS USING HYDRAULIC PRESSES.

5. ELECTRIC TAPE SHALL BE JOHNS-MANVILLE "DUTCH-BRAND" 3M," SCOTCH BRANCH," OR PLYMOUTH "SLIPKNOT BRAND".

6. WALL SWITCHES SHALL BE AS FOLLOWS OR APPROVED EQUAL WITH COLOR AS DIRECTED BY ARCHITECT:
   A. 20A, SP, 125/277V, HUBBELL #1221.
   B. 20A; 3W, 125/277V. HUBBELL #1223.
   C. 20A, 4W, 125/277V, HUBBELL #1224.
   D. 20A, SP, 125/277V, WITH PILOT LIGHT -HUBBELL #1221-PL
   E. 20A, SP, 125/277V, WEATHERPROOF - HUBBELL #1281/1795.
   F. 20A, SP, 125/277V KEYED SWITCH, HUBBELL #1221-L

7. RECEPTACLES SHALL BE AS FOLLOWS OR APPROVED EQUAL. PROVIDE OTHER RECEPTACLES AS INDICATED ON THE DRAWINGS.

   A. 20A, 125V., DUPLEX - HUBBELL #5362 (I)
   B. 20A, 250V., 2W+G - HUBBELL #5461
   C. 50A, 250V., 3W+G - ARROW-HART #5700, BRYANT #9630FR OR P & S #5950.
   D. GROUND FAULT (20A/125V) - HUBBELL #GF.-5362. PROVIDE SPRING LOADED WEATHERPROOF WHILE IN USE COVERS WHERE INDICATED.
   E. CLOCK AND SIGN HANGER - ARROW-HART #5708, BRYANT #2828-GS OR HUBBELL.

8. PLATES: PROVIDE FACEPLATES FOR ALL DEVICES INCLUDING WALL SWITCHES, RECEPTACLES, TELEPHONE OUTLETS AND ALL WALL OUTLETS. FACE PLATES SHALL BE SATIN FINISHED STAINLESS STEEL IN ALL FOOD PREPARATION AREAS, BAR, RESTROOMS, OFFICES AND COMMERCIAL GRADE SMOOTH UNBREAKABLE PLASTIC IN LOBBY/DINING, COLOR TO MATCH DEVICES AND WALLS.

9. LIGHT FIXTURES SHALL BE AS SCHEDULED ON DRAWINGS AND CONTRACTOR SHALL INSTALL ALL LIGHTING FIXTURES. ALL RECESSED LIGHTING FIXTURES SHALL BE THERMALLY PROTECTED AS REQUIRED BY CODE.

10. LAMPS:
    - A. CONTRACTOR SHALL FURNISH AND INSTALL ONE COMPLETE SET OF LAMPS FOR ALL LIGHTING FIXTURES PROVIDE LABEL IN EACH FIXTURE INDICATING SIZE AND TYPE OF LAMP CORRESPONDING WITH SCHEDULE ON DRAWING. SIZE SHALL BE WORKED "MAXIMUM WATTAGE".
    - B. FLUORESCENT LAMPS SHALL BE STANDARD COOL WHITE, ENERGY EFFICIENT, MANUFACTURED BY GENERAL
    - C. ELECTRIC WATT MISER II UNLESS NOTED OTHERWISE.
    - D. INCANDESCENT LAMPS SHALL BE INSIDE FROSTED WITH 2500 HOUR LAMP LIFE RATED 130 VOLTS.

11. FLUORESCENT BALLASTS SHALL BE ELECTRONIC, ENERGY EFFICIENT, MANUFACTURED BY GENERAL ELECTRIC, MAXI-MISER II. CLASS "P" OR APPROVED EQUAL.

12. RACEWAY SYSTEM
    - A. ALL WIRE SHALL BE (INSTALLED IN A METAL RACEWAY AND SHALL BE) CONCEALED WHERE POSSIBLE. WHERE NECESSARY TO EXPOSE THE WIRING THE RACEWAY SHALL BE INSTALLED AS INCONSPICUOUSLY AS POSSIBLE AND IN STRAIGHT LINES WITH 90-DEGREE BENDS, PARALLEL WITH BUILDING LINES. SQUARE RACEWAYS, REAM SMOOTH AND MAKE-UP TIGHT, PLUG ENDS OF RACEWAYS FURRING CONSTRUCTION AND SWAB CLEAN BEFORE PULLING WIRE OR CABLE. SUPPORT RACEWAYS FROM BUILDING STRUCTURE MEMBERS ONLY WITH APPROVED FASTENERS DESIGNED FOR THE PURPOSE.
    - B. RACEWAY SYSTEM SHALL BE INSTALLED TO MAINTAIN THE MAXIMUM HEADROOM WITH REQUIRED SUPPORTS FOR THE LOAD. ALL ANCHORS, STRAPS AND CLIPS SHALL BE THE TYPE DESIGNED FOR THE PURPOSE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. COMMON SUPPORTS MAY BE USED FOR MECHANICAL AND ELECTRICAL EQUIPMENT BY COORDINATING THE WORK WITH ALL TRADES.
    - C. ALL ELECTRICAL BOXES SHALL BE SUPPORTED FROM BUILDING STRUCTURAL MEMBERS INDEPENDENTLY OF THE CONDUIT RACEWAYS. MECHANICAL SYSTEMS OR SUSPENDED CEILING SUPPORTS. RECESSED BOXES SHALL BE FLUSH WITH SURROUNDING SURFACE. ALL BOXES AND CABINETS SHALL BE PROTECTED DURING CONSTRUCTION AND SHALL BE CLEANED BEFORE PULLING WIRE AND INSTALLING DEVICES.
    - D. SIZE OF CONDUIT SHALL NOT BE LESS THAN 3/4" AND NOT LESS THAN REQUIRED BY THE NATIONAL ELECTRICAL CODE.

13. WIRE: USE ONLY APPROVED TYPE WIRE-PULLING LUBRICANTS FOR WIRE PULLS. SPLICE WIRE ONLY IN ACCESSIBLE AND UL APPROVED JUNCTION BOXES. MAKE WIRE JOINTS MECHANICALLY STRONG BEFORE APPLYING THE CONNECTOR AND WHERE TAPE IS USED, WRAP EACH JOINT TO THE THICKNESS OF THE ORIGINAL INSULATION. CLEAN AND POLISH METALLIC SURFACES BEFORE INSTALLING CONDUCTORS. APPLY PRESSURE TYPE LUGS ON STRANDED CONDUCTORS CONNECTED TO SCREW OR BOLT TYPE CONNECTIONS.

14. WIRING DEVICES: UNLESS NOTED OTHERWISE, RECEPTACLES SHALL BE INSTALLED 18" ABOVE THE FINISHED FLOOR, SWITCHES SHALL BE 48" AND CLOCK HANGERS 8'-0". RECEPTACLES NOTED ABOVE WORK COUNTERS AND CABINETS (AC) SHALL BE MOUNTED ABOVE THE BACKSPLASH. WEATHERPROOF RECEPTACLE COVERS SHALL BE WEATHERPROOF WHILE IN USE. PROVIDE A BONDING JUMPER BETWEEN THE BOX AND ALL RECEPTACLES.

15. EQUIPMENT CONNECTIONS: PROVIDE ALL NECESSARY MOTOR STARTERS (VERIFY HOOD FANS WITH SUPPLIER), DISCONNECT SWITCHES, CONTROLS, CONDUIT, BOXES, WIRE, ETC. AND CONNECT COMPLETE TO EACH PIECE OF EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS INDICATED .ON THE DRAWINGS. WHERE EQUIPMENT RATINGS DIFFERENT FROM THAT INDICATED, CONSULT OWNER. CONSULT WITH EQUIPMENT SUPPLIER TO DETERMINE ROUGH-IN REQUIREMENTS. WHERE EQUIPMENT IS NOTED AS FUTURE, TERMINATE CIRCUIT IN JUNCTION BOX AND INSTALL SPRING WIRE NUTS ON THE ENDS OF THE CONDUCTORS.

16. LIGHTING FIXTURES:

    A. PROVIDE ALL NECESSARY MOUNTING HARDWARE AND RELATED ITEMS TO PROPERLY INSTALL THE LIGHTING FIXTURES. FIXTURES SUPPORTED IN EXPOSED OR CONCEALED GRID CEILINGS SHALL BE PROVIDED WITH CLIPS. FIXTURES MOUNTED IN OR ON TILE CEILINGS SHALL BE ALIGNED WITH TILES. LIGHTING FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURAL MEMBERS EXCEPT FOR EXPOSED GRID CEILINGS WHERE A CEILING SUPPORTING WIRE SHALL BE PROVIDED AT EACH FIXTURE CORNER. DO NOT USE CEILING GRID CEILING SUPPORT WIRES FOR STRAPPING OR SUPPORT.

17. CLEANING: ALL EQUIPMENT INCLUDING PANELBOARDS, SWITCHES, WIRING DEVICES, LIGHTING FIXTURES, WALL PLATES, ETC. SHALL BE FREE OF CORROSION, DIRT, PAINT SPLATTER OR DAMAGE OF ANY SORT AT FINAL ACCEPTANCE OF THE WORK. CONTRACTOR SHALL CLEAN, REPAIR OR REPLACE SAME AS INSTRUCTED BY THE OWNER BEFORE FINAL PAYMENT.

18. POWER AND LIGHTING PANELS:

    A. THE SERVICE ENTRANCE EQUIPMENT SHALL BE UL LISTED AND LABELED FOR THAT APPLICATION. BUSSING SHALL BE ALUMINUM, TIN-PLATED. BRACE BUSSING FOR 65,000 A.I.C. UNLESS NOTED OTHERWISE ON THE CONTRACT DRAWINGS.
    B. LIGHTING AND POWER PANELBOARDS SHALL HAVE LOCKING DOOR AND FLUSH TRIM. BUSSING SHALL BE ALUMINUM, WITH BRACING TO SUIT INTERRUPTING RATING.
    C. BREAKERS SHALL BE INDIVIDUAL MOLDED CASE, BOLT-IN STYLE, SIZED AS SCHEDULED. TWO POLE AND THREE POLE BREAKERS SHALL BE COMMON TRIP SINGLE POLE UNITS WITH HANDLETIES ARE NOT ACCEPTABLE.
    D. PANELS SHALL BE CURB MOUNTED AS SHOWN ON PLANS.
    E. CONTRACTOR TO VERIFY AVAILABLE FAULT CURRENT WITH UTILITY COMPANY FOR PROPER PANEL ASYMMETRICAL INTERRUPTING RATINGS. SUBMIT THIS INFORMATION WITH SHOP DRAWINGS AND PANELS, ALONG WITH LETTER FROM POWER COMPANY.
    F. METER, C.T. CABINET, SERVICE CONDUCTORS AND CONDUIT, TRANSFORMER, ETC., SHALL BE PER LOCAL UTILITY REQUIREMENTS. COORDINATE SERVICE INSTALLATION WITH LOCAL UTILITY COMPANY, PROVIDING ALL NEEDED EQUIPMENT AND LABOR.

19. LIGHTING CONTROLS: FURNISH AS NOTED ON ELECTRICAL PLANS. UL LISTED.

20. GROUNDING:

    A. EQUIPMENT GROUNDING
    1. THE EQUIPMENT GROUNDING SYSTEM SHALL BE SUCH THAT ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS, JUNCTION BOXES, OUTLET BOXES, CABINETS, MACHINE FRAMES, PORTABLE EQUIPMENT AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH ELECTRICAL CIRCUITS OPERATE CONTINUOUSLY AT GROUND POTENTIAL AND PROVIDE A LOW IMPEDANCE PATH FOR POSSIBLE GROUND FAULT CURRENTS.
    2. WIREWAYS, SWITCHGEAR, PANELBOARDS AND MOTOR CONTROL PANELS SHALL BE PROVIDED WITH AN EQUIPMENT GROUND BUS (INCLUDING LUG OR SCREW TERMINALS) SECURELY BONDED TO THE ENCLOSURE. JUNCTION BOXES AND OTHER ENCLOSURES (SIZES ABOVE 6"X6" SHALL UTILIZE AN EQUIPMENT GROUND BUS OR LUG AS REQUIRED TO SECURELY BOND THE EQUIPMENT GROUND CONDUCTOR TO THE ENCLOSURE.
    3. ALL BRANCH CIRCUITS FOR POWER AND LIGHT SHALL INCLUDE A GREEN INSULATED GROUNDING CONDUCTOR. THE EQUIPMENT GROUND CONDUCTOR SHALL BE ELECTRICALLY AND MECHANICALLY CONTINUOUS FROM THE SOURCE OF SUPPLY TO THE EQUIPMENT TO BE GROUNDED.
    4. LIGHTING FIXTURES SHALL BE SECURELY CONNECTED TO THE EQUIPMENT GROUND CONDUCTOR.
    5. MOTORS SHALL BE CONNECTED TO THE EQUIPMENT GROUND CONDUCTOR WITH A CONDUIT GROUNDING BUSHING AND WITH A BOLTED SOLDERLESS LUG CONNECTION ON THE METAL FRAME. BOLTS, NUTS AND WASHERS SHALL BE BRONZE, CADMIUM PLATED STEEL, OR OTHER NON-CORROSIVE MATERIAL.
    6. ALL CONDUIT SHALL BE CONNECTED TO THE EQUIPMENT GROUND BUS BY MEANS OF A GROUNDING BUSHING.
    7. E.C. SHALL COORDINATE WITH CASH REGISTER SYSTEM SUPPLIER TO CLARIFY ANY GROUNDING AND/OR WIRING REQUIREMENTS.

    B. SYSTEM GROUND
    1. THE SERVICE NEUTRAL SHALL BE SOLIDLY BONDED TO THE GROUNDING ELECTRODE AT THE SERVICE, WATERLINE, BUILDING STEEL AND FOOTER REBAR. IN COMPIANCE WITH N.E.C. ARTICAL 250.

21. INSTALLATION:
    - A. ALL GROUNDING CONDUCTORS SHALL BE SIZED AS PER THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
    - B. GROUND RODS: GROUND RODS SHALL BE THE COPPER CLAD STEEL TYPE END SHALL BE A MINIMUM OF 8 FEET IN LENGTH AND 3/4 INCH IN DIAMETER. GROUND RODS SHALL BE AS MANUFACTURED BY COPPERWELD STEEL COMPANY, OR AND ACCEPTABLE EQUIVALENT.
    - C. GROUNDING ELECTRODE CONDUCTORS SHALL BE STRANDED COPPER. EQUIPMENT GROUND WIRE SHALL B THW INSULATED AND SHALL BE GREEN IN COLOR.
    - D. CONNECTIONS TO WATER SERVICE SHALL BE MADE WITH SUITABLE GROUND CLAMP OF LUG CONNECTION AHEAD OF THE BUILDING METER OR CUTOFF VALVE. VERIFY THE EXISTENCE AND BURIAL OF 10' OF COPPER WATER PIPE AHEAD OF AND AFTER THE WATER METER. OTHERWISE, PROVIDE UFER GROUND PER NEC.
    - E. CONNECTIONS TO GROUND RODS SHALL BE MADE BY A EXOTHERMAL WELD.
    - F. GROUNDING CABLES EMBEDDED IN THE FLOOR SHALL BE MADE IN RIGID CONDUIT.
    - G. GROUND RODS SHALL BE DRIVEN FULL LENGTH DIAGONALLY INTO THE EARTH AND HAVE A ONE (1) FOOT MINIMUM COVER.
    - H. ALL CONDUCTOR CONNECTIONS SHALL BE MADE UP TIGHT TO PROVIDE CONTINUITY OF METALLIC GROUND
    - I. GROUND WIRES NOT IN CONDUIT SHALL BE SUPPORTED EVERY FIVE (5) FEET.

22. TEST:

    A. THE CONTRACTOR SHALL RUN A GROUND RESISTANCE TEST AND IF THE RESISTANCE TO GROUND IS GREATER THAN 25 OHMS, ADDITIONAL GROUND RODS SHALL BE INSTALLED. THE TEST SHALL NOT BE MADE WITHIN FIVE (5) DAYS AFTER A RAIN.
    B. THE CONTRACTOR SHALL PROVIDE OWNER WITH A COPY OF THE TEST PROCEDURE AND RESULTS OF THE TEST.
    C. THE GROUND TEST SHALL BE MEASURED IN THE PRESENCE OF AN AUTHORIZED REPRESENTATIVE OF THE ARCHITECT. NO EQUIPMENT SHALL BE OPERATED UNTIL GROUND POTENTIAL IS VERIFIED.

23. WORKMANSHIP:

    A. ALL WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THEIR TRADES AND SHALL BE TYPICAL OF THE BEST TRADE PRACTICES.

SECTION 16163 - SERVICE AND DISTRIBUTION

1. GENERAL

   A. SCOPE: SECTION APPLIES TO ALL WORKS HEREUNDER AND SHALL INCLUDE SERVICE, METERING AND DISTRIBUTION.
   B. SERVICE: THE ELECTRICAL DISTRIBUTION IS SIZED AS INDICATED ON THE ELECTRICAL PLANS. CONTRACTOR SHALL VERIFY SERVICE VOLTAGE WITH UTILITY COMPANY AND PROVIDE NECESSARY REVISIONS AND MODIFICATIONS REQUIRED. ELECTRICAL CONTRACTOR IS TO REFER TO THE POWER RISER DIAGRAM FOR FURTHER INFORMATION.
   C. METERING: CONTRACTOR SHALL PROVIDE MODIFICATIONS NECESSARY METERING FACILITIES INCLUDING METER SOCKET, CURRENT TRANSFORMER CABINET, CONDUIT AND OTHER WORK FOR METERING REQUIRED BY THE LOCAL UTILITY COMPANY.

2. MATERIALS

   A. DISCONNECT SWITCHES: SHALL BE (HEAVY-DUTY TYPE, NEMA HD) FUSED UNLESS NOTED OTHERWISE, DESIGNED TO ACCEPT ONLY REJECTION TYPE FUSES AND OPERATOR INTERLOCKED WITH THE DOOR IN THE "OFF" POSITION. SWITCHES SHALL BE MANUFACTURED BY GENERAL ELECTRIC, SQUARE D OR CUTLER-HAMMER.
   B. FUSES: SHALL BE CURRENT LIMITING WITH 200,000 AMPERES INTERRUPTING CAPACITY, UL INC. CLASS RK1 AND SHALL BE DUAL ELEMENT, TIME DELAY, CLASS R REJECTION TYPE. ONE SET OF SPARE FUSES SHALL BE PROVIDED FOR EACH SIZE AND MOUNTED IN "SPARE FUSE CABINET" LOCATED AT THE SERVICE ENTRANCE. FUSE IDENTIFICATION LABELS SHALL BE MANUFACTURED BY BUSSMAN OR SHAWMUT.

3. EXECUTION

   A. DISCONNECT SWITCHES SHALL BE INSTALLED 4'-0" ABOVE FINISHED FLOOR. ALL CABINETS SHALL BE VACUUM CLEANED BEFORE PULLING WIRE

4. INSTALLATION OF EQUIPMENT AND FIXTURES

   A. INSTALL ALL EQUIPMENT AND FIXTURES FORMING PART OF THE WORK OF THIS SECTION IN -COMPLETE ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ALL PERTINENT CODES AND REGULATIONS. MAKE ALL FINAL CONNECTIONS TO BAR AND KITCHEN EQUIPMENT.

5. LAMPING

   A. LAMP ALL FIXTURES WITH LAMPS OF THE DESIGNED RATING AND PATTERN.

6. TESTING

   A. GENERAL: UPON COMPLETION OF THIS PORTION AT THE WORK, FURNISH ALL EQUIPMENT AND PERSONNEL AND CONDUCT ALL TEST REQUIRED TO SECURE APPROVAL OF THE INSTALLATION FROM ALL AGENCIES HAVING JURISDICTION.

   B. CRITERIA:

   1. ALL SYSTEMS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS SHALL BE FREE FROM MECHANICAL AND ELECTRICAL DEFECTS AND SHALL SHOW AN INSULATION RESISTANCE BETWEEN PHASE CONDUCTORS AND GROUND OF NOT LESS THON THAT REQUIRED BY THE NATIONAL ELECTRICAL CODE.
   2. ALL SYSTEMS SHALL SHOW PROPER NEUTRAL CONNECTIONS.

7. CLEANING UP

   A. ALL EQUIPMENT AND EXPOSED SURFACES SHALL BE LEFT SMOOTH AND CLEAN. ALL PLATE WORK SHALL BE POLISHED AND THE ENTIRE PREMISES SHALL BE CLEANED OF UNUSED MATERIALS, RUBBISH, DEBRIS AND GREASE SPOTS.

METROPOLITAN INFRASTRUCTURE

10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11.22.17	ELECTRICAL REV.

Date	10.30.2017
Drawn	RLN
Checked	RLN
MI Project No.	17029
City Project No.	

Sheet Title

SPECIFICATIONS

Sheet No.

E5

SHEET 28 OF 35

STATE OF TEXAS
Richard L. Norris
100089
REGISTERED
PROFESSIONAL ENGINEER

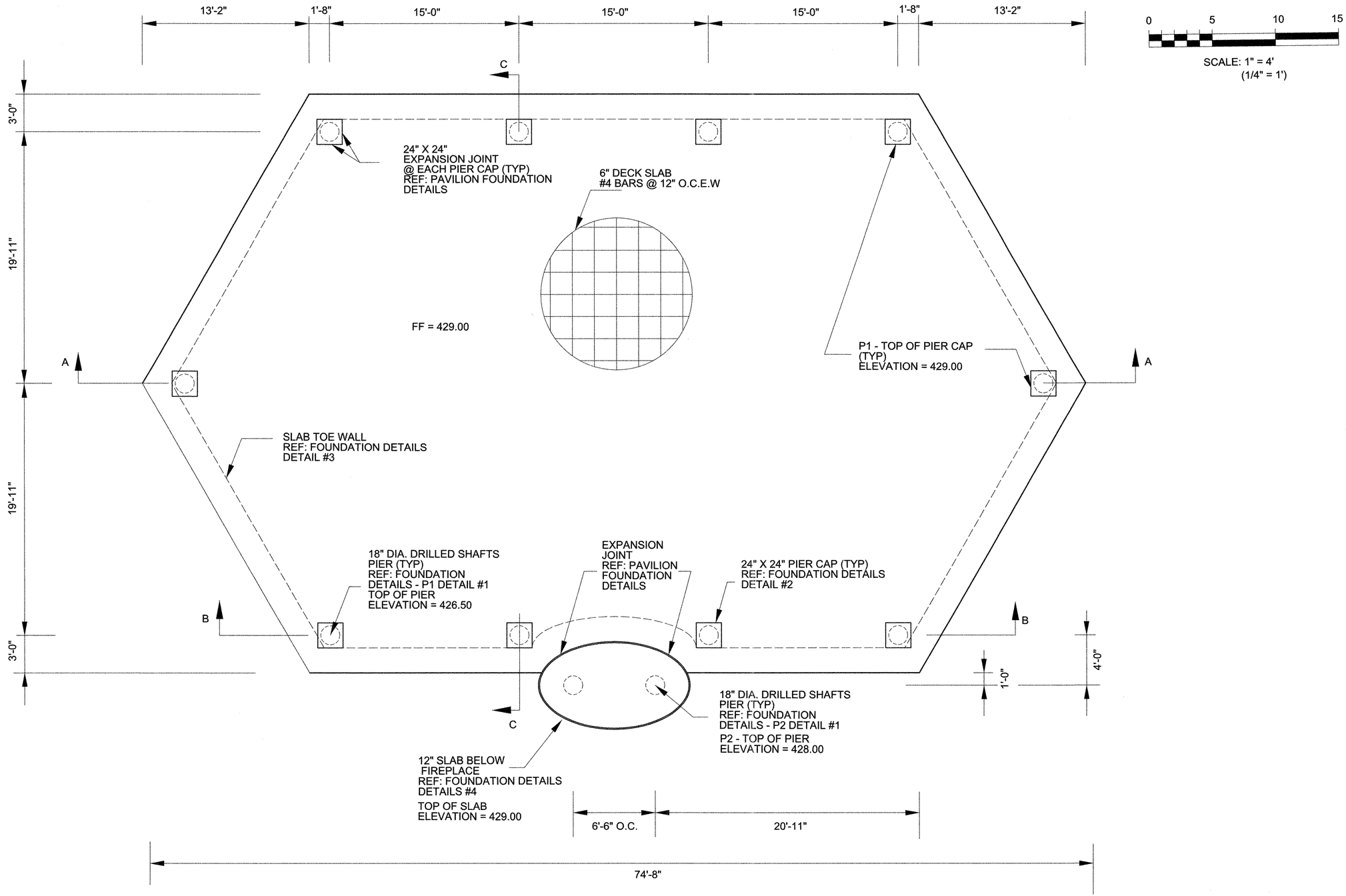
The seal on this document was authorized by Richard L. Norris, P.E. 100089 on the date shown below.

RSCE Project #1483

R Squared Consulting Engineers, Inc.

Firm Registration: F-15033
4720 Forchester Lane
McKinney, Texas 75070
972-914-0007

CAMP RORIE GALLOWAY



A FOUNDATION PLAN
PLAN VIEW

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

PAVILION FOUNDATION PLAN

Sheet No.
S1
SHEET 29 OF 35

CAMP RORIE GALLOWAY

GENERAL NOTES:

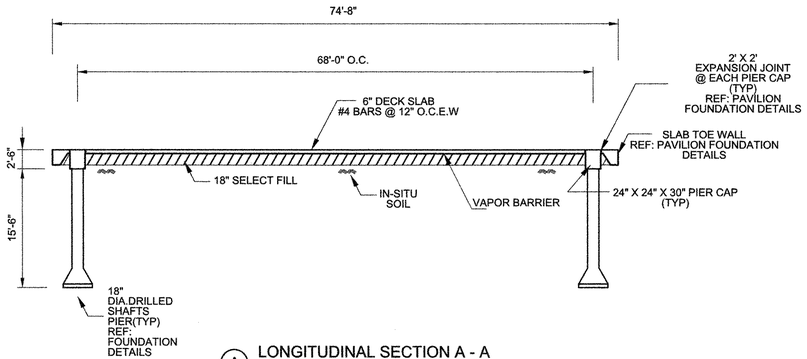
1. REPORT ANY AND ALL DISCREPANCIES, ERRORS OR OMISSIONS IN THE DOCUMENTS TO THE DESIGNER PRIOR TO ORDERING MATERIALS AND/OR COMMENCING CONSTRUCTION.
2. GRADE SITE TO DIVERT WATER AWAY FROM BLDG.
3. SITE SHALL BE GRADED TO DRAIN WITH NO PONDING ON SITE.
4. VERIFY ALL DIMENSIONS AT JOB SITE AND DO NOT SCALE DRAWINGS.
5. ALL STRUCTURAL ANCHORS FOR FRAMING SHALL BE VERIFIED IN FIELD BY CONTRACTOR AND MANUFACTURER PRIOR TO PLACEMENT OF CONCRETE.
6. FOUNDATION DESIGN WAS BASED ON AN ASSUMED ALLOWABLE BEARING CAPACITY OF 1800 PSF. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THIS BEARING CAPACITY.
7. ALL FOOTING EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY A QUALIFIED SOILS ENGINEER REPRESENTING THE OWNER PRIOR TO PLACING CONCRETE. EXCAVATIONS SHALL BE FREE OF WATER AT ALL TIMES.
8. NO ENGINEERED FILL SHALL BE PLACED UNTIL EXCAVATION BOTTOMS HAVE BEEN INSPECTED AND APPROVED BY A SOILS ENGINEER.
9. BACKFILLING:
a) BOTH SIDES OF FOUNDATION WALLS SHALL BE BACKFILLED SIMULTANEOUSLY SO AS TO PREVENT OVERTURNING OR LATERAL MOVEMENT OF WALLS.
b) NO FILL OR BACKFILL SHALL BE SETTLED BY THE USE OF WATER.
10. ALL CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER FOUNDATION.
11. SEE ELECTRICAL SHEETS FOR LOCATIONS OF UNDERGROUND CONDUIT. SEE PLUMBING PLAN FOR LOCATIONS OF UNDERGROUND PIPING.
12. FOUNDATIONS CONTRACTOR SHALL REFER AND CONFORM TO ALL RECOMMENDATIONS AND FINDINGS BY ENGINEER.
13. ENGINEER ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF THE FINDINGS OR FOR THE FINAL RECOMMENDATIONS, GRADING, TRENCHING, ETC. CONTACT OWNER AND EMGINEER FOR INSTRUCTIONS PRIOR TO THE CONTINUATION OF WORK SHOULD ANY UNUSUAL CONDITIONS BECOME APPARENT DURING GRADING OR FOUNDATION CONSTRUCTION.

0 10 20

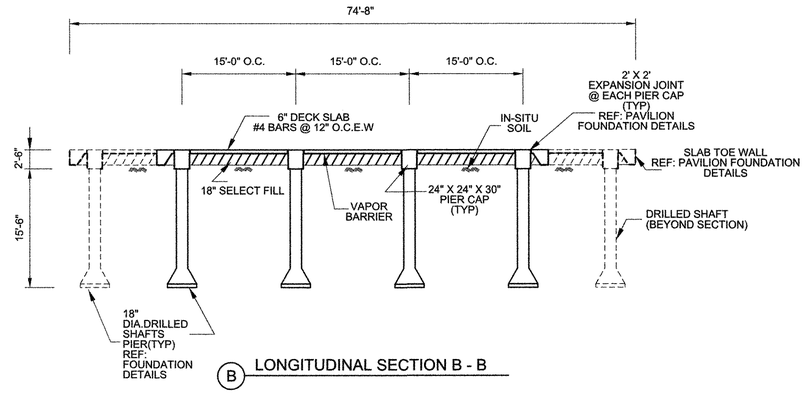
SCALE: 1" = 10'

GENERAL SPECIFICATIONS

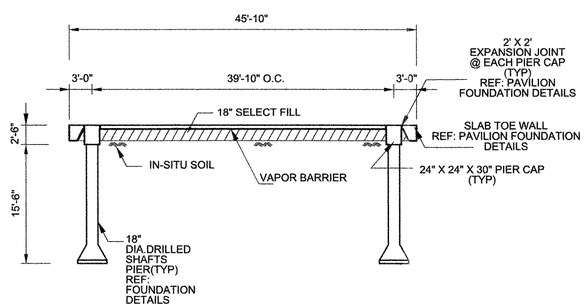
1. FILL PLACED ON SITE SHALL BE NON POROUS AND SHALL HAVE A PI LESS THAN 15. ALL FILL SHALL BE PLACED IN MAXIMUM 6" LIFTS IN ACCORDANCE WITH ASTM 698 OR THE ENGINEERS DIRECTION AND SHALL BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR DENSITY.
2. THE SITE SHALL BE WATERED AS NEEDED TO MAINTAIN THE SOIL MOISTURE UNDER THE FOUNDATION AT OR SLIGHTLY ABOVE THE OPTIMUM MOISTURE LEVEL TO ENSURE THE CLAY SOIL UNDER THE SLAB IS IN A SWELLED CONDITION BEFORE PLACEMENT OF THE SLAB. THIS MAY REQUIRE THE SITE BE WATERED DAILY FOR A PERIOD OF SEVERAL WEEKS BEFORE PLACEMENT DEPENDING ON THE SOIL MOISTURE CONDITIONS.
3. PLACE A 6 MIL POLY SHEET WITH LAPPED JOINTS BETWEEN THE SOIL AND THE CONCRETE SLAB.
4. ALL REINFORCING STEEL SHALL BE SUPPORTED ON CHAIRS SPACED AT 4 FOOT INTERVALS EACH WAY AND TIED AT ALL INTERSECTIONS TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT. REINFORCING STEEL SHALL NOT BE PLACED CLOSER THAN 1 1/2 INCH TO THE EXTERIOR OF THE CONCRETE. BAR LAPS SHALL BE A MINIMUM OF 36 BAR DIAMETERS. PROVIDE "ELL" BARS, THE SAME DIAMETER AS THE CORRESPONDING BAR AND WITH A MINIMUM 24" LAP ON ADJOINING BARS AT ALL CORNERS AND OFFSETS THAT DO NOT HAVE CONTINUOUS BARS. REINFORCING STEEL TO BE GRADE 60.
5. TRENCHES FOR PLUMBING LINES SHALL NOT BE LOCATED UNDER BEAMS AND SHALL CROSS BEAMS AT RIGHT ANGLES.
6. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. WATER CONTENT OF THE MIX SHALL BE CONTROLLED AND MAINTAINED AT THE MINIMUM NECESSARY FOR PLACEMENT PER ACI BUILDING CODE REQUIREMENTS. CONCRETE SHALL BE WELL CONSOLIDATED WITH NO POROSITY AT EXTERIOR FACES. VIBRATION OF THE CONCRETE IS REQUIRED. CONSTRUCTION JOINTS IN THE SLAB ARE NOT PERMITTED.
7. CONCRETE FINISH FLOOR SHALL BE LEVEL TO WITHIN 1/4" IN 10 FEET AND 1/2" OVERALL ACROSS THE FOUNDATION.
8. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES.
9. COORDINATE THE STRUCTURAL DRAWINGS WITH THE ARCHITECTURAL AND MEP DRAWINGS FOR ALL OPENINGS, DROPS, INSERTS, AND RELATED ITEMS.
10. SOIL OR CONCRETE SHALL BE PLACED ADJACENT TO THE CONCRETE FOUNDATION AND SLOPED TO DRAIN AWAY FROM THE STRUCTURE A MINIMUM OF 1" PER FOOT FOR THE AT LEAST THE FIRST 4 FEET.



A LONGITUDINAL SECTION A - A



B LONGITUDINAL SECTION B - B



C TRANSVERSE SECTION C - C

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

PAVILION FOUNDATION SECTION AND NOTES

Sheet No.

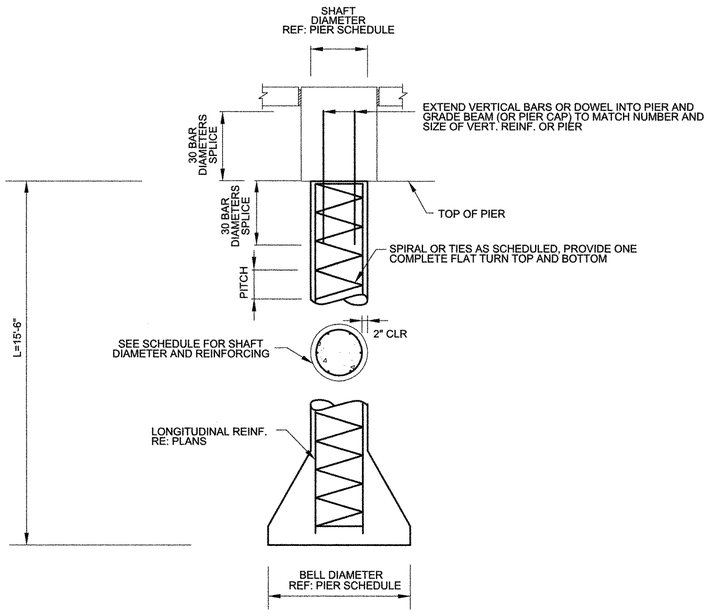
S2

SHEET 30 OF 35

CAMP RORIE GALLOWAY

PIER SPECIFICATIONS

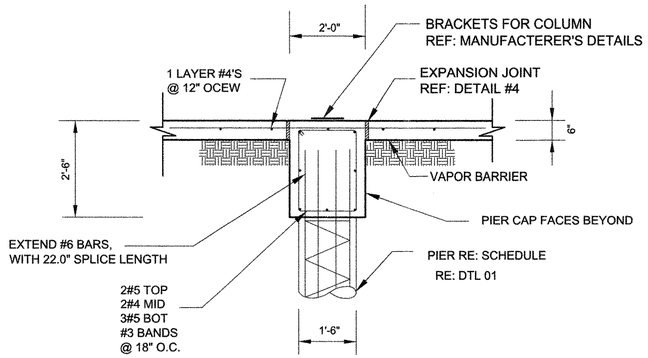
1. REFER PIER DETAIL AND SCHEDULE FOR DIAMETER, LENGTH, PENETRATION AND REINFORCEMENT REQUIREMENTS.
2. THE PIER HOLES SHALL BE CLEAR OF ANY DEBRIS OR EXCESS WATER BEFORE CONCRETE IS PLACED.
3. THE TOPS OF THE PIERS SHALL BE CLEANED OF ANY LAITANCE AND SOIL SPILLAGE AND THE EXPOSED.
4. REBAR SHALL BE FREE OF ANY RESIDUAL CONCRETE AND DIRT BEFORE BEAM CONCRETE PLACEMENT.



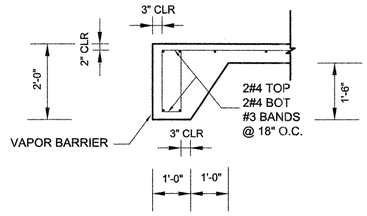
A BELL REQUIRED IF NO SOLID STRATA BY DEPTH OF 15'
NTS

1 PIER DETAILS

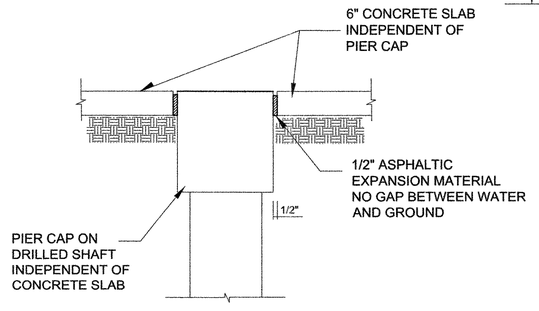
PIER SCHEDULE						
OPTION	MARK	LENGTH	SHAFT DIAMETER	VERTICAL BARS	SPIRALS	CAPACITY
1	P1	15'-6"	1'-6"	6 - #6	#3 @ 15"	62 KIPS
2	P2	17'-0"	1'-6"	6 - #6	#3 @ 15"	62 KIPS
3	P3	14'-5"	1'-0"	5 - #5	#3 @ 15"	62 KIPS



2 PIER CAP DETAILS
NTS



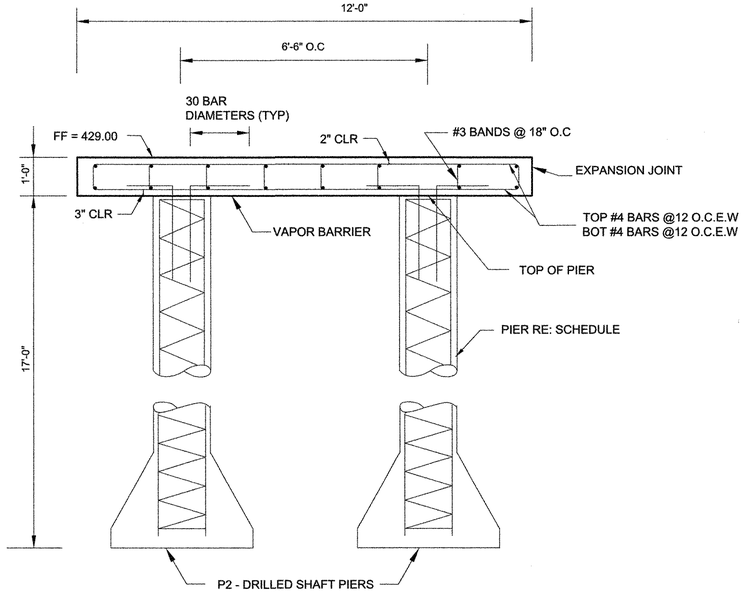
3 TOE WALL DETAILS
NTS



4 EXPANSION JOINT DETAILS
NTS

NOTES:

1. WHERE 90 DEGREE HOOKS ARE SCHEDULED OR DETAILED FOR TOP BARS, CORNER BARS MAY BE OMITTED.
2. MATCH SIZE, LOCATION AND NUMBER OF HORIZONTAL BEAM AND WALL BARS, EXCEPT WHERE THERE ARE MORE THAN 2 TOP OF BOTTOM BARS, ONLY THE INSIDE AND OUTSIDE BARS MUST BE MATCHED.



5 FIREPLACE SLAB DETAILS
NTS

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item

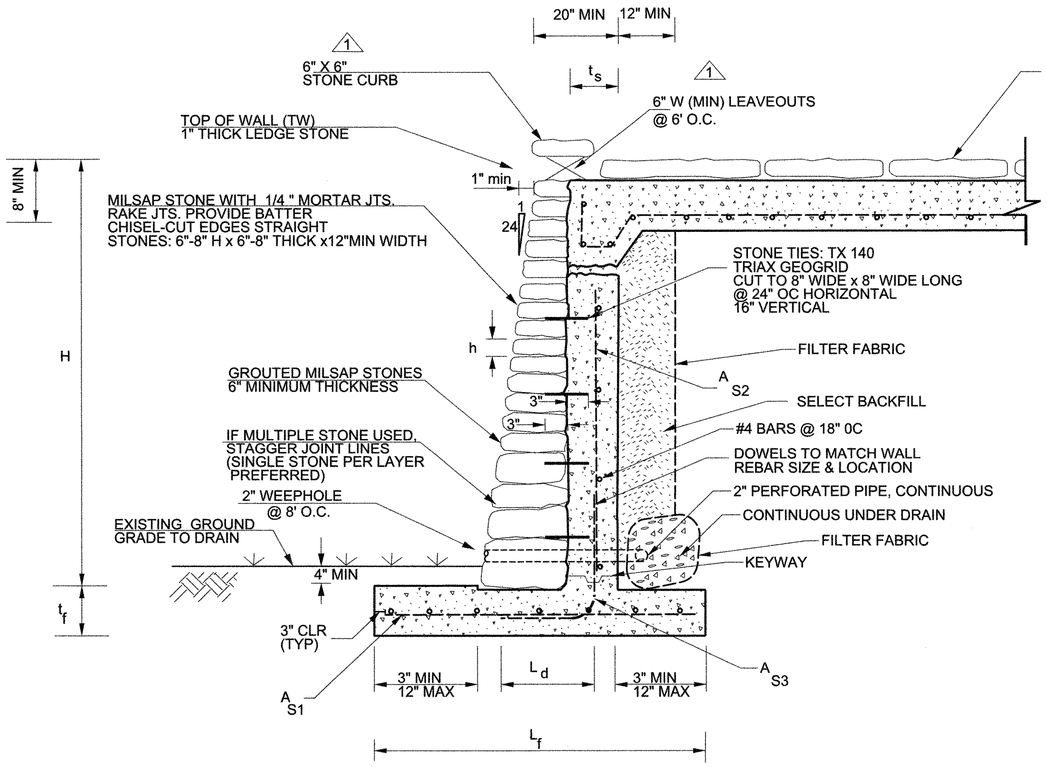
Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

PAVILION FOUNDATION DETAILS

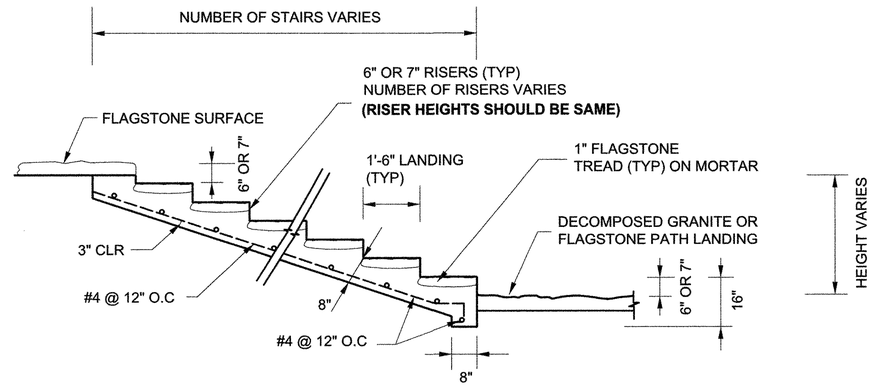
Sheet No.
S3
SHEET 31 OF 35

CAMP RORIE GALLOWAY



A VERTICAL COMPOSITE WALL SECTION - STRUCTURAL
SECTION NTS

H (ft)	t_s (in)	L_f	t_f (in)	A_{s1}	A_{s2}	A_{s3}	L_d
UP TO 5'-0"	8"	3'-9"	12"	# 4 @ 18" OCEW	# 4 @ 18" OCEW	# 4 @ 18"	12"
UP TO 4'-0"	8"	3'-0"	12"	# 4 @ 18" OCEW	# 4 @ 18" OCEW	# 4 @ 18"	12"
UP TO 2'-0"	6"	2'-0"	12"	# 4 @ 18" OCEW	# 4 @ 18" OCEW	# 4 @ 18"	12"



B STAIR DETAIL
SECTION NTS

NOTES:

1. FOUNDATION DESIGN IS BASED ON GEO-TECHNICAL REPORT BY ALPHA TESTING
2. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE 4000 PSI.
3. LAP SPLICE LENGTH SHALL BE MINIMUM: 36" FOR BARS #4 & #5; AND 48" FOR BARS #6.
4. REBARS SHALL BE SECURED ON CHAIRS BEFORE CONCRETE IS POURED.
5. CONCRETE SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
6. CONTRACTOR SHALL PROVIDE TIE BACKS FROM THE STONE WALL TO CAST IN-PLACE CONCRETE TO RESIST A HORIZONTAL FORCE OF 200 LBS.
7. THE DIMENSIONS FOR WALL DETAIL A SHALL BE REFERRED TO RETAINING WALL SCHEDULE.
8. WALL BACKFILL COMPACTION SHALL BE PERFORMED WITH LIGHT COMPACTION EQUIPMENT. PLACE IN 8" LOOSE LIFTS AND COMPACT TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM 698. AND SHOULD BE WITHIN -2 TO +2 PERCENT OF THE OPTIMUM MOISTURE CONTENT

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY
IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

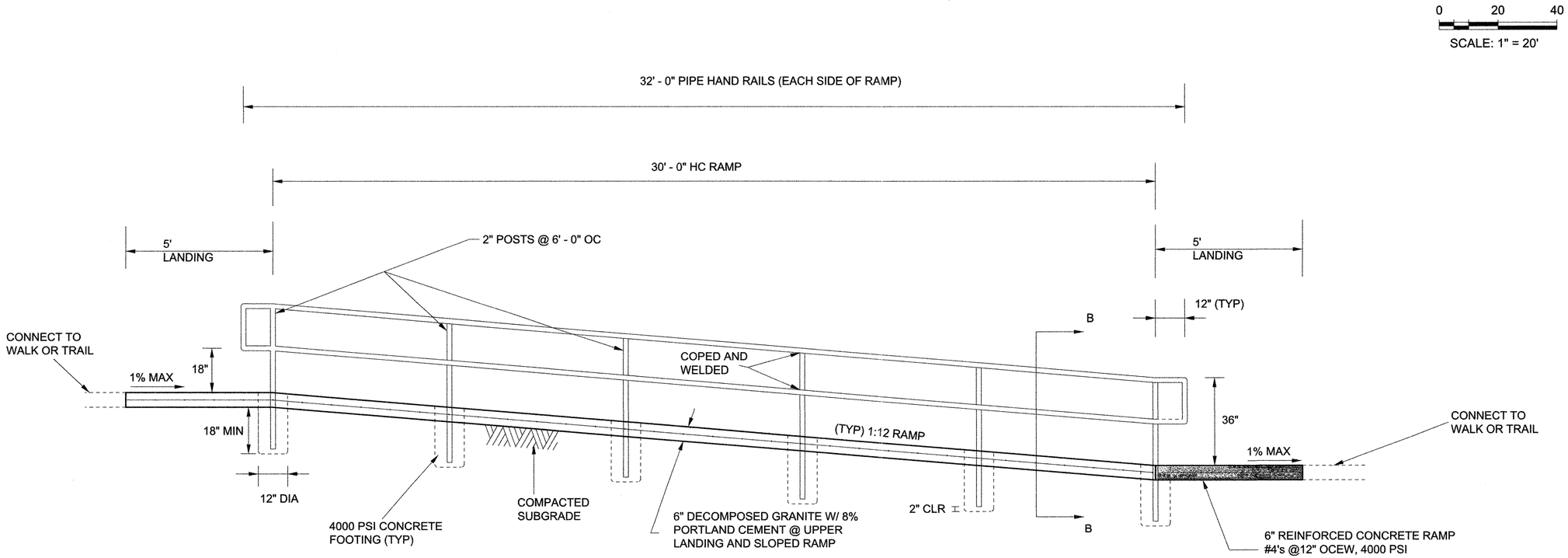
No.	Date	Item
1	11/27/17	6" STONE CURB AND LEAVEOUTS

Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

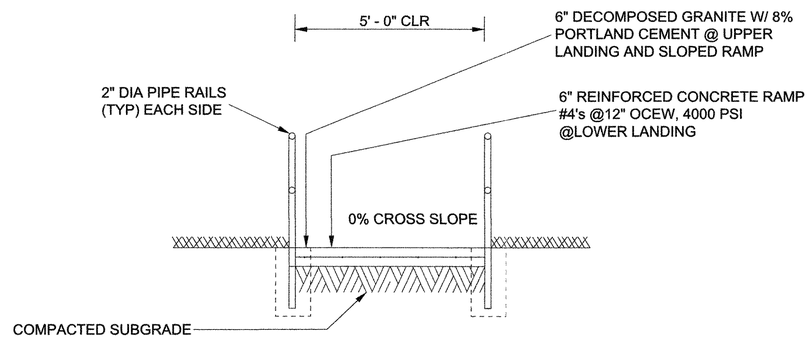
Sheet Title
RETAINING WALL AND STAIR DETAILS

Sheet No.
S4
SHEET 32 OF 35

CAMP RORIE GALLOWAY



A HC RAMP WITH HANDRAIL DETAIL
NTS



B HC RAMP CROSS SECTION
NTS

1 SAME DESIGN AT LANDING ON SOUTH SIDE OF CABIN

0 20 40
SCALE: 1" = 20'

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 17, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No. Date Item
1

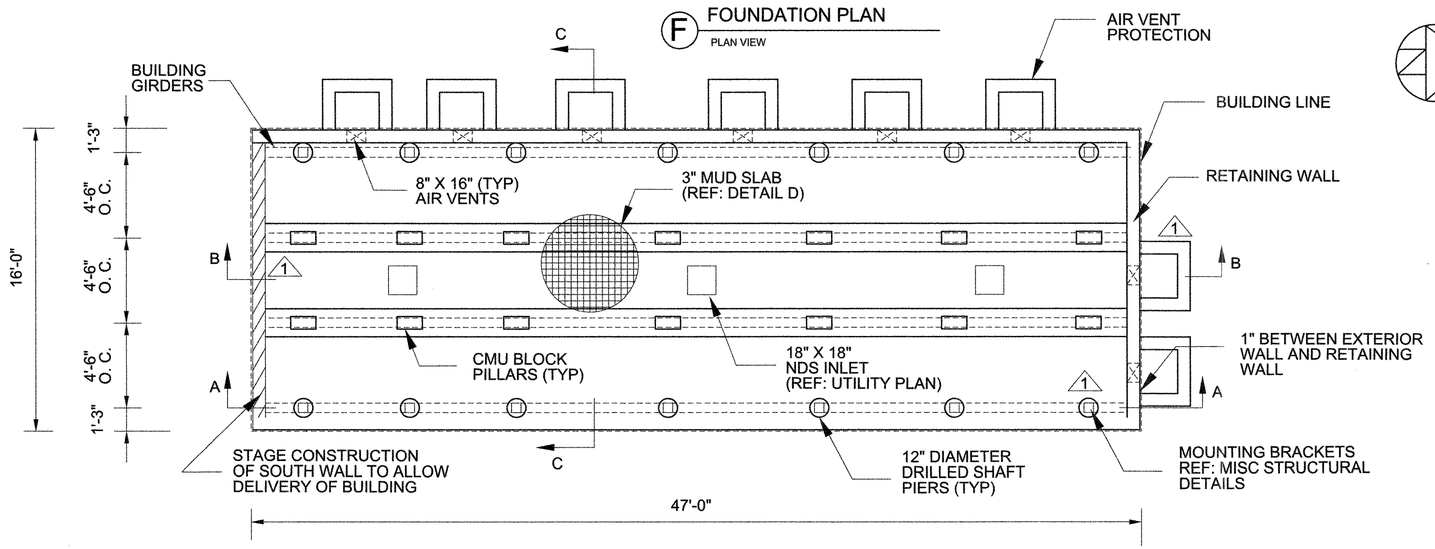
Date 10/31/2017
Drawn MMS
Checked LF
MI Project No. 17029
City Project No.

Sheet Title
HC RAMP AND RAILING DETAILS

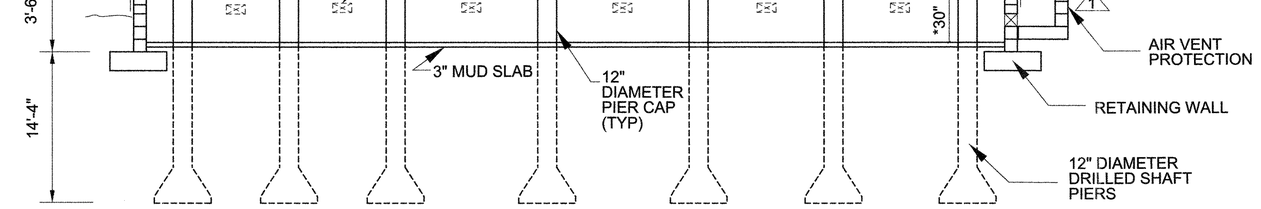
Sheet No.
S5
SHEET 33 OF 35

CAMP RORIE GALLOWAY

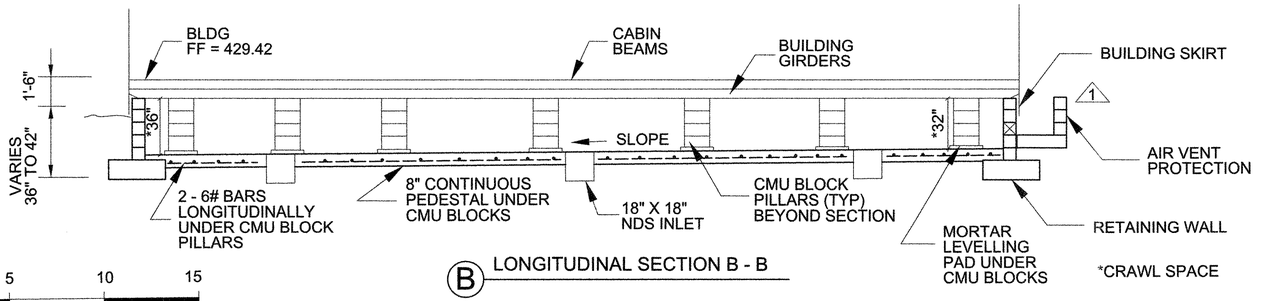
F FOUNDATION PLAN
PLAN VIEW



A LONGITUDINAL SECTION A - A



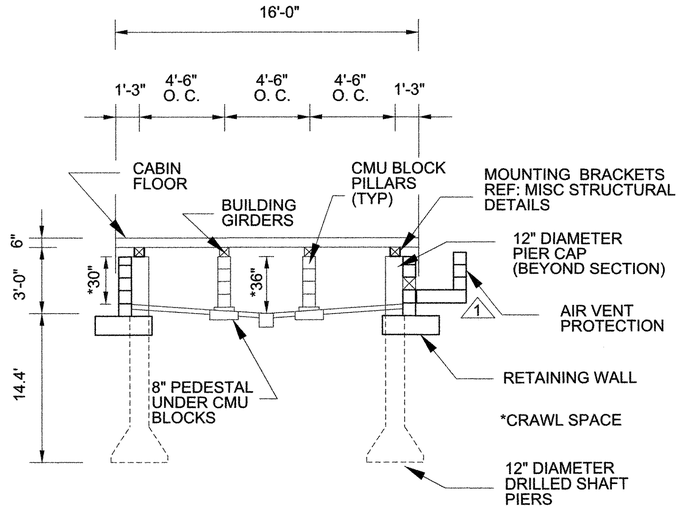
B LONGITUDINAL SECTION B - B

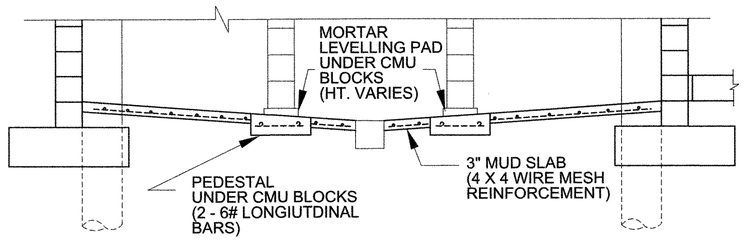


0 5 10 15

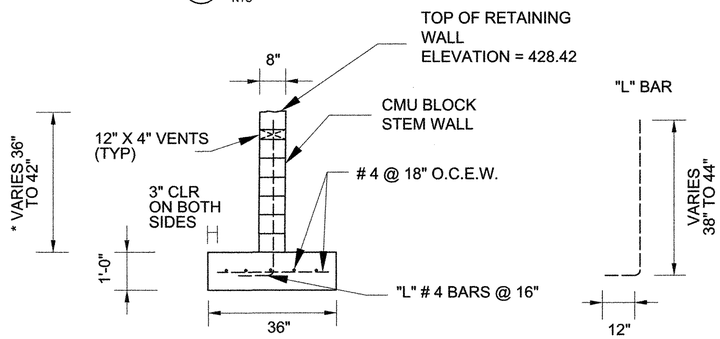
SCALE: 1" = 4'
(1/4" = 1')

C TRANSVERSE SECTION C - C





D MUD SLAB AND PEDESTAL DETAILS
NTS



E RETAINING WALL DETAILS
NTS

* NOTES

HEIGHT OF WALLS SHALL BE 36" FOR EAST AND WEST WALLS.

HEIGHT FOR NORTH AND SOUTH WALLS SHALL VARY, STARTING AT 36" ON SIDES AND 42" AT CENTER.

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lfrisbie@metroinfrastructure.com
Registered Engineering Firm #6939

MI PROJECT NO. 17029

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED PROFESSIONAL ENGINEER
Nov. 27, 2017

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions

No.	Date	Item
1	11/27/17	AIR VENTS, VENT PROTECTION, BRACKETS

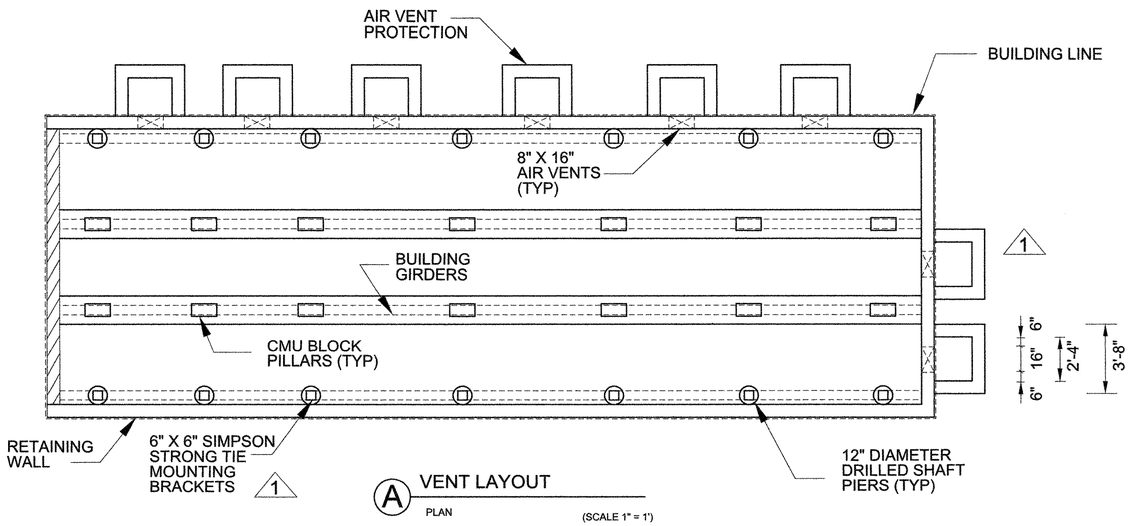
Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title

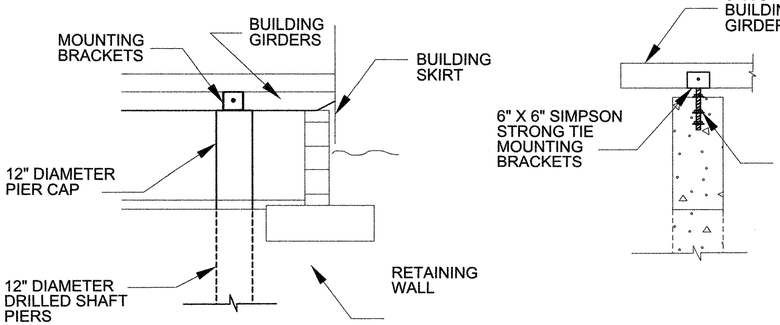
OFFICE FOUNDATION PLAN AND SECTION

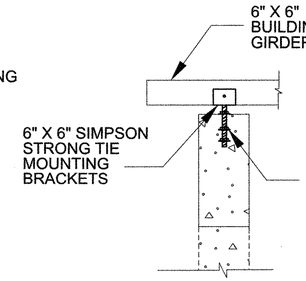
Sheet No.
S6
SHEET 34 OF 35

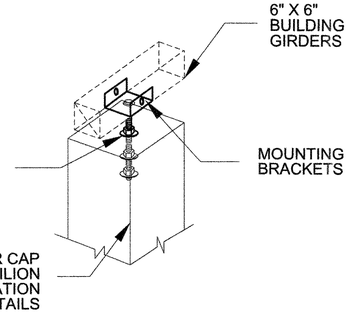
CAMP RORIE GALLOWAY



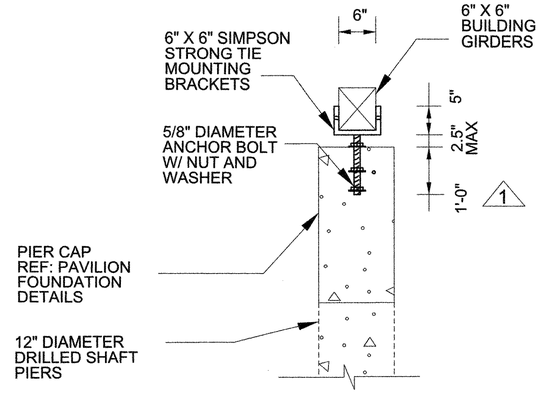
A VENT LAYOUT
PLAN (SCALE 1" = 1')



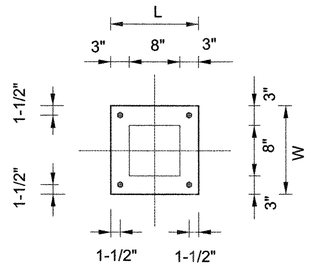




C ELEVATIONS FOR BRACKET DETAILS
ELEVATION NTS

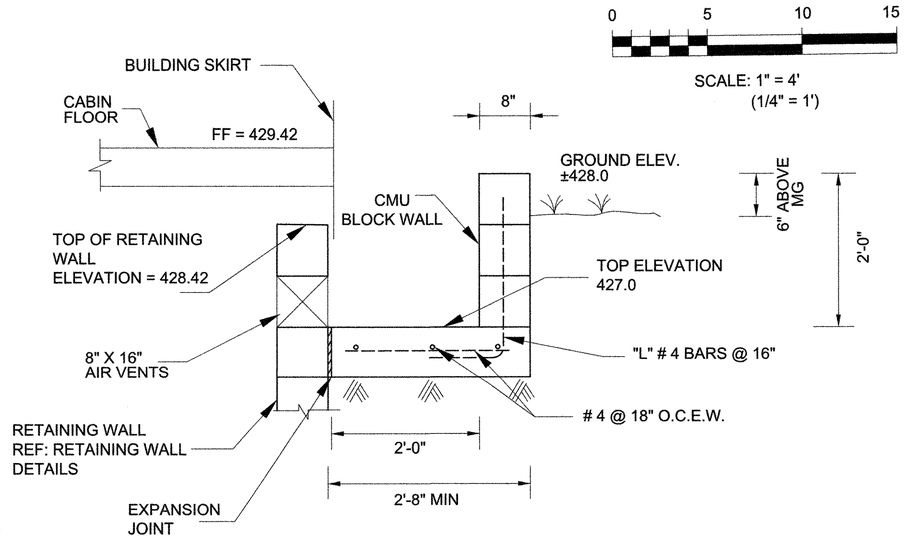


D BRACKET DETAILS FOR CABIN BEAMS
SECTION

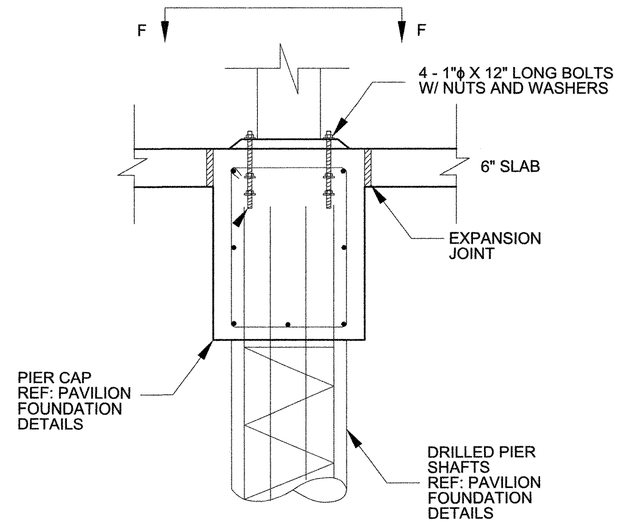


NOTE:
REFER TO BASE PLATE SCHEDULE FOR DIMENSIONS

F BASE PLATE - TS COLUMN
PLAN



B VENT PROTECTION DETAILS
SECTION



BASE PLATE SCHEDULE					
MARK	DIMENSIONS		THICK.	ANCHOR BOLTS	REMARKS
	L	W			
BP-1	1'-2"	1'-2"	1-1/4"	4-1"ϕ	TS 8 X 8 X 1/4

E ANCHORING DETAILS FOR PAVILION COLUMNS
SECTION

METROPOLITAN INFRASTRUCTURE
10925 Estate Ln, Suite W225
Dallas, Texas 75238
tel: 214-341-1501
fax: 214-341-1640
Lrfrisble@metroinfrastructure.com
Registered Engineering Firm #6939

STATE OF TEXAS
LOUIS R. FRISBIE
69355
LICENSED
PROFESSIONAL ENGINEER
Nov. 27, 2017

MI PROJECT NO. 17029

CAMP RORIE GALLOWAY IMPROVEMENTS
MESQUITE
DALLAS COUNTY, TEXAS

Revisions
No.	Date	Item
1	11/27/17	NEW SHEET

Date	10/31/2017
Drawn	AP
Checked	LF
MI Project No.	17029
City Project No.	

Sheet Title
MISCELLANEOUS STRUCTUAL DETAILS

Sheet No.
S7
SHEET 35 OF 35

CAMP RORIE GALLOWAY

Attachment 2.3

Geotechnical Exploration

GEOTECHNICAL EXPLORATION

on

CAMP RORIE GALLOWAY – PAVILION AND OFFICE
3100 Lawson Road
Mesquite, Texas
ALPHA Report No. G171289

Prepared for:

CITY OF MESQUITE
P.O. Box 850137
Mesquite, Texas 75185-0137
Attention: Mr. Robert Blankenship
June 14, 2017

Prepared By:

ALPHA TESTING, INC.
2209 Wisconsin Street, Suite 100
Dallas, Texas 75229

ALPHA TESTING
WHERE IT ALL BEGINS

Geotechnical
Construction Materials
Environmental
TBPE Firm No. 813

2209 Wisconsin Street,
Suite 100
Dallas, Texas 75229

Tel: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

June 14, 2017

City of Mesquite
P.O. Box 850137
Mesquite, Texas 75185-0137
Attention: Mr. Robert Blankenship

Re: Geotechnical Exploration
Camp Rorie Galloway – Pavilion and Office
3100 Lawson Road
Mesquite, Texas
ALPHA Report No. G171289

Attached is the report of the Geotechnical Exploration performed for the project referenced above. This study was authorized by Mr. Robert Blankenship on May 16, 2017 and performed in accordance with ALPHA Proposal No. 58825-rev dated May 16, 2017.

This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses were used to develop recommendations to aid design and construction of foundations and pavement.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing materials testing services during construction, please contact our office.

Sincerely,

ALPHA TESTING, INC.

STATE OF TEXAS
CHRISTOPHER W. EDDY
86610
LICENSED
PROFESSIONAL ENGINEER

Christopher W. Eddy, P.E.
Senior Project Engineer

Mark L. McKay, P.E.
Geotechnical Department Manager

CWE/MLM
Copies: (1) Client

TABLE OF CONTENTS

On

ALPHA REPORT NO. G171289

1.0 PURPOSE AND SCOPE

The purpose of this geotechnical exploration is for ALPHA TESTING, INC. (ALPHA) to evaluate for the "Client" some of the physical and engineering properties of subsurface materials at selected locations on the subject site with respect to formulation of geotechnical design parameters for the proposed construction. The field exploration was accomplished by securing subsurface samples from widely spaced test borings performed across the new proposed construction area. Engineering analyses were performed from results of the field exploration and results of laboratory tests performed on representative samples.

Also included are general comments pertaining to reasonably anticipated construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to evaluate subsurface conditions and to aid in ascertaining whether construction meets project specifications.

Recommendations provided in this report were developed from information obtained in the test borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those observed at the boring locations. The scope of work may not fully define the variability of subsurface materials that is present on the site.

The nature and extent of variations from conditions encountered at the borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and possibly other tests.

2.0 PROJECT CHARACTERISTICS

The project site is located within Camp Rorie Galloway located at 3100 Lawson Road in Mesquite, Texas. A site plan illustrating the general outline of the property, with ALPHA's boring locations noted on it, is provided as Figure 1, titled "Boring Location Plan," in the Appendix of this report. At the time the field exploration was performed, the planned improvement area was relatively open and covered with grass and a portland-cement concrete slab. The concrete slab appears to be the remnants of a previous pavilion/structure. Trees are located around the proposed improvement area. According to online maps available from the North Central Texas Council of Governments (NCTCOG, found at www.dfwmaps.com), the topography of the site generally slopes downward towards the south with about 2 to 4 feet of elevation change across the improvement area.

Present plans consist of constructing a pavilion with an office area on the west side. We understand the pavilion will be a pre-engineered, steel structure with eight columns supporting the roof. The slab for the pavilion will be grade-supported. The adjoining office will be a manufactured log cabin that will be brought to the site completed and installed on a perimeter grade beam foundation in order to produce a crawl space with a 30-inch minimum clearance. Grading plans were not available at the time of this report. We have assumed cuts and fills of 2 feet or less will be required to establish the building pad grades. It is anticipated new area pavement will consist of portland-cement concrete.

3.0 FIELD EXPLORATION

Subsurface conditions on the site were explored by drilling a total of two test borings in general accordance with ASTM D 420 using standard rotary drilling equipment. The borings were drilled to a depth of about 25 feet each. The approximate locations of the test borings are shown on the Boring Location Plan, Figure 1, in the Appendix of this report. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Section A-1 of the Appendix

Subsurface types encountered during the field exploration are presented on the Log of Boring sheets included in the Appendix of this report. The boring logs contain our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, the boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are approximate and the actual transition between strata may be gradual.

4.0 LABORATORY TESTS

Selected samples of the subsurface materials were tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for foundation design and earthwork construction. A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented on the Log of Boring sheets or summary data sheets enclosed in the Appendix.

5.0 GENERAL SUBSURFACE CONDITIONS

Based on the Geological Atlas of Texas (Sherman Sheet) from the Texas Bureau of Economic Geology, published by the University of Texas at Austin, the project site lies within alluvial materials associated with the Trinity River system that overlie the Ozan formation. Alluvial materials consist of predominantly clay, sand and gravel from over bank flow from ancient stream channels. The Ozan formation is composed of blocky highly active structured clays and marl with some pyrite, phosphate nodules and limestone seams. Marl is commonly present at greater depths. Near-surface residual soils associated with the Ozan formation generally consist of high plasticity clays and/or moderate plasticity marl. The residual soils of the Ozan Formation generally have high seasonal shrink-swell potential with changes in soil moisture content.

Within the 25-feet maximum depth explored on the site, subsurface materials generally consist of clay (CH) to the boring termination depths 25 feet. The letters in parenthesis represent the soils' classification according to the Unified Soil Classification System (ASTM D 2487). More detailed stratigraphic information is presented on the Log of Boring sheet attached to this report.

Most of the subsurface materials are relatively impermeable and are anticipated to have a relatively slow response to water movement. Therefore, several days of observation will be required to evaluate actual groundwater levels within the depths explored. Also, the groundwater level at the site is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions and subsurface drainage characteristics.

Groundwater was encountered at a depth of about 17 feet while advancing Boring 1 and was measured at about 23 feet upon completion of drilling. Groundwater was not observed in Boring 2. It is common to detect shallower seasonal groundwater from natural fractures/fissures in the

clayey matrix, particularly during or after periods of precipitation. If more detailed groundwater information is required, monitoring wells or piezometers can be installed.

Further details concerning subsurface materials and conditions encountered can be obtained from the Log of Boring sheets provided in the Appendix of this report.

6.0 DESIGN RECOMMENDATIONS

The following design recommendations were developed on the basis of the previously described Project Characteristics (Section 2.0) and conditions encountered at the boring locations. If project criteria should change, including locations of the buildings, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

The following design information given in this report was developed assuming slab-on-grade foundations and/or floor slabs are constructed within 2 feet of existing grades. Cutting and filling on the site greater than 2 feet can alter the recommended foundation design parameters. Therefore, it is recommended our office be contacted before performing other cutting and filling on site to verify the appropriate design parameters are utilized for final foundation design.

During preparation of this report, it was assumed the required fill for the buildings will be obtained from on-site grading or similar imported soils with a plasticity index of 35 or less. It should be noted if fill sources other than assumed above are utilized or if the amount (thickness) of fill required to establish the building pad grade is increased, the potential vertical rise (PVR) values will likely increase and can alter the estimated potential seasonal movements and foundation recommendations.

6.1 Drilled and Underreamed Pier Foundation System

The proposed pavilion and office building could be supported using a system of drilled and underreamed piers. It is recommended these piers bear in the clayey soils at a depth of about 17 feet below final grade.

Groundwater was encountered at a depth as shallow as 17 feet during our field exploration and could be encountered during pier drilling. The presence of groundwater could cause underream or sidewall collapse and may preclude the use of underreamed piers at this site. A test pier/underream is recommended after subgrade treatment is complete to verify the depth to groundwater and constructability of underreams at this site. The test pier should be performed just outside the building pad areas (within the zone of moisture conditioning) or within the building pads between production pier locations. If groundwater and/or underream collapse occurs, we should be contacted for further recommendations. It may be necessary to raise the underreams to avoid the seepage and/or caving soils.

Piers can be dimensioned using a net allowable end bearing pressure of 5 ksf and no skin friction component of resistance. The bearing capacity contains a factor of safety of at least 3 considering a general bearing capacity failure. Normal elastic settlement of piers under loading is estimated to be less than about 1 inch.

Each pier should contain full length reinforcing steel and should be designed to resist the uplift pressure (soil-to-pier adhesion) due to potential soil swell along the shaft from post-construction heave and other uplift forces applied by structural loadings. The magnitude of uplift adhesion due to soil swell along the pier shaft cannot be defined accurately and can vary according to the actual in-place moisture content of the soils during construction. It is estimated this uplift adhesion will not exceed about 2.2 ksf. This soil adhesion is approximated to act uniformly over the upper 12 feet of the pier shaft in contact with clayey soils. Uplift adhesion due to soil heave can be neglected over the portion of the pier shaft in contact with any non-expansive material.

The uplift force due to swelling of active clays should be resisted by the underreamed portion of the pier. The underreamed portion should be at least two (2) and not exceeding three (3) times the diameter of the shaft. The minimum clear spacing between edges of adjacent piers should be at least one (1) underream diameter, based on the larger underream.

All grade beams connecting piers and pier caps should be formed and not cast in earthen trenches. Grade beams/pier caps should be formed with a nominal 8-inch void at the bottom. Commercially available cardboard box forms (cartons) are made for this purpose. The cardboard cartons should extend the full length and width of the grade beams/pier caps. Prior to concrete placement, the cartons should be inspected to verify they are firm, properly placed, and capable of supporting wet concrete. Some type of permanent soil retainer, such as pre-cast concrete panels, must be provided to prevent soils adjacent to grade beams/pier caps from sloughing into the void space at the bottom of the grade beams/pier caps. Additionally, backfill soils placed adjacent to grade beams/pier caps must be compacted as outlined in Section 7.3 of this report.

6.2 Floor Systems for Pier-Supported Structures

Considering the subsurface conditions encountered at this site and methods used to estimate the PVR, grade-supported floor slabs and flatwork for the proposed pavilion and office building could experience soil-related potential movements up to 4 inches if constructed within 2 feet of existing grade.

These potential movements were estimated using results of absorption swell tests, in general accordance with methods outlined by Texas Department of Transportation (TxDOT) Test Method Tex-124-E and engineering judgment and experience. Estimated movements were calculated assuming the moisture content of the in-situ soil within the normal zone of seasonal moisture content change varies between a "dry" condition and a "wet" condition as defined by Tex-124-E. Also, it was assumed a 1 psi surcharge load from the slab acts on the subgrade soils. Movements exceeding those predicted above could occur if positive drainage of surface water is not maintained or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from off-site locations.

In view of these potential movements, the most positive floor system for the pavilion and office building supported on piers is a floor system suspended completely above the existing clayey soils. At least 12 inches of void space should be provided between the bottom of the floor system (and lowest suspended fixture/utility) and top surface of the

underlying expansive clays. Cardboard carton forms or a deeper crawl space can be used to create the minimum void space. A ventilated crawl space is preferred. Provisions should be made for (a) adequate drainage of the under-floor space and (b) differential movement of utility lines, including areas where the utility penetrates through the grade beam and/or where the utility penetrates below grade areas.

If some floor slab movement is tolerable (about 1 inch), an alternative method is for the floor system to consist of a concrete slab designed to bear uniformly on improved soils. Subgrade improvement options to reduce potential for floor slab movements include placing 2 feet of non-expansive material over 10 feet of moisture-conditioned soil or 10 feet of water pressure injected (WPI) soil. The extent of these subgrade improvement methods is discussed in more detail in Sections 6.2.1 and 6.2.2. Non-expansive fill material is discussed in Section 7.3 of this report. In choosing these methods of floor slab movement reduction, the Owner is accepting some post construction seasonal movement of the floor slab (about 1 inch).

If a soil-supported floor slab is utilized for the planned structures, consideration should be given to a "floating" (fully ground supported, and not structurally connected to walls or foundations) floor slab. This can reduce the risk of cracking and displacement of the floor slab due to differential movements between the slab and foundations. A floor slab doweled into perimeter grade beams can develop a plastic hinge (crack) parallel to and approximately 5 to 10 feet inside the building perimeter. Differential movements can still occur between the grade beam and a “floating” floor slab. The structural engineer should determine the need for connections between the slab and structural elements and determine if control joints to limit cracking are needed. A properly designed and constructed moisture barrier should be placed between the slab and subgrade soils to retard moisture migration through the slab.

6.2.1 Subgrade Improvement Utilizing Moisture-Conditioned Soil

Movement of the floor slab could be reduced to about 1 inch by placing at least 2 feet of non-expansive material between the bottom of floor slab and the top surface of 10 feet of moisture-conditioned soil.

Moisture-conditioning consists of over-excavating the site soils, then processing and compacting the specified minimum thickness of soil at a *“target”* moisture content approximated to be at least 5 percentage points (with a higher limit of 7 percentage points) above the material’s optimum moisture content as determined by the standard Proctor method (ASTM D 698). The moisture-conditioned soil should be placed in 8-in thick loose lifts and compacted to a dry density of 93 to 97 percent of standard Proctor maximum dry density. Moisture conditioning of the on-site soil should extend throughout the entire building pad area and at least 5 feet beyond the perimeter of the building (including adjoining flatwork). In entrance areas, the moisture conditioning process should extend at least 10 feet beyond the perimeter of the building. However, select, non-expansive material should not extend beyond the building limits. If flatwork or paving is not planned adjacent to the structures (i.e. above the moisture-conditioned soils), a moisture barrier consisting of a minimum of 10 mil plastic sheeting with 8 to 12 inches of soil cover should be provided above the moisture conditioned soils. Moisture-conditioned

soils should be maintained in a moist condition prior to placement of the required thickness of select, non-expansive material, plastic sheeting or flatwork.

The resulting estimated potential seasonal movement (about 1 inch) was calculated assuming the moisture content of the moisture-conditioned soil varies between the “target” moisture content and the “wet” condition while the deeper undisturbed in-situ soil within the normal zone of seasonal moisture content change varies between the "dry" condition and the "wet" condition as defined by methods outlined in TxDOT Test Method Tex-124-E.

Please note, it is the intent of the moisture-conditioning process described above to reduce the free swell potential of the moisture-conditioned soil to 1 percent or less. Additional laboratory tests (i.e., standard Proctors, absorption swell tests, etc.) should be conducted during construction to verify the “target” moisture content for moisture-conditioning (estimated at 5 percentage points above the material’s optimum moisture content as defined by ASTM D 698) is sufficient to reduce the free swell potential of the processed soil to 1 percent or less. In addition, it is recommended samples of the moisture-conditioned material be routinely obtained during construction to verify the free swell of the improved material is 1 percent or less.

Installation of moisture-conditioned soils should be monitored and tested on a full-time basis by a representative of ALPHA to verify the soils tested were placed with the proper lift thickness, moisture content, and degree of compaction.

6.2.2 Subgrade Improvement Utilizing Water Pressure Injection (WPI)

An alternative subgrade improvement method to reduce movement utilizes the procedures of water pressure injection (WPI) in conjunction with placement of non-expansive fill material. The improvement procedures outlined below will not eliminate future movement of the floor slab. Recommended specifications for WPI are attached to this report in the appendix.

Following removal of the necessary thickness of on-site expansive soils to allow for placement of at least 2 feet of non-expansive fill material, the exposed subgrade of the building pad should be injected to a depth of 10 feet below the bottom of the non-expansive fill.

The WPI should extend throughout the entire building pad area and at least 5 feet beyond the perimeter of the building. In entrance areas and adjoining flatwork, WPI should extend at least 10 feet beyond the perimeter of the building. The non-expansive fill material should not extend beyond the building limits. If flatwork or paving is not planned adjacent to the structure (i.e. above the moisture-conditioned soils), a moisture barrier consisting of a minimum of 10 mil plastic sheeting with 8 to 12 inches of soil cover should be provided above the water-injected soils. Injected soils should be maintained in a moist condition prior to placement of the required thickness of non-expansive fill material, plastic sheeting or flatwork.

Performance of post-injection swell testing and moisture content determinations should be employed as final acceptance criteria in engineering analysis to examine accomplishment of intended objectives of the injection treatment. Maximum benefit of these movement reduction procedures can be achieved by employing ALPHA to observe, monitor and test the entire process. Construction specifications for the water pressure injection process are provided in the Appendix of this report.

The purpose of the above procedure is to pre-swell the existing soils. Satisfactory completion of the injection process is achieved when the desired moisture content and abatement of swell in the injected subgrade clay soils are reached. Acceptance criteria for water pressure injection should be based upon obtaining an average free swell of 1 percent or less in the injected zone. Performance of post-injection swell testing and moisture content determinations should be employed as final acceptance criteria in engineering analysis to examine accomplishment of intended objectives of the injection treatment.

The resulting estimated potential seasonal movement (about 1 inch) was calculated assuming the average free swell of the injected soils does not exceed 1 percent. Further, it is assumed the moisture content of the soil below the injected zone and within the normal zone of seasonal moisture content change varies between a "dry" condition and a "wet" condition as defined by Tex-124-E.

6.3 Exterior Flatwork

Flatwork, pavement and any other soil-supported structural elements will be subjected to the same level of movement as discussed in Section 6.2 (on the order of 4 inches). In areas where flatwork movement is critical (such as, but not limited to, main entrances), subgrade improvement as discussed in Section 6.2 can be considered to reduce the potential soil movement.

6.4 Seismic Considerations

The Site Class for seismic design is based on several factors that include soil profile (soil or rock), shear wave velocity, and strength, averaged over a depth of 100 feet. Since our borings did not extend to 100-foot depths, we based our determinations on the assumption that the subsurface materials below the bottom of the borings were similar to those encountered at the termination depth. Based on Section 1613.3.2 of the 2012 International Building Code and Table 20.3-1 in the 2010 ASCE-7, we recommend using Site Class D for seismic design at this site.

6.5 Pavement

Clayey soils (fill or native) encountered near the existing ground surface at the boring will probably constitute the subgrade for most parking and drive areas. Therefore, it is recommended the existing subsurface materials be improved prior to construction as recommended in Section 7.1. A qualified Geotechnical Engineer should be retained to provide subgrade monitoring and testing during construction. If there is any change in project criteria, the recommendations contained in this report should be reviewed by our office.

Recommendations for portland-cement concrete (PCC) pavement are provided below. Calculations used to determine the required pavement thickness are based only on the physical and engineering properties of the materials used and conventional thickness determination procedures. Pavement adjoining the building should be constructed with a curb and the joint between the building and curb should be sealed. Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations, reinforcing steel, joint design, and environmental factors will significantly affect the service life and must be included in preparation of the construction drawings and specifications, but all were not included in the scope of this study. Normal periodic maintenance will be required for all pavements to achieve the design life of the pavement system.

The recommended pavement sections provided below are considered the minimum necessary to provide satisfactory performance based on the expected traffic loading. In some cases, City minimum standards for pavement section construction may exceed those provided below.

6.5.1 Pavement Subgrade Preparation

After final subgrade elevation is achieved, the exposed surface of the pavement subgrade soil should be scarified to a depth of 6 inches and mixed with a minimum 8 percent hydrated lime (by dry soil weight) in conformance with TxDOT Item 260. Assuming an in-place unit weight of 100 pcf for the pavement subgrade soils, this percentage of lime equates to about 36 lbs of lime per square yard of treated subgrade. The actual amount of lime required should be confirmed by additional laboratory tests (ASTM C 977 Appendix XI) prior to construction.

The on-site soils can contain a sufficient quantity of soluble sulfates that can adversely react with hydrated lime added during the mechanical lime stabilization process. Therefore, before committing to mechanical lime stabilization, samples of the pavement subgrade soil should be tested for the quantity of soluble sulfates. Our office should be contacted regarding evaluation of the quantity of soluble sulfates detected and any special processing/design features that may be applicable due to the soluble sulfate concentrations measured.

It is recommended lime modification procedures extend at least 1 foot beyond the edge of the pavement to reduce effects of seasonal shrinking and swelling upon the extreme edges of pavement. The soil-lime mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to +4 percentage points of the mixture's optimum moisture content. In all areas where hydrated lime is used to stabilize subgrade soil, routine Atterberg-limit tests should be performed to verify the resulting plasticity index of the soil-lime mixture is at/or below 15.

Lime modification of the pavement subgrade soil will not prevent normal seasonal movement of the underlying untreated materials. Pavement and other flatwork will have the same potential for movement as slabs constructed directly on the existing undisturbed soils. Therefore, good perimeter surface drainage with a minimum slope of 2 percent away from the pavement is recommended. The use of sand as a

leveling course below pavement supported on expansive clays should be avoided. Normal maintenance of pavement should be expected over the life of the structures.

6.5.2 Portland-Cement Concrete (PCC) Pavement

Following subgrade improvement as recommended in Section 6.5.1 above, the following PCC (reinforced) pavement sections are recommended.

TABLE A
RECOMMENDED PCC PAVEMENT SECTIONS

Paving Areas and/or Type	PCC Thickness, Inches
*Parking Areas Subjected Exclusively to Passenger Vehicle Traffic	5
Drive Lanes, Fire Lanes, Areas Subject to Light Volume Truck Traffic	6
Dumpster Traffic Areas	7

***Note:** Lime treatment of the pavement subgrade is not necessary for pavements subjected *exclusively* to passenger vehicle traffic, although lime treatment in these areas would be generally beneficial to the long-term performance of the pavement and improve constructability. Prior to construction of pavement on untreated clay subgrade soil, the exposed subgrade should be scarified to a depth of at least 6 inches and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -1 percentage point below to +3 percentage of the material's optimum moisture content.

Portland-cement concrete should have a minimum compressive strength of 3,000 psi at 28 days in parking areas subjected exclusively to passenger vehicle traffic. We recommend a minimum compressive strength of 3,500 psi at 28 days for drive lanes, fire lanes, and truck areas. Concrete should be designed with 5 $\pm$ 1 percent entrained air. Joints in concrete paving should not exceed 15 feet. Reinforcing steel should consist of No. 3 bars placed at 18 inches on-center in two directions.

Alternatively, mechanical lime modification of the pavement subgrade could be eliminated by increasing the PCC thickness in the pavement sections presented above by 1 inch. Prior to construction of pavement on untreated clay subgrade soil, the exposed subgrade should be scarified to a depth of at least 6 inches and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 1 percentage point below to 3 percentage points above the material's optimum moisture content.

6.6 Drainage and Other Considerations

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. All pavement and sidewalks within 5 feet of the structure should be sloped away from the structure to prevent ponding of water around the foundation. Final grades within 5 feet of the structure should be adjusted to slope away from the structure at a minimum slope of 2 percent. **Maintaining positive surface drainage throughout the life of the structure is essential.**

In areas with pavement or sidewalks adjacent to the new structure, a positive seal must be maintained between the structures and the pavement or sidewalk to minimize seepage of water into the underlying supporting soils. Post-construction movement of pavement and flatwork is common. Normal maintenance should include examination of all joints in paving and sidewalks, etc. as well as resealing where necessary.

Several factors relate to civil and architectural design and/or maintenance, which can significantly affect future movements of the foundation and floor slab system:

- Preferably, a complete system of gutters and downspouts should carry runoff water a minimum of 5 feet from the completed structure.

- Large trees and shrubs should not be allowed closer to the foundation than a horizontal distance equal to roughly one-half of their mature height due to their significant moisture demand upon maturing.

- Moisture conditions should be maintained "constant" around the edge of the slab. Ponding of water in planters, in unpaved areas, and around joints in paving and sidewalks can cause slab movements beyond those predicted in this report.

- Planter box structures placed adjacent to the building should be provided with a means to assure concentrations of water are not available to the subsoil stratigraphy.

- Architectural design of the floor slab should avoid additional features such as wing walls as extensions of the slab.

Trench backfill for utilities should be properly placed and compacted as outlined in Section 7.3 of this report and in accordance with requirements of local municipal standards. Since granular bedding backfill is used for most utility lines, the backfilled trench should not become a conduit and allow access for surface or subsurface water to travel toward the new structures. Concrete cut-off collars or clay plugs should be provided where utility lines cross building lines to prevent water from traveling in the trench backfill and entering beneath the structures.

7.0 GENERAL CONSTRUCTION PROCEDURES AND RECOMMENDATIONS

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Professional Engineering firm be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be reasonably anticipated until the course of construction. The recommendations offered in the following paragraphs are intended not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the boring.

7.1 Site Preparation and Grading

All areas supporting slab foundations, flatwork, or areas to receive new fill should be properly prepared. Site preparation for the proposed project should include removing existing site improvements (i.e. pavements, flatwork, foundation, utilities), vegetation, topsoil, and any other unsuitable surface materials from the areas of new construction. Existing foundation elements should be removed or cut off at least 1 foot below finished grade or 1 foot below the new structural elements, whichever is deeper. Abandoned utility lines should be either removed or positively sealed to prevent possible water seepage into subgrade soils. Any soil disturbed due to removal of the existing site improvements should be re-compacted in accordance with recommendations provided in Section 7.3 of this report.

After completion of the necessary stripping, clearing, and excavating and prior to placing any required fill, the exposed subgrade should be carefully evaluated by probing and testing. Any undesirable material (organic material, wet, soft, or loose soil) still in place should be removed.

The exposed subgrade should be further evaluated by proof-rolling with a heavy pneumatic-tired roller, loaded dump truck or similar equipment weighing approximately 20 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil.

Proof-rolling procedures should be observed routinely by a Professional Engineer or his designated representative.

Any undesirable material (organic material, wet, soft, or loose soil) exposed during the proofroll should be removed and replaced with well-compacted material as outlined in Section 7.3.

Prior to placement of any fill, the exposed subgrade should then be scarified to a minimum depth of 6 inches and recompacted as outlined in Section 7.3.

If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench width of 5 feet. This should provide a good contact between the existing soils and new fill materials, reduce potential sliding planes and allow relatively horizontal lift placements.

Even if fill is properly compacted, fills in excess of about 10 feet are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing utility lines under pavements and/or wall backfill.

Slope stability analysis of embankments (natural or constructed) and global stability analysis for retaining walls was not within the scope of this study.

The contractor is responsible for designing any excavation slopes, temporary sheeting or shoring. Design of these structures should include any imposed surface surcharges. Construction site safety is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods and sequencing of construction operations. The contractor should also be aware that slope height, slope inclination or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state and/or federal safety regulations, such as OSHA Health and Safety Standard for Excavations, 29 CFR Part 1926, or successor regulations. Stockpiles should be placed well away from the edge of the excavation and their heights should be controlled so they do not surcharge the sides of the excavation. Surface drainage should be carefully controlled to prevent flow of water over the slopes and/or into the excavations. Construction slopes should be closely observed for signs of mass movement, including tension cracks near the crest or bulging at the toe. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. Shoring, bracing or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Texas.

Due to the nature of the clayey soils found near the surface at the boring, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated during periods when these soils are saturated.

7.2 Foundation Excavations

All foundation excavations should be monitored to verify foundations bear on suitable material. The bearing stratum exposed in the base of all foundation excavations should be protected against any detrimental change in conditions. Surface runoff water should be drained away from excavations and not allowed to collect. All concrete for foundations should be placed as soon as practical after the excavation is made. Drilled piers should be excavated and concrete placed within the same day after the design penetration is begun.

Prolonged exposure of the bearing surface to air or water will result in changes in strength and compressibility of the bearing stratum. Therefore, if delays occur, underreamed pier excavations should be slightly widened and cleaned to provide a fresh bearing surface. Grade beams for slab foundations should be slightly deepened to provide a fresh bearing surface.

All pier shafts should be at least 1.5 feet in diameter to facilitate clean-out of the base and proper monitoring. Concrete placed in pier holes should be directed through a tremie, hopper, or equivalent. Placement of concrete should be vertical through the center of the shaft without hitting the sides of the pier or reinforcement to reduce the possibility of segregation of aggregates. Concrete placed in piers should have a minimum slump of 5 inches (but not greater than 7 inches) to avoid potential honey-combing.

Observations during pier drilling should include, but not necessarily be limited to, the following items:

- Verification of proper bearing strata and consistency of subsurface stratification with regard to boring logs,
- Confirmation the minimum required penetration into the bearing strata is achieved,
- Complete removal of cuttings from bottom of pier holes,
- Proper handling of any observed water seepage and sloughing of subsurface materials,
- No more than 2 inches of standing water should be permitted in the bottom of pier holes prior to placing concrete, and
- Verification of pier diameter, underream size and steel reinforcement.

Groundwater was encountered at a depth of about 17 feet while advancing the Boring 1 and was measured at a depth of about 23 feet at the completion of drilling. Groundwater seepage was not encountered in Boring 2. Groundwater seepage could be encountered during pier installation. The risk of encountering this seepage is increased during or after periods of precipitation. Some field adjustments in the depth of the piers may be required in some areas to maintain the bottom of the piers above groundwater seepage. In all cases, the top of the bell should remain at least 3 feet below the depth of subgrade treatment. Adjustments in the depths of the piers should be observed in the field by ALPHA personnel. Also, the clays encountered at the boring locations are prone to collapse during construction of the underreamed portion of the pier foundation. Immediate placement of concrete after constructing the underream and/or the use of submersible pumps may be adequate to control underream collapse and/or seepage. *A test pier/bell is recommended after subgrade treatment is complete to verify the constructability of underreams at this site. The test pier should be performed just outside the building pad area (within the zone of moisture conditioning) or within the building pads between production pier locations. If groundwater and/or underream collapse occurs, we should be contacted for further recommendations. The presence of groundwater and underream or sidewall collapse may preclude the use of underreamed piers at this site.*

7.3 Fill Compaction

Select Fill (Non-Expansive Fill): Materials used as select, non-expansive fill should have a liquid limit less than 35, a plasticity index (PI) not less than 4 nor greater than 15. Select, non-expansive fill should not contain deleterious material and debris. The select, non-expansive fill should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the material's optimum moisture content. The plasticity index and liquid limit of material used as select, non-expansive fill should be verified during fill placement using laboratory tests. Atterberg limits tests to verify the select, non-expansive fill shall be performed at a frequency of at least one test per 2 feet of thickness per 5,000 square feet. Atterberg limits shall be staggered between various lifts within each 5,000 square feet.

Flexible Base (Non-Expansive Fill): Flexible base material used as non-expansive fill for the building pad area should meet the requirements of TxDOT Item 247, Type A or D, Grade 1-2. The material should be compacted to a minimum 95 percent of standard Proctor maximum dry density (ASTM D 698) and within -2 to +3 percentage points of the material's optimum moisture content.

The following recommendations pertain to fill soils placed for general site grading as follows:

- *Outside* the designated building pad area *if* moisture conditioning will be used as the method for subgrade improvement. Where moisture conditioning is utilized for subgrade improvement, all fill within the designated building pad area, plus at least 5 feet outside the limits of the building pad area, should meet the requirements of Section 6.2 discussed earlier.

- For general grading *including* building areas *if* WPI will be used as the method for subgrade improvement or if drilled piers with a suspended floor system will be used as the foundation system.

Clay soils used for general fill with a plasticity index equal to or greater than 25 should be compacted to a dry density between 93 and 98 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of +2 to +6 percentage points of the material's optimum moisture.

Sandy clay and clayey sand soils used for general fill with a plasticity index less than 25 should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be within the range of -1 to +3 percentage points of the material's optimum moisture.

In cases where either mass fills or utility lines are more than 10 feet deep, the fill/backfill below 10 feet should be compacted to at least 98 percent of standard Proctor maximum dry density (ASTM D 698) and within – 2 to +2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 feet should be compacted as outlined above.

Clay soils used as fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction. Compaction should be accomplished by placing fill in about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

Even if fill is properly compacted, fills in excess of about 10 feet are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing utility lines under pavements and/or wall backfill.

7.4 Groundwater

Free groundwater was encountered in Boring 1 at a depth of about 17 feet below existing grade. From our experience with similar soils, groundwater seepage could be encountered in excavations for foundations, utilities and other general excavations at this site. The risk of seepage increases with depth of excavation and during or after periods of precipitation. Standard sump pits and pumping may be adequate to control seepage on a local basis.

In any areas where cuts are made to establish final grades for the site, attention should be given to possible seasonal water seepage that could occur through natural cracks and fissures in the newly exposed stratigraphy. In these cases, subsurface drains may be required to intercept seasonal groundwater seepage. The need for these or other de-watering devices should be carefully addressed during construction. Our office could be contacted to visually observe the final grade to evaluate the need for such drains.

8.0 LIMITATIONS

Professional services provided in this geotechnical exploration were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water or groundwater. ALPHA, upon written request, can be retained to provide these services.

ALPHA is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for the exclusive use of the Client (and their designated design representatives), and is related solely to design of the specific structure outlined in Section 2.0. No party other than the Client (and their designated design representatives) shall use or rely upon this report in any manner whatsoever unless such party shall have obtained ALPHA's written acceptance of such intended use. Any such third party using this report after obtaining ALPHA's written acceptance shall be bound by the limitations and limitations of liability contained herein, including ALPHA's liability being limited to the fee paid to it for this report.

Recommendations presented in this report should not be used for design of any other structures except that specifically described in this report. In all areas of this report in which ALPHA may provide additional services if requested to do so in writing, it is presumed that such requests have not been made if not evidenced by a written document accepted by ALPHA.

Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than one (1) year after completion of this report.

Non-compliance with any of these requirements by the Client or anyone else shall release ALPHA from any liability resulting from the use of, or reliance upon, this report.

Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may materially alter the recommendations. Further, ALPHA is not responsible for damages resulting from workmanship of designers or contractors. It is recommended the Owner retain qualified personnel, such as a Geotechnical Engineering firm, to verify construction is performed in accordance with plans and specifications.

APPENDIX

SOIL MODIFICATION
WATER PRESSURE INJECTION (WPI)
GUIDELINE SPECIFICATIONS

Purpose

The purpose of this specification is to provide a procedural basis for using water pressure injection (WPI) as a method to obtain a relatively uniform, moist, pre-swelled zone of soil beneath the floor slab. Specifically, the intent of this procedure is to reduce the average free swell potential of soils within the injected zone to 1 percent or less.

Material

1. Only potable water shall be used during the entire injection process.

2. A non-ionic surfactant (wetting agent) will be added to the water according to manufacturer's recommendations, but, in no case will proportions be less than one part (undiluted) per 3,500 gallons of water.

Application

1. The WPI work shall be accomplished after the site has been brought to near final subgrade elevation and prior to installation of any plumbing, trenches and utilities.

2. The injection vehicle will have a minimum gross weight of 5 tons and shall be capable of making straight vertical penetrations to minimize pressure loss around the injector rods to at least 10 feet.

3. Injections will be continued to "REFUSAL" (until the maximum reasonable quantity of water has been injected into the soil and water is flowing freely at the surface, either out of previous injection holes or from areas where the surface soils have fractured. The amount of water flowing from the areas described above will be approximately equivalent to the volume of water being pumped into the soil. As a minimum, injections should be at least 30 seconds at each injection interval unless altered by the Geotechnical Engineer).

   Loss of water or blow-back around injector pipes does not constitute refusal. Continued loss of water in this manner may indicate inadequate injection equipment or techniques, or in some instances, surficial soils that will not form an adequate seal to contain the water. In either instance, the owner's representative should be contacted and an on-site observation made to determine appropriate steps to achieve adequate injection.

   After completion of water injection, the injection contractor will submit records which reflect the total quantity of water used. The injection contractor will be totally responsible for determining the means and methods of injecting the on-site soils such that the average free swell of soils within the injected zone does not exceed 1 percent.

4. Injection pipe(s) will penetrate the soil in approximately 12 to 18-inch intervals, injecting to refusal at each interval for a total depth of 10 feet or impenetrable material, whichever occurs first. If a seemingly impenetrable layer is encountered, ALPHA must be contacted to evaluate the significance of the lack of penetration with the injector tubes or provide alternate recommendations. A minimum of seven injection intervals will be provided for the 10-foot injection depth. The lower portion of the injection pipe will consist of a hole pattern that will uniformly disperse water throughout the entire depth.

5. Spacing for the injections will not exceed 5 feet on-center each way. Subsequent injections will be offset laterally at one-half the distance in both directions between the original injection centers.

6. Injection pressures should be adjusted to inject the greatest quantity of water possible within a pressure range of 50 - 200 psi pump pressure.

7. After a minimum curing time of 48 hours, the water injected pad shall be tested for moisture content and swell abatement to determine if additional injections with water are necessary. Subsequent water injections will be 5 feet on-center each way and spaced 2½ feet offset in two orthogonal directions from the initial injection.

8. Upon completion of the final pass of WPI, the top surface of the injected pad should be scarified to a depth of at least 6 inches and re-compacted to between 93 and 98 percent of the optimum density, at a moisture content between +2 and +4 percentage points of the optimum values as defined by ASTM D 698. Compaction tests should be performed at a frequency of 1 test per 5,000 square feet with a minimum of three tests per pad.

9. The moisture content of the injected soils will be maintained until the floor slab is placed. Loss of moisture from the surface or sides of the building pad must be prevented by watering or use of a membrane. Any open trenches should be sealed or kept wet to prevent loss of moisture. All trenches should be backfilled with the excavated material. The moisture content of the backfill should be maintained in the range of +2 to +4 percentage points of optimum.

Special Considerations

Several water injections may be required to achieve the desired final moisture content and corresponding soil swell abatement. Due to variations in the subsurface soils, the number of injection passes required to reduce the swell potential of the injected soils to 1 percent or less is unknown. Hence, the Client should allow for extra construction time on the site considering the time frame required to achieve the desired reduction in swell potential is unknown. Further, the contract with the Injection Contractor should address the situation where more injection passes than predicted are required to achieve the desired result.

Between the time the subgrade is water pressure injected and either the select fill material or plastic sheeting is placed, the upper surface of the injected soil should not be allowed to dry. To allow for adequate pre-swelling of the soils from the injection procedure, concrete for slabs should not be placed above injected areas until at least two (2) weeks following the final water injection. During this two-week period, the surface of the injected soil must be kept moist or covered with plastic sheeting to prevent moisture loss. About 2 to 3 inches or more of heave can be expected in building pads during and shortly after completion of the injection process.

Additionally, experience indicates injection adjacent to existing structures supported at or near the existing ground surface (such as, but not limited to, buildings, roads, and utility conduits) can result in swelling of soil in the injected zone as well as those beneath existing nearby structures. Swelling of soil supporting existing floor slabs can result in distress (movement) to existing buildings. Therefore, if an existing building or other structure is located within 30 feet of the proposed water injection area, it is recommended a temporary vertical moisture barrier be installed longitudinally between the existing structure and the injected pad to prevent injected water from entering the subgrade of the existing structure. The moisture barrier could consist of a 12 feet deep trench, about 1 foot wide, backfilled with lean concrete or other suitable relatively impermeable material.

Monitoring

A full-time ALPHA technician should be retained and present throughout the injection operations. Moisture content and free swell samples should be taken at 1-foot intervals to the total depth injected from a minimum of one test boring per each 4,000 square feet of injected area (minimum two borings per pad). The moisture content and shear strength (using a pocket-penetrometer) will be determined for each sample. One-dimension free swell tests (ASTM D 4546) will be performed on selected samples at a frequency of at least three (3) free swell tests per test boring for the 10-foot injection depth. The free swell tests will be performed with a surcharge equal to the overburden pressure anticipated upon completion of the new structure. Based upon the test results, the current swell potential of the injected soils should be determined by the project Geotechnical Engineer. Acceptance criteria for WPI will be based upon achieving the potential movements indicated in the Geotechnical Exploration. As a guide, an average free swell of 1 percent or less in the injected zone could be used for planning. However, due to variations in the soils across the site, an average free swell of more than 1 percent may be allowable in some areas. Acceptance of soils with average free swells of more than 1 percent should be evaluated by ALPHA. Depending upon the moisture content and the potential swell remaining in the existing injected soils, additional injections with water containing surfactant may be required until these requirements are met.

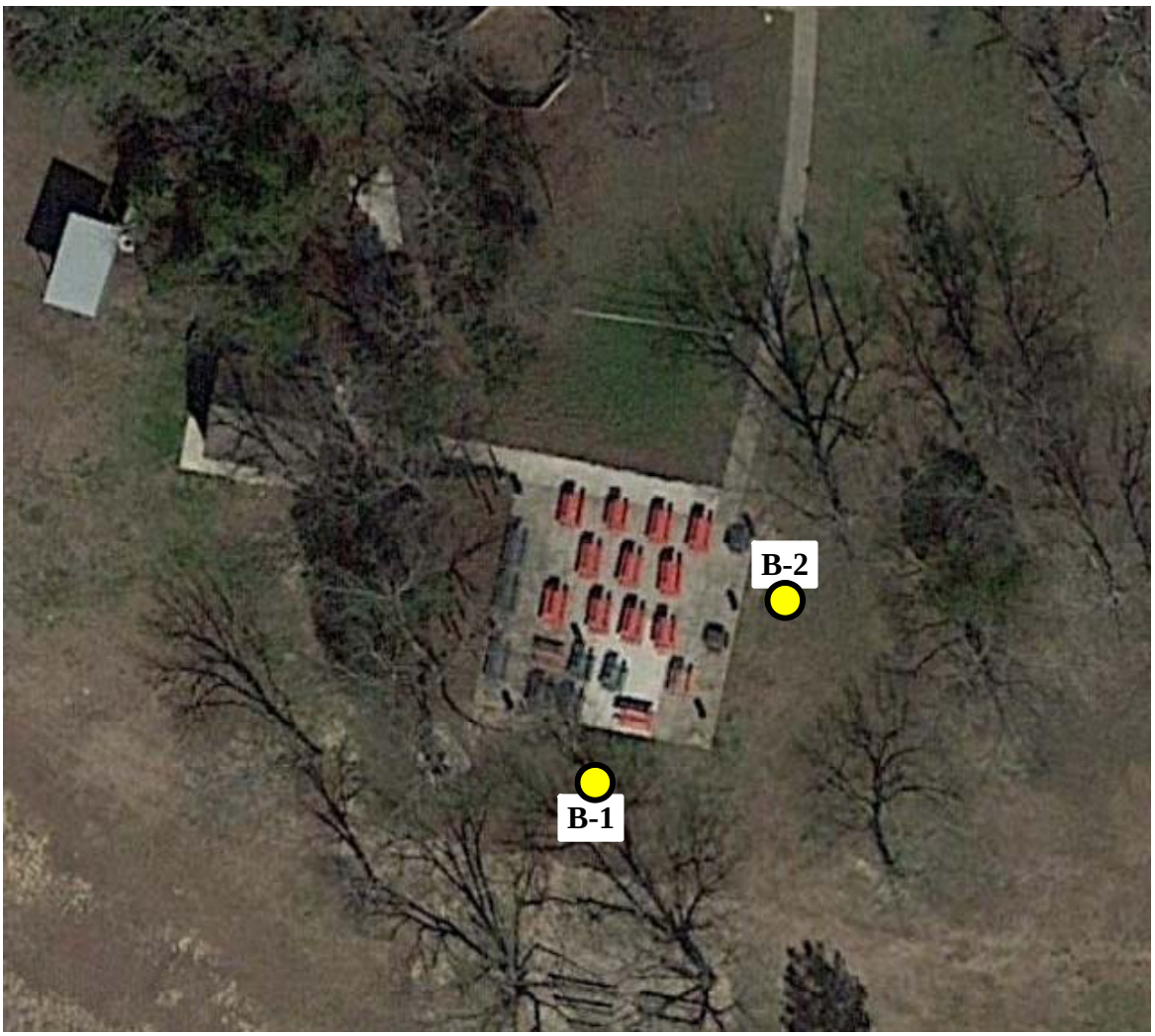
Wet and soft surface conditions resulting from the water injection procedures will require the contractor to provide access to drilling equipment used to obtain the soil samples which verify the injection process. Special track equipment may be required to provide the required access. The contractor will be responsible for providing and operating suitable equipment to permit sampling of the injected soils (test borings) with a standard truck-mounted drilling rig.

A-1 METHODS OF FIELD EXPLORATION

Using standard rotary drilling equipment, two test borings were performed for this geotechnical exploration at the approximate location shown on the Boring Location Plan, Figure 1. The test boring locations were marked in the field utilizing a hand-held GPS unit or by pacing/taping and estimating right angles from landmarks which could be identified in the field and as shown on the site plan provided during this study. The locations of test borings shown on the Boring Location Plan are considered accurate only to the degree implied by the method used to locate the borings.

Relatively undisturbed samples of the cohesive subsurface materials were obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples were removed from the sampling tubes in the field and examined visually. One representative portion of each sample was sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

Logs of all borings are included in the Appendix of this report. The logs show visual descriptions of subsurface strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Samples not consumed by testing will be retained in our laboratory for at least 14 days and then discarded unless the Client requests otherwise.



N

Approximate Boring Locations

Geotechnical Exploration
Camp Rorie Galloway - Pavillion and Office
3100 Lawson Road
Mesquite, Texas
ALPHA Report No. G171289

ALPHA TESTING
WHERE IT ALL BEGINS

Boring Location Plan
Figure 1

B-1 METHODS OF LABORATORY TESTING

Representative samples were evaluated and classified by a qualified member of the Geotechnical Division and the boring logs were edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318) and dry unit weight determinations were performed on selected samples. In addition, unconfined compression tests (ASTM D 2166) pocket-penetrometer tests were conducted on selected soil samples to evaluate the soil shear strength. Results of all laboratory tests described above are provided on either the accompanying Log of Boring or summary data sheets as noted.

In addition to the Atterberg-limit tests, the expansive properties of the clay soils encountered were further analyzed by absorption swell tests (ASTM D 4546). The swell test is performed by placing a selected sample in a consolidation machine and applying either the approximate current or expected overburden pressure and then allowing the sample to absorb water. When the sample exhibits very little tendency for further expansion, the height increase is recorded and the percent free swell and total moisture gain calculated. Results of the absorption swell tests are provided on the Swell Test Data sheet, Figure 2 included in this appendix.

SWELL TEST DATA

Boring No.	1	1	2	2
Average Depth, ft	3	7	5	9
Dry Unit Weight, pcf	105	113	120	114
Liquid Limit	53	52	49	58
Plastic Limit	20	17	19	22
Plasticity Index	33	35	30	36
Initial Moisture Content	14%	17%	14%	15%
Final Moisture Content	23%	20%	19%	21%
Free Swell	1.3%	0.7%	1.9%	2.1%

Geotechnical Exploration
Camp Rorie Galloway - Pavillion and Office
3100 Lawson Road
Mesquite, Texas
ALPHA Report No. G171289

ALPHA TESTING
WHERE IT ALL BEGINS

Swell Test Data
Figure 2

ALPHA TESTING
WHERE IT ALL BEGINS

2209 Wisconsin Street
Suite 100
Dallas, Texas
75229
Phone: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

LOG OF BORING NO.: 1
Sheet 1 of 1
PROJECT NO.: G171289

Client: City of Mesquite
Project: Camp Rorie Galloway - Pavilion and Office
Start Date: 5/26/2017 **End Date:** 5/26/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Mesquite, Texas
Surface Elevation:
West:
North:
Hammer Drop (lbs / in): 140 / 30

GROUND WATER OBSERVATIONS
▽ On Rods (ft): 17
▼ After Drilling (ft): 23
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown CLAY				4.0				23			
		2.0											
		Brown to Tan CLAY with a trace of calcareous nodules				4.5+				15	53	20	33
5						4.5+				16			
						4.5+				18	52	17	35
						4.0				19			
10													
						4.5				21			
15													
	▽												
						4.5				20			
20													
	▼												
						4.5							
25		25.0											
		TEST BORING TERMINATED AT 25 FT											
30													

ALPHA TESTING
WHERE IT ALL BEGINS

2209 Wisconsin Street
Suite 100
Dallas, Texas
75229
Phone: 972-620-8911
Fax: 972-620-1302
www.alphatesting.com

LOG OF BORING NO.: 2

PROJECT NO.: G171289

Client: City of Mesquite
Project: Camp Rorie Galloway - Pavilion and Office
Start Date: 5/26/2017 **End Date:** 5/26/2017
Drilling Method: CONTINUOUS FLIGHT AUGER

Location: Mesquite, Texas
Surface Elevation:
West:
North:
Hammer Drop (lbs / in): 140 / 30

GROUND WATER OBSERVATIONS
On Rods (ft): NONE
After Drilling (ft): DRY
After ____ Hours (ft):

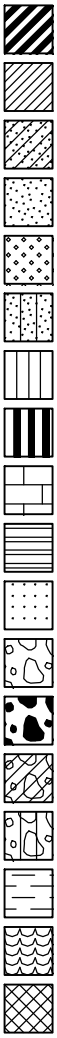
Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery % RQD	TX Cone or Std. Pen. (blows/ft,in)	Pocket Penetrometer (tsf)	Unconfined Comp. Strength (tsf)	% Passing No. 200 Sieve	Unit Dry Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown CLAY				4.5+				18			
		2.0											
		Brown to Tan CLAY with a trace of calcareous nodules				4.5+				16			
5						4.5+				15	49	19	30
						4.5+				16			
						4.5+				16	58	22	36
10													
						4.5+	5.8		112	18			
15													
						4.5+	4.9		108	19			
20													
						4.5+							
25		25.0											
		TEST BORING TERMINATED AT 25 FT											
30													

ALPHA TESTING

WHERE IT ALL BEGINS

KEY TO SOIL SYMBOLS AND CLASSIFICATIONS

SOIL & ROCK SYMBOLS



(CH), High Plasticity CLAY

(CL), Low Plasticity CLAY

(SC), CLAYEY SAND

(SP), Poorly Graded SAND

(SW), Well Graded SAND

(SM), SILTY SAND

(ML), SILT

(MH), Elastic SILT

LIMESTONE

SHALE / MARL

SANDSTONE

(GP), Poorly Graded GRAVEL

(GW), Well Graded GRAVEL

(GC), CLAYEY GRAVEL

(GM), SILTY GRAVEL

(OL), ORGANIC SILT

(OH), ORGANIC CLAY

FILL

SAMPLING SYMBOLS

SHELBY TUBE (3" OD except where noted otherwise)

SPLIT SPOON (2" OD except where noted otherwise)

AUGER SAMPLE

TEXAS CONE PENETRATION

ROCK CORE (2" ID except where noted otherwise)

RELATIVE DENSITY OF COHESIONLESS SOILS (blows/ft)

VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

SHEAR STRENGTH OF COHESIVE SOILS (tsf)

VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.50
FIRM	0.50 TO 1.00
STIFF	1.00 TO 2.00
VERY STIFF	2.00 TO 4.00
HARD	OVER 4.00

RELATIVE DEGREE OF PLASTICITY (PI)

LOW	4 TO 15
MEDIUM	16 TO 25
HIGH	26 TO 35
VERY HIGH	OVER 35

RELATIVE PROPORTIONS (%)

TRACE	1 TO 10
LITTLE	11 TO 20
SOME	21 TO 35
AND	36 TO 50

PARTICLE SIZE IDENTIFICATION (DIAMETER)

BOULDERS	8.0" OR LARGER
COBBLES	3.0" TO 8.0"
COARSE GRAVEL	0.75" TO 3.0"
FINE GRAVEL	5.0 mm TO 3.0"
COURSE SAND	2.0 mm TO 5.0 mm
MEDIUM SAND	0.4 mm TO 5.0 mm
FINE SAND	0.07 mm TO 0.4 mm
SILT	0.002 mm TO 0.07 mm
CLAY	LESS THAN 0.002 mm

Attachment 2.4

Pricing for Office Cabin

Exhibit A

Sales Order

Ulrich Log Cabins
PO Box 2797 Cleburne, TX 76033
817-645-1122 www.UlrichCabins.com
A division of Ulrich Barn Builders, LLC

Date	Project ID
11/30/2017	OF CIT

Buyer	
Name or Company:	City of Mesquite
Name 2:	Camp Rorie - Attn:Bob Blankenship
Address:	0
City, State, Zip:	Mesquite, TX
Phone:	-
Phone 2:	-
Email:	0

Project Address	
Name or Company:	City of Mesquite
Name 2:	Camp Rorie - Attn:Bob Blankenship
Address:	0
City, State, Zip:	Mesquite, TX
Phone:	-
Phone 2:	-
Email:	0

Serial #	Estimated Delivery	Marketing Code	Sales Rep
	TBD	Web Site	Tonya Johnson

Unit(s) Description	Amount
Ulrich Custom Cabin 16x47 per print	$ 92,315.00
McElroy Metal R-Panel Roof ($1,300 allowance)	
(2) 3'X5' Covered Awnings, HVAC - Minisplit - 3 Head Unit	
(10) 36"x 12" Fixed Frosted Windows ,(2) 3'x5' SH Windows	
3 Special Order Ceiling Fans, 3 Special Order Sconce Lights	
1 Special Order Exterior Front Door, 2 - Exterior Painted Steel Doors	
Vinyl Plank Floors Throughout	
Price does not include any additional equipment to place cabin on planned site	
Pricing is good through December 31st	

See Purchase Agreement for full terms of sale.

Thank you for the oppurtunity to serve you!

Total	$	92,315.00
Deposit	$	-
Remaining Balance	**$**	**92,315.00**

X _____

Client's Signature

Date: _____-_____-_____