

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

05/28/2025

Farmers Branch Westside Art Trail



**FARMERS
BRANCH**



Prepared by
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City of Farmers Branch, Texas

Date: May 2025

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I. GENERAL CONDITIONS OF AGREEMENT

Introduction

Local Government General Requirements

For all projects with State or Federal funds, and/or all projects on the State Highway System regardless of funding source, a Local Government must either adopt the latest TxDOT Standard Specifications, Special Specifications, and required Special Provisions or request TxDOT written approval of alternate, equivalent specifications. TxDOT's *2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* are the latest TxDOT Standard Specifications. These "General Requirements" along with additional requirements specified by the particular local government, are intended as a template for Items 1-9 in TxDOT's Standard Specifications on projects let by a local government that is on the State Highway System or includes reimbursement to the local government using FHWA or TxDOT funds.

This document is intended to be used as a template that allows local governments to modify Items 1-9 to meet their particular needs while assuring that all local, state, and federal statutory requirements are addressed. As this document modifies a TxDOT publication, there may be a question about terminology. In general, the "Owner" or the "Engineer" references the local government or its representatives (Consulting Engineers, etc.). Reference to "Department" or "Engineer" in the construction and maintenance specifications refers to the local government, except when it is referencing a TxDOT specification, manual, material specification, Material Producers List or test method.

Foreword

OUTLINE OF SPECIFICATIONS

Each specification is outlined by articles and sections. The basic articles required for a specification are:

1. DESCRIPTION
2. MATERIALS
3. EQUIPMENT
4. CONSTRUCTION OR WORK METHODS
5. MEASUREMENT
6. PAYMENT

Some articles are not used in every item. Measurement and Payment articles are combined when the work described is subsidiary to bid items of the Contract.

HIERARCHY OF ORGANIZATIONAL ELEMENTS

Here "XXX" represents the item number. The hierarchy of organizational elements available below the item level is as follows:

- XXX.1., Article
- XXX.1.1., Section
- XXX.1.1.1., Section
- XXX.1.1.1.1., Section
- XXX.1.1.1.1.1., Section
- XXX.1.1.1.1.1.1., Section

The term section is used for all breaks below the article.

Items 1L–9L

Local Government General Requirements and Covenants

Item 1L

Abbreviations and Definitions



1. APPLICABILITY

Wherever the following terms are used in these specifications or other Contract documents, the intent and meaning will be interpreted as shown below.

2. ABBREVIATIONS

AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standard Committee, Inc.
AMRL	AASHTO Materials Reference Laboratory
ANLA	American Nursery and Landscape Association
ANSI	American National Standards Institute
APA	The Engineered Wood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASBI	American Segmental Bridge Institute
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Materials
AWC	American Wood Council
AWG	American Wire Gage
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BMP	Best Management Practices
CFR	Code of Federal Regulations
CMP	Corrugated Metal Pipe
COE	U. S. Army Corps of Engineers
CRSI	Concrete Reinforcing Steel Institute
DBE	Disadvantaged Business Enterprise
DMS	Departmental Material Specification
EIA	Electronic Industries Alliance
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration, U.S. Department of Transportation
FSS	Federal Specifications and Standards (General Services Administration)
GSA	United States General Services Administration
HUB	Historically Underutilized Business
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers

IESNA	Illuminating Engineering Society of North America
IMSA	International Municipal Signal Association
ISO	International Organization for Standardization
ITS	Intelligent Transportation System
ITE	Institute of Transportation Engineers
LG	Local Government
LRFD	Load and Resistance Factor Design
MASH	Manual for Assessing Safety Hardware
MPL	Material Producer List (TxDOT document)
NCHRP	National Cooperative Highway Research Program
NCR	Nonconformance Report (TxDOT form)
NEC	National Electrical Code (Published by NFPA)
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NRM	Nonhazardous Recyclable Material
NRMCA	National Ready Mixed Concrete Association
NSBA	National Steel Bridge Alliance
NTPEP	National Transportation Product Evaluation Program
OSHA	Occupational Safety & Health Administration, U.S. Department of Labor
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PE	Professional Engineer
PPI	Plastics Pipe Institute
PS&E	Plans, Specifications, and Estimates
PSL	Project-Specific Location
PTI	Post-Tension Institute
QA	Quality Assurance
QC	Quality Control
RCP	Reinforced Concrete Pipe
RPLS	Registered Public Land Surveyor
RRC	Railroad Commission of Texas
SBE	Small Business Enterprise
SFPA	Southern Forest Products Association
SI	International System of Units
SPIB	Southern Pine Inspection Bureau
SSPC	The Society for Protective Coatings
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDLR	Texas Department of Licensing and Regulation
TGC	Texas Government Code
TMUTCD	Texas Manual on Uniform Traffic Control Devices
TxDOT	Texas Department of Transportation
UL	Underwriters Laboratory, Inc.
USC	United States Code
WRI	Wire Reinforcement Institute
WWPA	Western Wood Products Association

3. DEFINITIONS

- 3.1. **Abrasive Blasting.** Spraying blasts of pressurized air combined with abrasive media.
- 3.2. **Actual Cost.** Contractor's actual cost to provide labor, material, equipment, and project overhead necessary for the work.

- 3.3. **Addendum.** Change in bid documents developed between advertising and bid submittal deadline.
- 3.4. **Additive Alternate.** A bid item contained in the bid documents that is not a regular item or a replacement alternate bid item. The additive alternate items include work that may be added to the base bid work.
- 3.5. **Deductive Alternate.** A bid item contained in the bid documents that is not a regular item or a replacement alternate bid item. The deductive alternate items include work that may be deducted from the base bid work.
- 3.6. **Advertisement.** The public announcement required by law inviting bids for work to be performed or materials to be furnished.
- 3.7. **Affiliates.** Two or more firms are affiliated if they share common officers, directors, or stockholders; a family member of an officer, director, or stockholder of one firm serves in a similar capacity in another of the firms; an individual who has an interest in, or controls a part of, one firm either directly or indirectly also has an interest in, or controls a part of, another of the firms; the firms are so closely connected or associated that one of the firms, either directly or indirectly, controls or has the power to control another firm; one firm controls or has the power to control another of the firms; or the firms are closely allied through an established course of dealings, including, but not limited to, the lending of financial assistance.
- 3.8. **Air Blasting.** Spraying blasts of pressurized air free of oil and moisture.
- 3.9. **Air Temperature.** The temperature measured in degrees Fahrenheit (°F) in the shade, not in the direct rays of the sun, and away from artificial heat.
- 3.10. **Anticipated Profit.** Profit for work not performed.
- 3.11. **Apparent Low Bidder.** The Bidder determined to have the numerically lowest total bid as a result of the tabulation of bids by the Owner.
- 3.12. **Architect of Record.** A person registered as an architect or licensed as a landscape architect, in accordance with State law, exercising overall responsibility for the design or a significant portion of the design and performs certain Contract administration responsibilities as described in the Contract; or a firm employed by the Owner to provide professional architectural services.
- 3.13. **Arterial Highway.** A highway used primarily for through traffic and usually on a continuous route.
- 3.14. **Notice of Award.** The Owner's acceptance of a Contractor's bid for a proposed Contract that authorizes the Owner to enter into a Contract.
- 3.15. **Base Bid.** The total bid amount without additive alternates.
- 3.16. **Bid.** The offer from the Bidder for performing the work described in the bid documents, submitted on the prescribed bid form, considering addenda issued and giving unit bid prices for performing the work described in the bid documents.

- 3.17. **Bid Bond.** The security executed by the Contractor and the Surety furnished to the Owner to guarantee payment of liquidated damages if the Contractor fails to enter into an awarded Contract.
- 3.18. **Bid Documents.** The complete set of documents necessary for a Bidder to submit a bid. The documents may include plans, specifications, special specifications, special provisions, addenda, and the prescribed form a Bidder is to submit as the Bid. Other terms used may include general conditions, proposal, instructions to bidders, and construction specifications.
- 3.19. **Bid Error.** A mathematical mistake made by a Bidder in the unit price entered into the bid documents.
- 3.20. **Bidder.** An individual, partnership, limited liability company, corporation, or joint venture submitting a bid for a proposed Contract.
- 3.21. **Blast Cleaning.** Using one of the blasting methods, including, but not limited to, water blasting, low-pressure water blasting, high-pressure water blasting, abrasive blasting, water-abrasive blasting, shot blasting, slurry blasting, water injected abrasive blasting, and brush blasting.
- 3.22. **Bridge.** A structure, including supports, erected over a depression or an obstruction (e.g., water, a highway, or a railway) having a roadway or track for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 ft. between faces of abutments, spring lines of arches, or extreme ends of the openings for multiple box culverts.
- 3.23. **Brush Blasting.** Sweeping lightly with an abrasive blast to remove loose material.
- 3.24. **Building Contract.** A Contract entered under State law for the construction or maintenance of an Owner building or appurtenance facilities. Building Contracts are considered to be construction Contracts.
- 3.25. **Certificate of Insurance.** A form approved by the Owner covering insurance requirements stated in the Contract.
- 3.26. **Change Order.** Written order to the Contractor detailing changes to the specified work, item quantities or any other modification to the Contract.
- 3.27. **Concrete Construction Joint.** A joint formed by placing plastic concrete in direct contact with concrete that has attained its initial set.
- 3.28. **Concrete Repair Manual.** TxDOT manual specifying methods and procedures for concrete repair as an extension of the standard specifications.
- 3.29. **ConcreteWorks®.** TxDOT-owned software for concrete heat analysis. Software is available on the TxDOT's website.
- 3.30. **Construction Contract.** A Contract entered under State law for the construction, reconstruction, or maintenance of a segment of the Owner's facilities.
- 3.31. **Consultant.** The licensed professional engineer or engineering firm, or the architect or architectural firm, registered in the State of Texas and under Contract to the Owner to perform professional services. The

consultant may be the Engineer or architect of record or may provide services through and be subcontracted to the Engineer or architect of record.

- 3.32. **Contract.** The agreement between the Owner and the Contractor establishing the obligations of the parties for furnishing of materials and performance of the work prescribed in the Contract documents.
- 3.33. **Contract Documents.** Elements of the Contract, including, but not limited to, the plans, specifications incorporated by reference, special provisions, special specifications, Contract bonds, change orders, addendums, and special conditions.
- 3.34. **Contract Time.** The number of days specified for completion of the work, including authorized additional working days.
- 3.35. **Contractor.** The individual, partnership, limited liability company, corporation, or joint venture and all principals and representatives with which the Contract is made by the Owner.
- 3.36. **Controlled Access Highway.** Any highway to or from which access is denied or controlled, in whole or in part, from or to abutting land or intersecting streets, roads, highways, alleys, or other public or private ways.
- 3.37. **Control of Access.** The condition in which the right to access of owners or occupants of abutting land or other persons in connection with a highway is fully or partially controlled by public authority.
- 3.38. **Control Point.** An established point shown on the plans to provide vertical and horizontal references for geometric control for construction.
- 3.39. **Cross-Sections.** Graphic representations of the original ground and the proposed facility, at right angles to the centerline or base line.
- 3.40. **Culvert.** Any buried structure providing an opening under a roadway for drainage or other purposes. Culverts may also be classified as bridges. (See Section 1.3.23., "Bridge.")
- 3.41. **Cycle.** The activity necessary for performing the specified work within the right of way project limits once.
- 3.42. **Daily Road-User Cost.** Damages based on the estimated daily cost of inconvenience to the traveling public resulting from the work.
- 3.43. **Date of Written Authorization.** Date of the written Notice to Proceed authorizing the Contractor to begin work.
- 3.44. **Debar (Debarment).** Action taken by the Owner, State, or federal government pursuant to regulation that prohibits a person or company from entering into a Contract, or from participating as a subcontractor, or supplier of materials or equipment used in a highway improvement Contract as defined in local, state, or federal law.
- 3.45. **Detour.** A temporary traffic route around a closed portion of a road.

- 3.46. **Department.** When used in the context of the party with whom the Contractor has a Construction Contract, Department refers to Owner. When used in other contexts such as technical specifications, refers to the Texas Department of Transportation.
- 3.47. **Departmental Material Specifications.** Reference specifications for various materials published by TxDOT's Construction Division with a DMS-XXXXX numbering system.
- 3.48. **Direct Traffic Culvert.** Concrete box culvert whose top slab is used as the final riding surface or is to have an overlay or other riding surface treatment.
- 3.49. **Disadvantaged Business Enterprise.** A small business certified through the Texas Unified Certification Program in accordance with 49 CFR Part 26, that is at least 51% owned by one or more socially and economically disadvantaged individuals, or in the case of a publicly owned business, in which is at least 51% of the stock is owned by one or more socially and economically disadvantaged individuals, and whose management and daily business operations are controlled by one or more of the individuals who own it.
- 3.50. **Divided Highway.** A highway with separate roadways intended to move traffic in opposite directions.
- 3.51. **Easement.** A real property right acquired by one party to use land belonging to another party for a specified purpose.
- 3.52. **Engineer.** The Professional Engineer licensed in Texas who represents the interests of the Owner.
- 3.53. **Entity.** Political subdivision for which the project is designed and constructed. Either a Municipality (City) or a County or other entity organized under the authority of State of Texas statutes. May also be referred to as an **Owner**.
- 3.54. **Expressway.** A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at intersections.
- 3.55. **Family Member.** A family member of an individual is the individual's parent, parent's spouse, step-parent, step-parent's spouse, sibling, sibling's spouse, spouse, child, child's spouse, spouse's child, spouse's child's spouse, grandchild, grandparent, uncle, uncle's spouse, aunt, aunt's spouse, first cousin, or first cousin's spouse.
- 3.56. **Force Account.** Payment for directed work based on the actual cost of labor, equipment, and materials furnished with markups for project overhead and profit.
- 3.57. **Freeway.** An expressway with full control of access.
- 3.58. **Frontage Road.** A local street or road auxiliary to and located along an arterial highway for service to abutting property and adjacent areas and for control of access (sometimes known as a service road, access road, or insulator road).
- 3.59. **Hazardous Materials or Waste.** Hazardous materials or waste include, but are not limited to, explosives, compressed gas, flammable liquids, flammable solids, combustible liquids, oxidizers, poisons, radioactive materials, corrosives, etiologic agents, and other material classified as hazardous by 40 CFR 261, or applicable state and federal regulations.

- 3.60. **High-Pressure Water Blasting.** Water blasting with pressures between 5,000 and 10,000 psi.
- 3.61. **Highway, Street, or Road.** General terms denoting a public way for purposes of vehicular travel, including the entire area within the right of way. Recommended usage in urban areas is highway or street; in rural areas, highway or road.
- 3.62. **Historically Underutilized Business.** A corporation, sole proprietorship, partnership, or joint venture formed for the purpose of making a profit certified by the Texas Comptroller of Public Accounts, and 51% owned by one or more persons who are economically disadvantaged because of their identification as members of certain groups, including African Americans, Hispanic Americans, Asian-Pacific Americans, Native Americans, or women, and have a proportionate interest and demonstrate active participation in the control, operation, and management of the business' affairs. Individuals meeting the HUB definition are required to be residents of the State of Texas. Businesses that do not have their primary headquarters in the State of Texas are not eligible for HUB certification.
- 3.63. **Incentive/Disincentive Provisions.** An adjustment to the Contract price of a predetermined amount for each day the work is completed ahead of or behind the specified milestone, phase, or Contract completion dates. The amount of the incentive/disincentive is determined based on estimated costs for engineering, traffic control, delays to the motorists, and other items involved in the Contract.
- 3.64. **Independent Assurance Tests.** Tests used to evaluate the sampling and testing techniques and equipment used in the acceptance program. The tests are performed by the Owner or the Owner's representative and are not used for acceptance purposes.
- 3.65. **Inspector.** The person assigned by the Owner to inspect any or all parts of the work and the materials used for compliance with the Contract.
- 3.66. **Intelligent Transportation System.** An integrated system that uses video and other electronic detection devices to monitor traffic flows.
- 3.67. **Intersection.** The general area where 2 or more highways, streets, or roads join or cross, including the roadway and roadside facilities for traffic movements within it.
- 3.68. **Island.** An area within a roadway from which vehicular traffic is intended to be excluded, together with any area at the approach occupied by protective deflecting or warning devices.
- 3.69. **Joint Venture.** Any combination of individuals, partnerships, limited liability companies, or corporations submitting a single bid form.
- 3.70. **Lane Rental.** A method to assess the Contractor daily or hourly rental fees for each lane, shoulder, or combination of lanes and shoulders taken out of service.
- 3.71. **Letting.** The receipt, opening, tabulation, and determination of the apparent low Bidder.
- 3.72. **Letting Official.** The Owner representative empowered by the Owner to officially receive bids and close the receipt of bids at a letting.

- 3.73. **Licensed Professional Engineer.** A person who has been duly licensed by the Texas Board of Professional Engineers to engage in the practice of engineering in the State of Texas; also referred to as a Professional Engineer.
- 3.74. **Limits of Construction.** An area with established boundaries, identified within the highway right of way and easements, where the Contractor is permitted to perform the work.
- 3.75. **Local Street or Road.** A street or road primarily for access to residence, business, or other abutting property.
- 3.76. **Low-Pressure Water Blasting.** Water blasting with pressures between 3,000 and 5,000 psi.
- 3.77. **Major Item.** An item of work included in the Contract that has a total cost equal to or greater than 5% of the original Contract or \$100,000 whichever is less. A major item at the time of bid will remain a major item. An item not originally a major item does not become one through the course of the Contract.
- 3.78. **Manual of Testing Procedures.** Department manual outlining test methods and procedures maintained by the Materials and Tests Division.
- 3.79. **Material Producer List.** TxDOT-maintained list of approved products. Referenced as “Department’s MPL”.
- 3.80. **Materially Unbalanced Bid.** A bid that generates a reasonable doubt that award to the Bidder submitting a mathematically unbalanced bid will result in the lowest ultimate cost to the Owner.
- 3.81. **Mathematically Unbalanced Bid.** A bid containing bid prices that do not reflect reasonable actual costs plus a reasonable proportionate share of the Bidder’s anticipated profit, overhead costs, and other indirect costs.
- 3.82. **Median.** The portion of a divided highway separating the traffic lanes in opposite directions.
- 3.83. **Milestone Date.** The date that a specific portion of the work is to be completed, before the completion date for all work under the Contract.
- 3.84. **Monolithic Concrete Placement.** The placement of plastic concrete in such manner and sequence to prevent a construction joint.
- 3.85. **National Holidays.** January 1, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, and December 24 or December 25.
- 3.86. **Nonhazardous Recyclable Material.** A material recovered or diverted from the nonhazardous waste stream for the purposes of reuse or recycling in the manufacture of products that may otherwise be produced using raw or virgin materials.
- 3.87. **Nonresident Bidder.** A Bidder whose principal place of business is not in Texas. This includes a Bidder whose ultimate parent company or majority owner does not have its principal place of business in Texas.

- 3.88. **Nonresponsive Bid.** A bid that does not meet the criteria for acceptance contained in the bid documents.
- 3.89. **Non-Site-Specific Contracts.** Contracts in which a geographic region is specified for the work and for which work orders, with or without plans, further detail the limits and work to be performed.
- 3.90. **Notice to Proceed,** Written notification to the Contractor authorizing work to begin.
- 3.91. **Notification.** Either written or oral instruction to the Contractor concerning the work. Voice mail is oral notification.
- 3.92. **Owner,** Political subdivision for whom the project is designed and constructed. Either a Municipality (City), a County or other entity organized under the authority of State of Texas statutes. May also be referred to as an **Entity**.
- 3.93. **Pavement.** That part of the roadway having a constructed surface for the use of vehicular traffic.
- 3.94. **Pavement Structure.** Combination of surface course and base course placed on a subgrade to support the traffic load and distribute it to the roadbed.
- 3.94.1. **Surface Course.** Pavement structure layers designed to accommodate the traffic load. The top layer resists skidding, traffic abrasion, and the disintegrating effects of climate and is sometimes called the wearing course.
- 3.94.2. **Base Course.** One or more layers of specified material thickness placed on a subgrade to support a surface course.
- 3.94.3. **Subgrade.** The top surface of a roadbed upon which the pavement structure, shoulders, and curbs are constructed.
- 3.94.4. **Subgrade Treatment.** Modifying or stabilizing material in the subgrade.
- 3.95. **Payment Bond.** The security executed by the Contractor and the Surety, furnished to the Owner to guarantee payment of all legal debts of the Contractor pertaining to the Contract.
- 3.96. **Performance Bond.** The security executed by the Contractor and the Surety, furnished to the Owner to guarantee the completion of the work in accordance with the terms of the Contract.
- 3.97. **Plans.** The approved drawings, including true reproductions of the drawings that show the location, character, dimensions, and details of the work and are a part of the Contract.
- 3.98. **Power of Attorney for Surety Bonds.** An instrument under corporate seal appointing an attorney-in-fact to act on behalf of a Surety in signing bonds.
- 3.99. **Qualification.** The process for determining a Contractor's eligibility to be awarded a construction contract
- 3.100. **Prequalification.** The process for determining a Contractor's eligibility to bid work.

- 3.101. **Prequalification Statement.** The forms on which required information is furnished concerning the Contractor's ability to perform and finance the work.
- 3.102. **Prequalified Contractor.** A contractor that is approved to bid on TxDOT contracts by satisfying their Prequalification Process.
- 3.103. **Post Qualification.** The owner will determine if contractors are qualified to bid on the project after bids are open. The bid documents will identify the minimum requirements that contractor must meet to be qualified for the project. Unqualified contractors' bids will be considered non-responsive and not accepted.
- 3.104. **Project-Specific Location.** A material source, plant, waste site, parking area, storage area, field office, staging area, haul road, or other similar location either outside the project limits or within the project limits but not specifically addressed in the Contract.
- 3.105. **Proposal.** The offer from the Bidder submitted on the prescribed form, including addenda issued, giving unit bid prices for performing the work described in the plans and Specifications.
- 3.106. **Proposal Form.** The form printed and sent to the Bidder by the Owner or printed by the Bidder from the Owner's bidding system.
- 3.107. **Proposal Guaranty.** The security furnished by the Bidder as a guarantee that the Bidder will enter into a Contract if awarded the work.
- 3.108. **Quality Assurance.** Sampling, testing, inspection, and other activities conducted by the Engineer to determine payment and make acceptance decisions.
- 3.109. **Quality Control.** Sampling, testing, and other process control activities conducted by the Contractor to monitor production and placement operations.
- 3.110. **Ramp.** A section of highway for the primary purpose of making connections with other highways.
- 3.111. **Referee Tests.** Tests requested to resolve differences between Contractor and Owner test results. The referee laboratory is the Owners, unless otherwise noted.
- 3.112. **Regular Item.** A bid item contained in the bid documents and not designated as an additive alternate or replacement alternate bid item.
- 3.113. **Rental Rate Blue Book for Construction Equipment.** Publication containing equipment rental rates.
- 3.114. **Replacement Alternate.** A bid item identified on the bid documents that a Bidder may substitute for a specific regular item of work.
- 3.115. **Responsive Bid.** A bid that meets all requirements of the advertisement and the bid documents for acceptance.
- 3.116. **Right of Way.** A general term denoting land or property devoted to transportation purposes.

- 3.117. **Roadbed.** The graded portion of a highway prepared as foundation for the pavement structure and shoulders. On divided highways, the depressed median type and the raised median type highways are considered to have 2 roadbeds. Highways with a flush median are considered to have 1 roadbed. Frontage roads are considered separate roadbeds.
- 3.118. **Road Master.** A railroad maintenance official in charge of a division of railway.
- 3.119. **Roadside.** The areas between the outside edges of the shoulders and the right of way boundaries. Unpaved median areas between inside shoulders of divided highways and areas within interchanges are included.
- 3.120. **Roadway.** The portion of the highway (including shoulders) used by the traveling public.
- 3.121. **Sandblasting, Dry.** Spraying blasts of pressurized air combined with sand.
- 3.122. **Sandblasting, Wet.** Spraying blasts of pressurized water combined with sand.
- 3.123. **Shoulder.** That portion of the roadway contiguous with the traffic lanes for accommodation of stopped vehicles for emergency use or for lateral support of base and surface courses.
- 3.124. **Shot Blasting.** Spraying blasts of pressurized air combined with metal shot.
- 3.125. **Sidewalk.** Portion of the right of way constructed exclusively for pedestrian use.
- 3.126. **Slurry Blasting.** Spraying blasts of pressurized air combined with a mixture of water and abrasive media.
- 3.127. **Special Provisions.** Additions or revisions to these standard specifications or special specifications.
- 3.128. **Special Specifications.** Supplemental specifications applicable to the Contract not covered by these standard specifications.
- 3.129. **Specifications.** Directives or requirements issued or made pertaining to the method and manner of performing the work or to quantities and qualities of materials to be furnished under the Contract. References to DMSs, ASTM or AASHTO specifications, or TxDOT bulletins and manuals, imply the latest standard or tentative standard in effect on the date of the bid. The Owner will consider incorporation of subsequent changes to these documents in accordance with Item 4L, "Scope of Work."
- 3.130. **Small Business Enterprise.** A firm (including affiliates) whose annual gross receipts do not exceed the U.S. Small Business Administration's size standards for 4 consecutive years.
- 3.131. **State.** The State of Texas.
- 3.132. **State Holiday.** A holiday authorized by the State Legislature excluding optional state holidays and not listed in Section 1L.3.85., "National Holidays." A list of state holidays can be found on the TxDOT's website.
- 3.133. **Station.** A unit of measurement consisting of 100 horizontal feet.

- 3.134. **Subcontract.** The agreement between the Contractor and subcontractor establishing the obligations of the parties for furnishing of materials and performance of the work prescribed in the Contract documents.
- 3.135. **Subcontractor.** An individual, partnership, limited liability company, corporation, or any combination thereof that the Contractor sublets, or proposes to sublet, any portion of a Contract, excluding a material supplier, a hauling firm hauling only from a commercial source to the project, truck owner-operator, wholly-owned subsidiary, or specialty-type businesses such as security companies and rental companies.
- 3.136. **Subsidiary.** Materials, labor, or other elements that because of their nature or quantity have not been identified as a separate item and are included within the items on which they necessarily depend.
- 3.137. **Substructure.** The part of the structure below the bridge seats, but not including bearings, drilled shafts, or piling. Parapets, back walls, wing walls of the abutments, and drainage structures are considered parts of the substructure.
- 3.138. **Superintendent.** The representative of the Contractor who is available at all times and able to receive instructions from the Owner or authorized Owner representatives and to act for the Contractor.
- 3.139. **Superstructure.** The part of the structure above the bridge seats or above the springing lines of arches and including the bearings. Flatwork construction may be considered superstructure.
- 3.140. **Supplemental Agreement.** Written agreement entered into between the Contractor and the Owner and approved by the Surety, covering alterations and changes in the Contract. A supplemental agreement is used by the Owner whenever the modifications include assignment of the Contract from one party to another or other cases as desired by the Owner.
- 3.141. **Surety.** The corporate body or bodies authorized to do business in Texas bound with and for the Contractor for the faithful performance of the work covered by the Contract and for the payment for all labor and material supplied in the prosecution of the work.
- 3.142. **Surplus Materials.** Any debris or material related to the Contract but not incorporated into the work.
- 3.143. **Suspension.** Action taken by the Owner, State, or federal government pursuant to regulation that prohibits a person or company from entering into a Contract, or from participating as a subcontractor, or supplier of materials or equipment used in a contract
- 3.144. **Tex –XXX-X.** TxDOT material test methods found on TxDOT's website.
- 3.145. **Traffic Lane.** The strip of roadway intended to accommodate the forward movement of a single line of vehicles.
- 3.146. **Traveled Way.** The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.
- 3.147. **Truck Owner-Operator.** An individual who owns and operates 1 truck for hire.
- 3.148. **UT-Bridge.** TxDOT-owned software for steel girder erection. Software is available on TxDOT's website.

- 3.149. **UT-Lift.** TxDOT-owned software for steel girder erection. Software is available on TxDOT's website.
- 3.150. **Utility.** Privately, publicly, or cooperatively owned lines, facilities, and systems for producing, transmitting, or distributing communications, power, heat, gas, oil, water, waste, or storm water that are not connected with the highway drainage, signal systems, or other products that directly or indirectly serve the public; the utility company.
- 3.151. **Verification Tests.** Tests used to verify accuracy of QC and QA and mixture design testing.
- 3.152. **Water-Abrasive Blasting.** Spraying blasts of pressurized water combined with abrasive media.
- 3.153. **Water Blasting.** Spraying blasts of pressurized water of at least 3,000 psi.
- 3.154. **Water-Injected Abrasive Blasting.** Abrasive blasting with water injected into the abrasive/air stream at the nozzle.
- 3.155. **Wholly-Owned Subsidiary.** A legal entity owned entirely by the Contractor or subcontractor.
- 3.156. **Work.** The furnishing of all labor, materials, equipment, and other incidentals necessary for the successful completion of the Contract.
- 3.157. **Written Notice.** Written notice is considered to have been duly given if delivered in person to the individual or member to whom it is intended or if sent by regular, registered, or certified mail and delivered to the last known business address; sent by facsimile to the last known phone number; or sent by e-mail to the last known address. The date of the letter will serve as the beginning day of notice. Unclaimed mail or failure to provide current mailing address will not be considered a failure to provide written notice.

Item 2L

Instructions to Bidders



1. INTRODUCTION

Instructions to the Contractor in these specifications are generally written in active voice, imperative mood. The subject of imperative sentences is understood to be "the Contractor." The Owner's responsibilities are generally written in passive voice, indicative mood. Phrases such as "as approved," "unless otherwise approved," "upon approval," "as directed," "as verified," "as ordered," and "as determined" refer to actions of the Engineer unless otherwise stated, and it is understood that the directions, orders, or instructions to which they relate are within the limitations of and authorized by the Contract.

2. ELIGIBILITY OF BIDDERS

The Owner may make such investigations as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted, either by the bidder or from an investigation of the bidder, fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and therefore to complete the work contemplated herein. Conditional bids will not be accepted.

3. ISSUING BID DOCUMENTS

Bid Documents may be obtained through the Civcast website at <http://civcastusa.com>. Civcast is free to all Bidders to view or download plans and documents, however if the contractor requests a printed plan set, there will be a cost. Contractors are required to create an account to sign in to the website in order to access the bid documents. Civcast will alert bidders of any addendums to the projects. If there are any questions about Civcast or the Civcast website, please contact the company by phone at (281) 346 - 4577 or support@civcastusa.com.

At the time Bid Documents are obtained, Bidder must provide a working e-mail address, so as to receive any addenda or clarification issued by the Owner.

The Owner will not issue bid documents if one or more of the following apply:

the Bidder is suspended or debarred by the Department or federal agency,

the Bidder is not eligible per Article 2L.2

the Bidder is prohibited from rebidding a specific project due to a bid error on the original bid documents, the Bidder failed to enter into a Contract on the original award,

the Bidder was defaulted or terminated on the original Contract, unless the Owner terminated for convenience, or

the Bidder or a subsidiary or affiliate of the Bidder has received compensation from the Owner to participate in the preparation of the plans or specifications on which the bid or Contract is based.

4. INTERPRETING ESTIMATED QUANTITIES

The quantities listed in the bid documents are approximate and will be used for the comparison of bids. Payments will be made for actual quantities of work performed in accordance with the Contract.

5. EXAMINING DOCUMENTS AND WORK LOCATIONS

Examine the bid documents and specified work locations before submitting a bid for the work. Submitting a bid will be considered evidence that the Bidder has performed this examination. Borings, soil profiles, water elevations, and underground utilities shown on the plans were obtained for the use of the Owner in the preparation of plans. This information is provided for the Bidder's information only and the Owner makes no representation as to the accuracy of the data. Be aware of the difficulty of accurately classifying all material encountered in making foundation investigations, the possible erosion of stream channels and banks after survey data have been obtained, and the unreliability of water elevations other than for the date recorded.

Oral explanations, instructions, or consideration for Contractor-proposed changes in the bid documents given during the bidding process are not binding. Only requirements included in the bid documents and Owner-issued addenda are binding. Request explanations of documents at least five (5) days prior to the bid opening.

Immediately notify the Owner of any error, omission, or ambiguity discovered in any part of the bid documents. The Owner will issue addenda when appropriate.

6. PREPARING THE BID

Prepare the proposal form furnished by the Owner. Informational proposal forms printed from the Owner's website will not be accepted.

Specify a unit price in dollars and cents for each regular item, additive alternate item, deductive alternate item or replacement alternate item for which an estimated quantity is given.

When "Working Days" is an item, submit the number of working days to be used to complete the Contract or phases of the Contract.

The Owner will not accept an incomplete bid. A bid that has one or more of the deficiencies listed below is considered incomplete:

- the proposal form was not signed,
 - all certifications were not acknowledged,
 - a regular item, additive alternate item or deductive alternate item is left blank,
 - a regular item and the corresponding replacement alternate item are left blank,
 - the proposal form submitted had the incorrect number of items, or
 - all addenda were not acknowledged.
- bid security was not included with the proposal. See Article 2L.8.1.2.

7. NONRESPONSIVE BID

The Owner will not accept a nonresponsive bid. A bid that has one or more of the deficiencies listed below is considered nonresponsive:

The bid was not in the hands of the Letting Official at the time and location specified in the advertisement.

A bid was submitted for the same project by a Bidder or Bidders and one or more of its partners or affiliates.

The Bidder was not authorized to receive a proposal form under Article 2L.3, "Issuing Bid Documents", The Bidder failed to acknowledge receipt of all addenda issued.

The proposal form was signed by a person who was not authorized to bind the Bidder or Bidders.

The proposal guaranty did not comply with the requirements contained in this Item.
The bid was in a form other than the official proposal form issued by the Owner.
The Bidder modified the bid in a manner that altered the conditions or requirements for work as stated in the bid documents.
The Bidder bid more than the maximum or less than the minimum number of allowable working days when working days was an item.
The Bidder did not attend a specified mandatory pre-bid conference.
The Bidder did not meet the requirements of the technical qualification.
The Bidder did not include a signed State of Texas Child Support Business Ownership Form.
The bidder does not meet the Owner's qualification requirements.

8. SUBMITTAL OF BIDS

- 8.1. **Electronic Bids.** When electronic bidding is available, the Bidder is responsible for taking the appropriate measures to submit a bid. These measures include, but are not limited to, acquiring hardware, software, and Internet connectivity needed for submitting a bid via the Owner's bidding system.
- 8.1.1. **Proposal Form.** Use the electronic proposal form in the Owner's bidding system. When regular bid items have corresponding replacement alternate items, select the bid item or group of items to be used for the bid tabulation. Acknowledge all addenda listed in the Owner's bidding system.
- The electronic proposal form may not contain the special provisions, special specifications, general notes, and other Contract documents. These documents are included by reference.
- 8.1.2. **Bid Security.** Each bid must be accompanied by cashier's or certified check of the bidder, or a bid bond duly executed by the bidder as principal and having a surety thereon, a surety company approved by the Owner in the amount of five percent (5%) of the bid. Such cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the Contract or, if no award has been made within ninety (90) days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as the bidder has not been notified of the acceptance of its bid.
- 8.1.3. **Submittal of Bid.** Submit the bid using the Owner's bidding system.
- 8.1.4. **Revising the Proposal Form.** Make desired changes as allowed by the Owner's bidding system up until the time and date set for the opening of bids. The last bid submitted will be used for tabulation purposes.
- 8.1.5. **Withdrawing a Bid.** Submit an electronic or written request to withdraw a bid before the time and date set for the opening. The Owner will not accept oral requests. An electronic request must be made using the Owner's bidding system.

A written request must be signed and submitted to the Letting Official with proof of identification. The request must be made by a person authorized to bind the Bidder or Bidders. In the case of joint venture, the Owner will accept a request from any person authorized to bind a party to the joint venture. The Owner may require written delegation of authority to withdraw a bid when the individual sent to withdraw the bid is not authorized to bind the Bidder or Bidders.

- 8.2. **Printed Bid.**

- 8.2.1. **Proposal Form.** Mark all entries in ink. As an alternative to handwriting the unit prices in the proposal form, submit a typed proposal form. A typed proposal form must contain the information in the format shown in the proposal form.

When regular bid items have corresponding replacement alternate items, select the bid item or group of items to be used for the bid tabulation. Acknowledge all addenda by checking the appropriate box on the addendum acknowledgement section in the proposal form. Provide the complete and correct name of the Bidder submitting the bid. A person authorized to bind the Bidder must sign the proposal form. In the case of a joint venture, provide the complete and correct name of all Bidders submitting the bid. In the case of a joint venture, the person signing the proposal form must be authorized to bind all joint venture participants.

If a proposal form contains both regular items for domestic steel or iron materials and replacement alternate items for foreign steel or iron materials, the Bidder must either:
submit unit bid prices for domestic items only, or
submit unit bid prices for both the domestic and foreign items.

- 8.2.2. **Proposal Guaranty.** Provide a bid guaranty in the amount indicated on the bid documents. Use either a guaranty check or a printed bid bond. Ensure the electronic bid bond meets the requirements of Section 2L.8.1.2., "Bid Security".

- 8.2.3. **Guaranty Check.** Make the check payable to the Owner. The check must be a cashier's check, money order, or teller's check drawn by or on a state or national bank, or a state or federally chartered credit union (collectively referred to as "bank"). The check must be dated on or before the date of the bid opening. Postdated checks will not be accepted. The type of check or money order must be indicated on the face of the instrument, except in the case of a teller's check, and the instrument must be no more than 90 days old. A check must be made payable at or through the institution issuing the instrument; be drawn by a bank and on a bank; or be payable at or through a bank. The Owner will not accept personal checks, certified checks, or other types of money orders, unless otherwise noted.

- 8.2.4. **Bid Bond.** Use the bid bond form provided by the Owner. Submit the bid bond with the powers of attorney attached and in the amount specified. The bond must be dated on or before the date of the bid opening, bear the impressed seal of the Surety, and be signed by the Bidder or Bidders and an authorized individual of the Surety. As an alternative for joint venture Bidders, each of the Bidders may submit a separate bid bond completed as outlined in this section. Bid bonds will only be accepted from Sureties authorized to execute a bond under and in accordance with State law.

- 8.2.5. **Submittal of Bid.** Place the completed proposal form and the bid guaranty in a sealed envelope marked to indicate the contents.

When submitting by mail or delivery service, place the envelope in another sealed envelope and address as indicated in the official advertisement or in the bid documents. It is the Bidder's responsibility to ensure that the sealed bid arrives at the location described on or before the time and date set for the bid opening. To be accepted, the bid must be in the hands of the Letting Official by that time of opening regardless of the method chosen for delivery.

- 8.2.6. **Revising the Proposal Form.** Make desired changes to the proposal form in ink and submit the bid to the Letting Official. The Owner will not make revisions to a bid on behalf of a Bidder.

- 8.2.7. **Withdrawing a Bid.** Submit a written request to withdraw a bid before the time and date set for the opening. The Owner will not accept oral requests. A written request must be signed and submitted to the

Letting Official with proof of identification. The request must be made by a person authorized to bind the Bidder or Bidders. In the case of joint venture, the Owner will accept a request from any person authorized to bind a party to the joint venture. The Owner may require written delegation of authority to withdraw a bid when the individual sent to withdraw the bid is not authorized to bind the Bidder or Bidders.

9. OPENING AND READING OF BIDS

Bids will be received by the Owner at the office of the Purchasing Agent until July 10, 2025 at 10:00 am and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed and addressed to Purchasing Agent, City Hall Building, 13000 William Dodson Parkway, Farmers Branch, Texas 75234, with the word "PROPOSAL" and the name or description of the project as shown on the front cover of the Contract documents.

10. TABULATING BIDS

10.1. **Official Total Bid Amount.** The Owner will sum the products of the quantities and the unit prices bid in the proposal form to determine the official total bid amount, except as provided in Section 2L.11., "Consideration of Unit Prices." The official total bid amount is the basis for determining the apparent low Bidder. The total bid amounts will be compared and the results made public.

10.2. **Consideration of Bid Format.** When a Bidder submits both an electronic bid and a printed bid that is responsive, the unit bid prices in the printed bid will be used to determine the total bid amount. If the printed bid is incomplete or nonresponsive, the electronic bid will be used in the tabulation of the total bid amount.

If a Bidder submits 2 or more printed bids, all responsive bids will be tabulated. The bid with the lowest tabulation will be used to determine the total bid amount.

10.3. **Rounding of Unit Prices.** The Owner will round off all unit bids involving fractional parts of a cent to the nearest one-tenth cent (\$0.001) in determining the amount of the bid as well as computing the amount due for payment of each item under the Contract. For rounding purposes, entries of five-hundredths of a cent (\$0.0005) or more will be rounded up to the next highest tenth of a cent, while entries less than five-hundredths of a cent will be rounded down to the next lowest tenth of a cent.

10.4. **Interpretation of Unit Prices.** The Owner will make a documented determination of the unit bid price if a unit bid price is illegible or conflicting in the case of replacement alternate items. The Owner's determination will be final.

10.5. **Consideration of Unit Prices.**

10.5.1. **Additive Alternate Items.** The Owner will sum the products of the quantities and the unit prices for the regular items in the proposal form to determine the total bid amount for the base bid. The official total bid amount will be determined by the summation of the base bid plus a pre-determined order of additive alternate items. An estimate of the budgeted amount may be shown on the plans.

The Contract will identify the base bid work and additive alternate work to be performed. The Owner makes no guarantee that the additive alternate work will be required.

10.5.2. **A + B Bidding.** The official total bid amount will be determined by the summation of the Contract amount and the time element. The Owner will use the following formula to make the calculation:

$$A + B1 + B2 + BX + \dots + BT$$

The Contract amount, equal to A in the formula, is determined by the summation of the products of the approximate quantities shown in the bid and the unit bid prices bid. The time element, equal to B1, B2, BX (when phases are included as bid components), and BT (substantial completion of the project when included as a bid component), of the bid is determined by multiplying the number of working days bid to substantially complete the project, or phases, by the daily road-user cost (RUC) provided on the bid documents. When partial days are bid they will be rounded up to the nearest whole day.

The formula above determines the low Bidder and establishes the Contract time.

10.5.3. **“Buy America.”** Comply with Buy America in accordance with Section 6L.1.1.. For a Bidder who proposes to use foreign steel or iron materials to be considered the apparent low Bidder, their total bid must be at least 25% lower than the next lowest bid if that bid proposes to use domestic steel or iron materials.

This requirement does not apply to minimal use of steel or iron materials provided that the total cost of all foreign source items used in the project, as delivered to the project site, is less than \$2,500 or one-tenth-of-one-percent (1/10 of 1%) of the Contract amount, whichever is greater

11. **CONSIDERATION OF BID ERRORS.**

The Owner will consider a claim of a bid error by the apparent low Bidder if the following requirements have been met:

Submit written notification to the Owner within 5 business days after the date the bid is opened.
Identify the items of work involved and include bidding documentation. The Owner may request clarification of submitted documentation.

The Owner will evaluate the claim of an error by the apparent low Bidder by considering the following:

The bid error relates to a material item of work.
The bid error amount is a significant portion of the total bid.
The bid error occurred despite the exercise of ordinary care.
The delay of the proposed work will not impact cost and safety to the public.

Acceptance of the bid error claim by the Owner will result in the rejection of the bid of the apparent low bidder .and the Owner may consider the second responsive bid. The erring Contractor will not be allowed to bid the project if it is relet. Rejection of bids due to the Contractor’s bid error may result in the application of sanctions by the Owner.

12. **TIE BIDS**

If the official total bid amount for 2 or more Bidders is equal and those bids are the lowest submitted, each tie Bidder will be given an opportunity to withdraw their bid. If 2 or more tie Bidders do not withdraw their bids, the low Bidder will be determined by a coin toss. If all tie Bidders request to withdraw their bids, no withdrawals will be allowed and the low Bidder will be determined by a coin toss. The Letting Official will preside over the proceedings for the coin toss.

Item 3L

Award and Execution of Contract



1. AWARD OF CONTRACT

The Owner will award, reject, or defer the Contract within 30 days after the opening of the bid. The Owner reserves the right to reject any or all bids and to waive minor technicalities in the best interest of the Owner.

12.1. **Award.** The Owner will award the Contract to the low Bidder as determined by Article 2L.10., "Tabulating Bids." The Owner may award a Contract to the second lowest Bidder when the following requirements have been met:

The low Bidder withdraws its bid.

The low Bidder fails to enter into a contract with the Owner after Award.'

The second low Bidder's unit bid prices are reasonable.

12.2. **Rejection.** The Owner will reject the Contract if:

Collusion may have existed among the Bidders. Collusion participants will not be allowed to bid future bids for the same Contract.

The low bid is mathematically and materially unbalanced. The Bidder will not be allowed to bid future bids for the same Contract.

The lowest bid is higher than the Owner's estimate and re-advertising for bids may result in a lower bid.

The low bid contains a bid error that satisfies the requirements and criteria in Article 2L.11 "Consideration of Bid Errors."

Rejection of the Contract is in the best interest of the Owner.

Bidder fails to submit "Contractor's Information" within twenty-four (24) hours (one working day).

12.3. **Deferral.** The Owner may defer the award or rejection of the Contract when deferral is in the best interest of the Owner.

2. RESCINDING OF AWARD

The Owner reserves the right to cancel the award of any Contract before Contract execution with no compensation due when the cancellation is in the best interest of the Owner. The Owner will return the proposal guaranty to the Contractor.

3. DISADVANTAGED BUSINESS ENTERPRISE (DBE)/HISTORICALLY UNDERUTILIZED BUSINESS/SMALL BUSINESS ENTERPRISE (SBE)

Submit all DBE/HUB/SBE information in the time frame specified when required by the bid documents.

4. EXECUTION OF CONTRACT

Provide the following within 15 days after written notification of award of the Contract:

- 4.1. **Contract.** Executed by Contractor and Surety.
- 4.2. **Surety Bonds.**
- 4.3. **Contractor Surety.** With the execution and delivery of the Contract, the Contractor shall furnish and file with the Owner in the amounts herein required, the surety bonds specified hereunder, Without exception, the Owner's bond forms must be used, and exclusive venue for any lawsuit in connection with such bonds shall be specified as the county in which the Owner's principal office is located. Such surety bonds shall be in accordance with the provisions of Chapter 2253, Texas Government Code and Sections 3503.001-.005 of the Texas Insurance Code, as amended. These bonds shall automatically be increased by the amount of any change order which increases the Contract Price with or without notice to the Surety, but in no event shall a change, which reduces the Contract amount, reduce the penal amount of such bonds.
- 4.4. **Performance Bond.** In accordance with Chapter 2253 of the Texas Government Code, a performance bond in the amount of not less than one-hundred percent (100%) of the Contract Price conditioned upon the faithful performance of the Contract, and upon payment of all persons supplying labor or furnishing materials, for projects with a bid amount in excess of twenty-five thousand dollars (\$25,000.00), will be required upon the forms which are a part of the Contract documents.
- Said performance bond shall be a good and sufficient bond in an amount not less than one-hundred percent (100%) of the Contract Price, as evidenced by the proposal tabulation, shall guarantee the full and faithful execution of the work and performance of the Contract in accordance with the plans, specifications and Contract documents, including any extensions thereof, and shall be issued for the protection of the Owner. The bond shall automatically adjust in amount due to any change orders approved by the City. The Contractor shall include in the unit bid prices, the cost of the Performance Bonds and shall pay for said bonds.
- 4.5. **Payment Bond.** In accordance with Chapter 2253 of the Texas Government Code, payment bonds in the amount of not less than one-hundred percent (100%) of the Contract Price conditioned upon the faithful performance of the Contract, and upon payment of all persons supplying labor or furnishing materials, for projects with a bid amount in excess of twenty-five thousand dollars (\$25,000.00), will be required upon the forms which are a part of the Contract documents.
- Said payment bond shall be a good and sufficient bond in an amount not less than one-hundred percent (100%) of the approximate total amount of the Contract, as evidenced by the proposal tabulation, shall guarantee the full and proper protection of all claimants supplying labor and material in the prosecution of the work provided for in said Contract. and shall be issued for the use of each claimant. The bond shall automatically adjust in amount due to any change orders approved by the City. The Contractor shall include in the unit bid prices, the cost of the Payment Bonds and shall pay for said bonds.
- 4.6. **Maintenance Bond.** The Contractor, upon execution of the Contract and before beginning work, shall furnish to the City a proper Maintenance Bond in the amount of one hundred (100%) percent of the contract amount written by an approved surety company covering the guarantee and maintenance prescribed above. The period of the Maintenance Bond shall be one (1) year from the date of final acceptance of all work done under the Contract, to cover the guarantee as set forth in the Special Conditions.
- The Contractor shall include in the unit bid prices, the cost of the Maintenance Bond and shall pay for said bond. Notice to the Contractor that repairs, renewals or reconstruction as required under this provision of the specifications, may be made in the form of a registered letter, signed by the Owner and addressed to the Contractor liable for the cost of expense thereof.

- 4.7. **Sureties.** A surety who is in default or delinquent on any bonds or who are interested in any litigation against the Owner will not be acceptable. All bonds shall be made on forms furnished by the Owner and shall be executed by not less than one (1) corporate surety authorized to do business in the State of Texas and acceptable to the Owner. The Sureties shall be listed in the most current Federal Register Treasury List. The Contractor and Surety shall execute each bond. Each Surety shall have designated an agent resident in the Owner's jurisdictional area acceptable to the Owner to whom any requisite notices may be delivered and on whom service of process may be had in matters arising out of such surety-ship. The Owner reserves the right to reject any and all Sureties.

- 4.8. **Additional or Substitute Bond.** If at any time the Owner is or becomes dissatisfied with any Surety then upon the performance, payment bond, or maintenance bond, the Contractor shall, within five (5) days after notice from the Owner to do so, substitute an acceptable bond (or bonds), or provide an additional bond, in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The Contractor shall pay the premiums on such bonds without recourse to the Owner. No further payments under the Contract shall be deemed due or payable until the substitute or additional bonds shall have been furnished and accepted by the Owner.

- 4.9. **Power of Attorney.** Attorneys in fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

4.10. **Insurance.** Submit a Certificate of Insurance showing coverages in accordance with Contract requirements.

The Contractor at his own expense shall purchase, maintain and keep in force such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- (1) Workers' Compensation claims;
- (2) Claims for damages because of bodily injury, occupational sickness or disease or death of his employees, and claims insured by usual bodily injury liability coverage;
- (3) Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees, and claims insured by usual bodily injury liability coverage; and
- (4) Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

The insurance required to be furnished by Contractor and all Subcontractors and Sub subcontractors shall be written in the form and for coverage and limits not less than the following:

- (1) Workers' Compensation (including occupational disease) Insurance to cover full liability under the Workers' Compensation Laws of the State of Texas with Employer's Liability coverage in limits not less than the following:
 - \$1,000,000.....per accident
 - \$1,000,000.....per person for disease
 - \$1,000,000.....for disease aggregate

THE FOLLOWING INSURANCE POLICIES MUST BE ENDORSED WITH WAIVER OF SUBROGATION ENDORSEMENT, WAIVING THE CARRIER'S RIGHT OF SUBROGATION WITH RESPECT TO OWNER AND ENGINEER.

- (2) Comprehensive General Liability Insurance, including, on an "occurrence" basis, insurance for Hazards of Operations, Elevators, Independent Contractors, products and Completed Operations. Contractual Liability Insurance either designating this contract or written "Blanket" designating all written agreements. Such Comprehensive General Liability and Contractual Liability Insurance must be endorsed with Broad Form Property Damage Endorsement (including Completed Operations) and afford coverage for explosion, collapse, and underground hazards. The insurance required by this clause (2) shall be in limits not less than the following:

Bodily Injury or Death Liability and Property Damage Liability
Combined single limit of \$1,000,000 per occurrence

Personal Injury Liability
\$1,000,000.....each occurrence
\$1,000,000.....aggregate

- (3) Automobile Liability Insurance covering all owned, non owned and hired automobiles used in connection with the Work with the following minimum limits:

Bodily Injury and Property Damage
Combined single limit of \$1,000,000 per occurrence

- (4) Comprehensive Catastrophe Liability (Umbrella) indemnifying for ultimate net loss, sustained by reason of liability imposed by law or assumed under contract arising out of:

- (a) Personal Injury, including death at any time resulting therefrom, sustained by any person or persons:
- (b) Property damage for damages because of injury to or destruction of tangible property including consequential loss resulting therefrom, caused by an occurrence;
- (c) Advertising, for damages because of libel, slander, defamation, infringement of copyright, title or slogan, piracy, unfair competition, idea misappropriation or invasion of rights of privacy arising out of advertising activities. As respects Contractor, such insurance shall be in limits not less than the difference between:
 - A. \$2,000,000 with respect to each occurrence for each annual period with respect to the Products Hazard; and
 - B. The applicable limits of the insurance set forth in (1), (2), and (3) above.

As respects Subcontractors and Sub subcontractors, such insurance shall be in limits not less than the difference between:

- C. \$1,000,000 with respect to each occurrence; for each annual period with respect to the Products Hazard; and
- D. The applicable limits of the insurance set forth in (1), (2) and (3) above. This insurance shall include property damage coverage for property in care, custody, or control of the insured at least to the extent such coverage is provided by the Broad Form property damage Endorsement required in (2) above.

Certain minor Subcontractors and Sub subcontractors may have less than limits outlined above coverage, subject to Owner expressed approval. Insurance described herein shall be written in company or companies, satisfactory to Owner. If the Contractor, all Subcontractors and Sub subcontractors fail to procure and maintain the said insurance, Owner shall have the right, but not the obligation, to procure and maintain the said insurance for and in the name of such parties and such parties shall pay the cost thereof and shall furnish all necessary information to make effective and maintain such insurance. Such parties will not violate or knowingly permit to be violated any conditions of insurance described herein. All such policies and any other policies of insurance which Contractor and all subcontractors and Sub

subcontractors may elect to secure and maintain to the work shall and which are in any way related to the work shall also be endorsed waiving carrier's rights of subrogation with respect to Owner.

4.11. **Business Ownership Information.** Submit the names and social security numbers of all individuals owning 25% or more of the firm on the Owner's form.

4.12. **Railroad Documents.** Provide all required documents for satisfaction of railroad requirements for projects that have work which involves railroad right of way. Comply with the requirements of Article 5L.8., "Cooperation With Railroads."

5. FAILURE TO ENTER CONTRACT

If the Contractor fails to comply with all of the requirements in Article 3L.4., "Execution of Contract," the proposal guaranty will become the property of the Owner, not as a penalty, but as liquidated damages. The Contractor forfeiting the proposal guaranty will not be considered in future bids for the same work unless there has been a substantial change in design of the work.

6. APPROVAL AND EXECUTION OF CONTRACT

The Contract will be approved and signed under authority of the Owner.

7. RETURN OF PROPOSAL GUARANTY

The proposal guaranty check of the low Bidder will be retained until after the Contract has been rejected or awarded and executed. Bid bonds will not be returned.

8. BEGINNING OF WORK

Do not begin work until authorized in writing by the Owner.

Verify all quantities of materials shown on the plans before ordering.

For Contracts with callout work and work orders, the purchase of materials before a work order is issued or without prior written approval of the Engineer is at the Contractor's risk, and the Department is not obligated for the cost of the materials or work to acquire the materials.

9. ASSIGNMENT OF CONTRACT

Do not assign, sell, transfer, or otherwise dispose of the Contract or any portion rights, title, or interest (including claims) without the approval of the Owner or designated representative. The Owner must deem any proposed assignment justified and legally acceptable before the assignment can take place.

10. EXCLUDED PARTIES

The Contractor certifies by signing the Contract that the Contractor will not enter into any subcontract with a subcontractor that is debarred or suspended by the Owner or by any state or federal agency.

Item 4L

Scope of Work



1. CONTRACT INTENT

The intent of the Contract is to describe the completed work to be performed. Furnish materials, supplies, tools, equipment, labor, and other incidentals necessary for the proper prosecution and completion of the work in accordance with Contract documents.

2. PRECONSTRUCTION CONFERENCE

Before starting work, schedule and attend a preconstruction conference with the Owner. Failure to schedule and attend a preconstruction conference is not grounds for delaying the beginning of working day charges. The preconstruction conference may be scheduled with the safety preconstruction meeting described in Section 7L.1.2., "Safety Preconstruction Meeting."

- 2.1. **Issue Resolution Process.** An issue is any aspect of the Contract where parties of the Contract do not agree. The individuals identified at the lowest level of the issue escalation ladder will initiate the issue resolution process by escalating any issue that remains unresolved within the time frame outlined in the issue escalation ladder.

Work with the Owner to resolve all issues during the course of the Contract. Refer to Article 4L.7., "Dispute or Claims Procedure," for all unresolved issues.

3. PARTNERING

The intent of this Article is to promote an environment of trust, mutual respect, integrity, and fair-dealing between the Owner and the Contractor.

Informal partnering does not make use of a facilitator, while formal partnering uses the services of a facilitator (internal or external).

- 3.1. **Procedures for Partnering Meetings and Format.** Informal partnering is required, unless formal partnering is mutually agreed to instead of the informal partnering.

- 3.2. **Facilitators.** The facilitator is to act as a neutral party seeking to initiate cooperative working relationships. This individual must have the technical knowledge and ability to lead and guide discussions. Choose either an internal or external facilitator. The facilitator must be acceptable to the Engineer.

- 3.2.1. **Internal Facilitators.** An Owner or Contractor internal (staff) facilitator may be selected as the facilitator at no additional cost to either party.

- 3.2.2. **External Facilitators.** A private firm or individual that is independent of the Contractor and the Owner may be selected as the facilitator. Submit the facilitator's name and estimated fees for approval before contracting with the facilitator.

3.3. **Meetings and Arrangements.** Coordinate with the Engineer for meeting dates and times, locations including third party facilities, and other needs and appurtenances, including, but not limited to, audio or visual equipment. Make all meeting arrangements for formal partnering. Use Owner facilities or facilities in the vicinity of the project if available. Submit the estimated meeting costs for approval before finalizing arrangements.

Coordinate facilitator discussions before the partnering meeting to allow the facilitator time to prepare an appropriate agenda. Prepare a list of attendees with job titles and include critical Contractor, subcontractor, and supplier staff in the list. Provide the facilitator the list of attendees and invite the attendees listed.

The Owner will invite and provide a list of attendees that includes, but is not limited to, Owner, TxDOT, other local governments, law enforcement, railroad, and utility representatives.

Participate in additional partnering meetings as mutually agreed.

3.4. **Payment.** Expenses for labor, Contractor equipment, or overhead will not be allowed. Markups as prescribed in Article 9L.7., "Payment for Extra Work and Force Account Method," will not be allowed.

Informal partnering will be conducted with each party responsible for their own costs.

For formal partnering using internal facilitators, the Contractor will be responsible for arrangements and for expenses incurred by its internal facilitator, including, but not limited to, meals, travel, and lodging. Owner facilitators, if available, may be used at no additional cost.

For formal partnering using external facilitators, submit an invoice to the Engineer for reimbursement. The Owner will reimburse the Contractor for half of the eligible expenses as approved. For external facilitators not approved by the Owner but used at the Contractor's option, the Contractor will be responsible for all costs of the external facilitator.

For meeting facilities and appurtenances, submit an invoice to the Engineer for reimbursement. The Owner will reimburse the Contractor for half of the eligible expenses as approved.

4. **CHANGES IN THE WORK**

The Engineer reserves the right to make changes in the work including addition, reduction, or elimination of quantities and alterations needed to complete the Contract. Perform the work as altered. These changes will not invalidate the Contract nor release the Surety. The Contractor is responsible for notifying the sureties of any changes to the Contract.

If the changes in quantities or the alterations do not significantly change the character of the work under the Contract, the altered work will be paid for at the Contract unit price. If the changes in quantities or the alterations significantly change the character of the work, the Contract will be amended by a change order. If no unit prices exist, this will be considered extra work and the Contract will be amended by a change order. Provide cost justification as requested, in an acceptable format. Payment will not be made for anticipated profits on work that is eliminated.

Agree on the scope of work and the basis of payment for the change order before beginning the work. If there is no agreement, the Engineer may order the work to proceed under Article 9L.7., "Payment for Extra Work and Force Account Method," or by making an interim adjustment to the Contract. In the case of an adjustment, the Engineer will consider modifying the compensation after the work is performed.

A significant change in the character of the work occurs when:
the character of the work for any item as altered differs materially in kind or nature from that in the
Contract or

a major item of work varies by more or less than 25% from the original Contract quantity.

When the quantity of work to be done under any major item of the Contract is more than 125% of the original quantity stated in the Contract, then either party to the Contract may request an adjustment to the unit price on the portion of the work that is above 125%.

When the quantity of work to be done under any major item of the Contract is less than 75% of the original quantity stated in the Contract, then either party to the Contract may request an adjustment to the unit price. When mutually agreed, the unit price may be adjusted by multiplying the Contract unit price by the factor in Table 1. If an adjusted unit price cannot be agreed upon, the Owner may determine the unit price by multiplying the Contract unit price by the factor in Table 1.

Table 1
Quantity-Based Price Adjustment Factors

% of Original Quantity	Factor
≥ 50 and < 75	1.05
≥ 25 and < 50	1.15
< 25	1.25

If the changes require additional working days to complete the Contract, Contract working days will be adjusted in accordance with Item 8L, "Prosecution and Progress."

5. DIFFERING SITE CONDITIONS

During the progress of the work, differing subsurface or latent physical conditions may be encountered at the site. The 2 types of differing site conditions are defined as:

those that differ materially from those indicated in the Contract and
unknown physical conditions of an unusual nature differing materially from those ordinarily encountered
and generally recognized as inherent in the work provided for in the Contract.

Notify the Engineer in writing when differing site conditions are encountered. The Engineer will notify the Contractor when the Owner discovers differing site conditions. Unless directed otherwise, do not work on the affected items and leave the site undisturbed. The Engineer will investigate the conditions and determine whether differing site conditions exist. If the differing site conditions cause an increase or decrease in the cost or number of working days specified for the performance of the Contract, the Engineer will make adjustments, excluding the loss of anticipated profits, in accordance with the Contract. Additional compensation will be made only if the required written notice has been provided.

6. REQUESTS FOR ADDITIONAL COMPENSATION

Notify the Engineer in writing of any intent to request additional compensation once there is knowledge of the basis for the request. An assessment of damages is not required to be part of this notice but is desirable. The intent of the written notice requirement is to provide the Owner an opportunity to evaluate the request and to keep an accurate account of the actual costs that may arise. Minimize impacts and costs.

If written notice is not given, the Contractor waives the right to additional compensation unless the circumstances could have reasonably prevented the Contractor from knowing the cost impact before performing the work. Notice of the request and the documentation of the costs will not be construed as proof or substantiation of the validity of the request. Submit the request in enough detail to enable the

Owner to determine the basis for entitlement, adjustment in the number of working days specified in the Contract, and compensation.

The Owner will not consider fees and interest on requests for additional compensation. Fees include, but are not limited to: preparation, attorney, printing, shipping, and various other fees.

Damages occur when impacts that are the responsibility of the Owner result in additional costs to the Contractor that could not have been reasonably anticipated at the time of letting. Costs of performing additional work are not considered damages. For Contractor damages, the intent is to reimburse the Contractor for actual expenses arising out of a compensable impact. No profit or markups, other than labor burden, will be allowed. For damages, labor burden will be reimbursed at 35% unless the Contractor can justify higher actual cost. Justification for a higher percentage must be in accordance with the methodology provided by the Owner, submitted separately for project overhead labor and direct labor, and determined and submitted by a Certified Public Accountant (CPA). Submit CPA-prepared labor burden rates directly to the Owner.

If the Contractor requests compensation for delay damages and the delay is determined to be compensable, then standby equipment costs and project overhead compensation will be based on the duration of the compensable delay and will be limited as follows:

- 6.1. **Standby Equipment Costs.** Payment will be made in accordance with Section 9L.7.1.4.3., "Standby Equipment Costs."
- 6.2. **Project Overhead.** Project overhead is defined as the administrative and supervisory expenses incurred at the work locations. When delay to project completion occurs, reimbursement for project overhead for the Contractor will be made using the following options:
reimbursed at 6% (computed as daily cost by dividing 6% of the original Contract amount by the number of original Contract work days), or
actual documented costs for the impacted period.

Project overhead for delays impacting subcontractors will be determined from actual documented costs submitted by the Contractor.

Time extensions and suspensions alone will not be justification for reimbursement for project overhead.
- 6.3. **Home Office Overhead.** The Owner will not compensate the Contractor for home office overhead.

7. DISPUTE OR CLAIMS PROCEDURE

The dispute resolution policy promotes a cooperative attitude between the Engineer and Contractor. Emphasis is placed on resolving issues while they are still current, at the project office, and in an informal manner. Open sharing of information is encouraged by all parties involved so the information provided completely and accurately reflects the issues and facts. If information is not shared, decisions may be limited to relying on the documentation that is available for review.

The Owners's goal is to have a dispute settled by the Engineer before elevating it as a claim.

If a dispute cannot be resolved, initiate the Contract claim procedure by filing a Contract claim after the completion of the Contract or when required for orderly performance of the Contract. Submit the claim to the Owner in accordance with state law.

For a claim resulting from enforcement of a warranty period, file the claim no later than one year after expiration of the warranty period. For all other claims, file the claim no later than the date the Owner issues notice to the Contractor that they are in default, the date the Owner terminates the Contract, or one year after the date of final acceptance of the Contract. It is the Contractor's responsibility to submit requests in a timely manner.

Item 5L

Control of the Work



1. AUTHORITY OF ENGINEER

The Engineer has the authority to observe, test, inspect, approve, and accept the work on behalf of the Owner. The Engineer decides all questions about the quality and acceptability of materials, work performed, work progress, Contract interpretations, and acceptable Contract fulfillment. The Engineer has the authority to enforce and make effective these decisions.

The Engineer acts as a referee in all questions arising under the terms of the Contract. The Engineer's decisions will be final and binding.

The Engineer may pursue actions against the Contractor, including but not limited to the withholding of payments and suspending the work, for noncompliance of the Contract.

The Engineer may suspend the work without suspending working day charges for noncompliance of the Contract.

2. PLANS AND WORKING DRAWINGS

When required, provide working drawings to supplement the plans with all necessary details not included on the Contract plans. Prepare and furnish working drawings in a timely manner and obtain approval, if required, before the beginning of the associated work. For all working drawing submittal requirements, the Engineer may allow electronic and other alternative submission procedures. Have a licensed professional engineer sign, seal, and date the working drawings as indicated in Table 1.

Prepare working drawings using United States standard measures in the English language. The routing of submittals for review and approval will be established at the preconstruction conference. The Contractor is responsible for the accuracy, coordination, and conformity of the various components and details of the working drawings. Owner approval of the Contractor's working drawings will not relieve the Contractor of any responsibility under the Contract. The work performed under this article will not be measured or paid for directly but will be subsidiary to pertinent items.

**Table 1
Signature and Approval Requirements for Working Drawings**

Working Drawings For		Requires Licensed Professional Engineer's Signature, Seal, and Date	Requires Owner Approval
1. Alternate or optional designs submitted by Contractor		Yes	Yes
2. Supplementary shop and fabrication drawings for structural items		No unless required on the plans	See applicable item
3. Contractor-proposed temporary facilities that affect the public safety, not included on the plans		Yes	Yes
4. Form and falsework details	Bridges, retaining walls, and other major structures	Yes unless otherwise shown on the plans	No ¹
	Minor structures	No unless otherwise shown on the plans	No
5. Erection drawings		Yes	No ^{1,2}
6. Contractor-proposed major modifications to traffic control plan		Yes	Yes

1. The Engineer may require that the Contractor have a licensed professional engineer certify that the temporary works are constructed according to the sealed drawings.
2. Approval is required for items spanning over live traffic or where safety of the traveling public is affected, in the opinion of the Engineer.

Submit shop drawings electronically for the fabrication of structural items.

3. CONFORMITY WITH PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

Furnish materials and perform work in reasonably close conformity with the lines, grades, cross-sections, dimensions, details, gradations, physical and chemical characteristics of materials, and other requirements shown in the Contract (including additional plans for non-site-specific work). Reasonably close conformity limits will be as defined in the respective items of the Contract or, if not defined, as determined by the Engineer. Obtain approval before deviating from the plans and approved working drawings. Do not perform work beyond the lines and grades shown on the plans or any extra work without the Engineer's approval. Work performed beyond the lines and grades shown on the plans or any extra work performed without approval is considered unauthorized and excluded from pay consideration. The Owner will not pay for material rejected due to improper fabrication, excess quantity, or any other reasons within the Contractor's control.

- 3.1. **Acceptance of Defective or Unauthorized Work.** When work fails to meet Contract requirements, but is adequate to serve the design purpose, the Engineer will decide the extent to which the work will be accepted and remain in place. The Engineer will document the basis of acceptance by a letter and may adjust the Contract price.
- 3.2. **Correction of Defective or Unauthorized Work.** When work fails to meet Contract requirements and is inadequate to serve the design purpose it will be considered defective. Correct, or remove and replace, the work at the Contractor's expense, as directed.

The Engineer has the authority to correct or to remove and replace defective or unauthorized work. The cost may be deducted from any money due or to become due to the Contractor.

4. COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

The specifications, accompanying plans (including additional plans for non-site-specific work), special provisions, change orders, and supplemental agreements are intended to work together and be interpreted as a whole.

Numerical dimensions govern over scaled dimensions. Special provisions govern over plans (including general notes), which govern over standard specifications and special specifications. Job-specific plan sheets govern over standard plan sheets.

However, in the case of conflict between plans (including general notes) and specifications regarding responsibilities for hazardous materials and traffic control in Items 1L through 9L and Item 502, "Barricades, Signs, and Traffic Handling," special provisions govern over standard specifications and special specifications, which govern over the plans.

Notify the Engineer promptly of any omissions, errors, or discrepancies discovered so that necessary corrections and interpretations can be made. Failure to promptly notify the Engineer will constitute a waiver of all claims for misunderstandings or ambiguities that result from the errors, omissions, or discrepancies discovered.

5. COOPERATION OF CONTRACTOR

Cooperate with the Engineer. Respond promptly to instructions from the Engineer. Provide all information necessary to administer the Contract.

Designate in writing a competent, English-speaking Superintendent employed by the Contractor. The Superintendent must be experienced with the work being performed and capable of reading and understanding the Contract. Ensure the Superintendent is available at all times and able to receive instructions from the Engineer or authorized Owner representatives and to act for the Contractor. The Engineer may suspend work without suspending working day charges if a Superintendent is not available or does not meet the above criteria.

At the written request of the Engineer, immediately remove from the project any employee or representative of the Contractor or a subcontractor who, in the opinion of the Engineer, does not perform work in a proper and skillful manner or who is disrespectful, intemperate, disorderly, uncooperative, or otherwise objectionable. Do not reinstate these individuals without the written consent of the Engineer.

Furnish suitable machinery, equipment, and construction forces for the proper prosecution of the work. Provide adequate lighting to address quality requirements and inspection of nighttime work.

The Engineer may suspend the work without suspending working day charges until the Contractor complies with this requirement. All work associated with fulfilling this requirement is subsidiary to the various items of the Contract and no direct compensation will be made.

6. COOPERATING WITH UTILITIES

Use established safety practices when working near utilities. Consult with the appropriate utilities before beginning work. Notify the Engineer immediately of utility conflicts. The Engineer will decide whether to adjust utilities or adjust the work to eliminate or lessen the conflict. Unless otherwise shown on the plans, the Engineer will make necessary arrangements with the utility owner when utility adjustments are required.

Use work procedures that protect utilities or appurtenances that remain in place during construction. Cooperate with utilities to remove and rearrange utilities to avoid service interruption or duplicate work by the utilities. Allow utilities access to the right of way.

Immediately notify the appropriate utility of service interruptions resulting from damage due to construction activities. Cooperate with utilities until service is restored. Maintain access to active fire hydrants at all times unless approved by the Engineer.

7. COOPERATION BETWEEN CONTRACTORS

Cooperate and coordinate with other Contractors working within the limits or adjacent to the limits.

8. COOPERATION WITH RAILROADS

Plan and prosecute portions of the work involving a railway to avoid interference with or hindrance to the railroad company.

If the work is on railroad right of way, do not interfere with the operation of the railroad company's trains or other property.

8.1. **Project-Specific Information.** Refer to project-specific plan sheets in the Contract for specific information concerning the work to be completed by both the Contractor and the railroad within railroad right of way; railroad right of way locations impacted by construction; percentage of Contract work at each location; train movements at each location; and requirements for railroad insurance, flagging, and Right of Entry (ROE) Agreements.

8.2. **Right of Entry Agreement (if required).** The process for obtaining a fully executed ROE Agreement will be as follows:

The Owner will send the unexecuted ROE Agreement to the Contractor with the unexecuted construction Contract.

Partially execute the ROE Agreement and return it to the Department with the required insurance attached.

The Owner will coordinate with the railroad company regarding the further execution of the ROE Agreement and associated fees. The Owner will pay any ROE Agreement fees directly to the railroad company.

Once the Owner has received the fully-executed ROE Agreement from the railroad company, the Owner will forward the fully-executed ROE Agreement to the Contractor.

9. CONSTRUCTION SURVEYING

Use Method C unless otherwise specified in the Contract. Upon request, the Engineer will allow the Contractor to copy available earthwork cross-sections, computer printouts or data files, and other information necessary to establish and control work. Maintain the integrity of control points. Preserve all control points, stakes, marks, and right of way markers. Assume cost and responsibility of replacing disturbed control points, stakes, marks, and right of way markers damaged by the Contractor's or its subcontractor operations. If the Owner repairs disturbed control points, stakes, marks, or right of way markers, the cost of repair may be deducted from money due or to become due to the Contractor. Replace right of way markers under the direction of a RPLS. This work will be subsidiary to pertinent items.

The Engineer reserves the right to make measurements and surveys to determine the accuracy of the work and determine pay quantities. The Engineer's measurements and surveys do not relieve the Contractor's responsibility for accuracy of work. Allow the Engineer adequate time to verify the surveying.

- 9.1. **Method A.** The Engineer will set control points for establishing lines, slopes, grades, and centerlines and for providing both vertical and horizontal control. At a minimum, provide a controlling pair of monument points at both the beginning and end of construction project for projects less than 2 miles in length. For projects greater than 2 miles in length, monuments will be set in pairs of 2 at a minimum of 2 miles based on the overall length of the project. Use these control points as reference to perform the work.

Furnish materials, equipment, and qualified workforce necessary for the construction survey work. Place construction points, stakes, and marks at intervals sufficient to control work to established tolerances. Place construction stakes at intervals of no more than 100 ft., or as directed. Place stakes and marks so as not to interfere with normal maintenance operations.

- 9.2. **Method B.** The Engineer will set adequate control points, stakes, and marks to establish lines, slopes, grades, and centerlines. Furnish additional work, stakes, materials, and templates necessary for marking and maintaining points and lines.

- 9.3. **Method C.** Set adequate control points, stakes, and marks to establish lines, slopes, grades, and centerlines.

10. INSPECTION

Inspectors are authorized representatives of the Engineer. Inspectors are authorized to examine all work performed and materials furnished, including preparation, fabrication, and material manufacture. Inspectors inform the Contractor of failures to meet Contract requirements. Inspectors may reject work or materials and may suspend work until any issues can be referred to and decided by the Engineer. Inspectors cannot alter, add, or waive Contract provisions, issue instructions contrary to the Contract, act as foremen for the Contractor, or interfere with the management of the work. Inspection, or lack of inspection, will not relieve the Contractor from obligation to provide materials or perform the work in accordance with the Contract.

Provide safe access to all parts of the work and provide information and assistance to the Engineer to allow a complete and detailed inspection. Give the Engineer sufficient notice to inspect the work. Work performed without suitable inspection, as determined by the Engineer, may be ordered removed and replaced at Contractor's expense. Remove or uncover portions of finished work as directed. Once inspected, restore work to Contract requirements. If the uncovered work is acceptable, the costs to uncover, remove, and replace or make good the parts removed will be paid for in accordance with Article 4L.4., "Changes in the Work." If the work is unacceptable, assume all costs associated with repair or replacement, including the costs to uncover, remove, and replace or make good the parts removed.

When a government entity, utility, railroad company, or other entity accepts or pays a portion of the Contract, that organization's representatives may inspect the work but cannot direct the Contractor. The right of inspection does not make that entity a party to the Contract and does not interfere with the rights of the parties to the Contract.

11. FINAL CLEANUP

Upon completion of the work, remove litter, debris, objectionable material, temporary structures, excess materials, and equipment from the work locations. Clean and restore property damaged by the

Contractor's operations during the prosecution of the work. Leave the work locations in a neat and presentable condition.

Remove from the right of way cofferdams, construction buildings, material and fabrication plants, temporary structures, excess materials, and debris resulting from construction. Where work is in a stream, remove debris to the ground line of the bed of the stream. Leave stream channels and rights of way in a neat and presentable condition. Clean structures to the flow line or the elevation of the outfall channel, whichever is higher. Dispose of all excess material in accordance with federal, state, and local regulations.

The work performed under this Article will not be paid for directly but will be considered subsidiary to Items of the Contract.

12. FINAL ACCEPTANCE

12.1. Final acceptance is made when all work is complete and the Engineer, in writing, accepts all work for the work locations in the Contract. Final acceptance relieves the Contractor from further Contract responsibilities.

12.1.1. **Work Completed.** Work completed must include work for vegetative establishment and maintenance, test, and performance periods and work to meet the requirements of Article 5L.11., "Final Cleanup."

12.1.2. **Final Inspection.** After all work is complete, the Contractor will request a final inspection by the Engineer authorized to accept the work.

The final inspection will be made as soon as possible, and not later than 10 calendar days after the request. No working day charges will be made between the date of request and final inspection.

After the final inspection, if the work is satisfactory, the Engineer will notify the Contractor in writing of the final acceptance of the work. If the final inspection finds any work to be unsatisfactory, the Engineer will identify in writing all deficiencies in the work requiring correction. Correct the deficiencies identified. Working day charges will resume if these deficiencies are not corrected within 7 calendar days, unless otherwise authorized by the Engineer. Upon correction, the Engineer will make an inspection to verify that all deficiencies were corrected satisfactorily. The Engineer will provide written notice of the final acceptance.

12.1.3. **Final Measurement.** Final measurements and pay quantity adjustments may be made after final acceptance.

12.1.4. **Removal of Traffic Control Devices.** Remove construction traffic control devices and advance warning signs upon final acceptance or as directed.

Item 6L

Control of Materials



1. SOURCE CONTROL

Use only materials that meet Contract requirements. Unless otherwise specified or approved, use new materials for the work. Secure the Engineer's approval of the proposed source of materials to be used before their delivery. Materials can be approved at a supply source or staging area but may be reinspected in accordance with Article 6L.4., "Sampling, Testing, and Inspection."

- 12.2. **Buy America.** Comply with the latest provisions of Buy America as listed at 23 CFR 635.410. Use steel or iron materials manufactured in the United States except when:
- the cost of materials, including delivery, does not exceed 0.1% of the total Contract cost or \$2,500, whichever is greater;
 - the Contract contains a replacement alternate item for a foreign source steel or iron product and the Contract is awarded based on the replacement alternate item; or
 - the materials are temporarily installed.

Provide a notarized original of the TxDOT FORM D-9-USA-1 (Department Form 1818 or equivalent) with the proper attachments for verification of compliance.

Manufacturing is any process that modifies the chemical content, physical shape or size, or final finish of a product. Manufacturing begins with initial melting and mixing and continues through fabrication (cutting, drilling, welding, bending, etc.) and coating (paint, galvanizing, epoxy, etc.).

- 1.2. **Convict Produced Materials.** Materials produced by convict labor may only be incorporated in the work if such materials have been:
- produced by convicts who are on parole, supervised release, or probation from prison; or
 - produced in a qualified prison facility.

A "qualified prison facility" means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in federal-aid highway construction projects.

2. MATERIAL QUALITY

Correct or remove materials that fail to meet Contract requirements or that do not produce satisfactory results. Reimburse the Owner for cost incurred if additional sampling and testing is required by a change of source.

Materials not meeting Contract requirements will be rejected, unless the Engineer approves corrective actions. Upon rejection, immediately remove and replace rejected materials.

If the Contractor does not comply with this article, the Owner may have defective material removed and replaced. The cost of testing, removal, and replacement will be deducted from the payments due to the Contractor.

3. MANUFACTURER WARRANTIES

Transfer to the Owner warranties and guarantees required by the Contract or received as part of normal trade practice.

4. SAMPLING, TESTING, AND INSPECTION

Unless specified otherwise, testing and laboratory services will be performed by independent testing agencies selected and paid by the Owner. All initial material testing shall be performed at the direction and expense of the Owner. In the event certain materials of construction do not measure up to the required standards and certain performance obligations are not met, the defective material and/or work shall be removed and replaced and the Contractor shall pay all subsequent testing and related work necessitated by the replacement.

The failure of the Owner to make any tests of materials shall in no way relieve the Contractor of his responsibility of furnishing materials conforming to the contract documents.

Tests, unless otherwise specified, shall be made in accordance with the latest methods of the American Society for Testing and Materials. The Contractor shall provide such facilities as the Owner may require for collecting and forwarding samples and shall not use the materials represented by the samples until tests have been made. The Contractor shall furnish adequate samples without charge.

The inspections and tests made by the Owner, its inspectors or agents shall ordinarily be made without cost to the Contractor unless otherwise expressly specified in the Contract Documents. The Contractor shall furnish without additional cost to the Owner such materials for testing as may be reasonably necessary. Retesting after failure to pass tests shall be at the expense of the Contractor. Should the percentage of rejected material or equipment be unreasonably large, the additional cost of such inspection and tests resulting therefrom shall be borne by the Contractor. The Owner shall judge what warrants extra inspection and shall determine the additional cost incurred thereby and payable by the Contractor.

5. PLANT INSPECTION AND TESTING

The Engineer may, but is not obligated to, inspect materials at the acquisition or manufacturing source. Material samples will be obtained and tested for compliance with quality requirements.

If inspection is at the plant, meet the following conditions unless otherwise specified:

Cooperate fully and assist the Engineer during the inspection.

Ensure the Engineer has full access to all parts of the plant used to manufacture or produce materials.

In accordance with pertinent items and the Contract, provide a facility at the plant for use by the Engineer as an office or laboratory.

Provide and maintain adequate safety measures and restroom facilities.

Furnish and calibrate scales, measuring devices, and other necessary equipment.

The Engineer may provide inspection for periods other than daylight hours if:

continuous production of materials for Owner use is necessary due to the production volume being handled at the plant, and

the lighting is adequate to allow satisfactory inspection.

6. STORAGE OF MATERIALS

Store and handle materials to preserve their quality and fitness for the work. Store materials so that they can be easily inspected and retested. Place materials under cover, on wooden platforms, or on other hard, clean surfaces as necessary or when directed.

Obtain approval to store materials on the right of way. Storage space off the right of way is at the Contractor's expense.

7. OWNER-FURNISHED MATERIAL

The Owner will supply materials as shown in the Contract documents. The cost of handling and placing materials supplied by the Owner will not be paid for directly but is subsidiary to the item in which they are used. Assume responsibility for materials upon receipt.

8. USE OF MATERIALS FOUND ON THE RIGHT OF WAY

Material found in the excavation areas and meeting the Owner's specifications may be used in the work. This material will be paid for at the Contract bid price for excavation and under the item for which the material is used.

Do not excavate or remove any material from within the right of way that is not within the limits of the excavation without written permission. If excavation is allowed within a right of way project-specific location (PSL), replace the removed material with suitable material at no cost to the Owner as directed.

9. RECYCLED MATERIALS

The Owner will not allow hazardous wastes, as defined in 30 TAC 335, proposed for recycling to be used on the project. Use nonhazardous recyclable materials (NRMs) only if the specification for the item does not disallow or restrict use. Determine if NRMs are regulated under 30 TAC 312, 330, 332, 334, or 335, and comply with all general prohibitions and requirements. Use NRMs in accordance with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines," and furnish all documentation required by that specification.

10. HAZARDOUS MATERIALS

Comply with the requirements of Article 7L.11., "Responsibility for Hazardous Materials."

Use materials that are free of hazardous materials as defined in Item 1L, "Abbreviations and Definitions."

Notify the Engineer immediately when a visual observation or odor indicates that materials in required material sources or on sites owned or controlled by the owner may contain hazardous materials. Except when the contract includes bid items for the contractor to remove hazardous materials, the Engineer is responsible for testing and removing or disposing of hazardous materials not introduced by the Contractor on sites owned or controlled by the Owner as indicated below.

The plans will indicate locations where paint on steel is suspected to contain hazardous materials and where regulated asbestos containing materials have been found. The Engineer may suspend work wholly or in part during the testing, removal, or disposition of hazardous materials on sites owned or controlled by the Owner, except in the case of when the contract includes removing and disposing of hazardous materials.

When a visual observation or odor indicates that materials delivered to the work locations by the Contractor may contain hazardous materials, have an approved commercial laboratory test the materials for contamination. Remove, remediate, and dispose of any of these materials found to be contaminated. Testing, removal, and disposition of hazardous materials introduced onto the work locations by the Contractor will be at the Contractor's expense. Working day charges will not be suspended and extensions of working days will not be granted for activities related to handling hazardous material delivered by the Contractor.

10.1. **Painted Steel Requirements.** Paint containing hazardous materials will be removed as shown on the plans.

10.1.1. **Paint Removed by Third Party.** The Owner may provide a third party to remove paint containing hazardous materials where paint must be removed to perform work or to allow dismantling of the steel.

10.1.2. **Paint Removed by the Contractor.** This work may only be performed by a firm or company with one of the following certifications:

- SSPC-QP2 certification for lead painting operations, or
- Certified Lead Firm by the Texas Department of State Health Services.

Maintain certification for the duration of the work. Provide copies of audits or certification if requested.

Comply with worker and public safety regulations, including, but not limited to, OSHA 29 CFR Parts 1910.1025, 1926.62, and 1926.63. Monitor permissible exposure limits in accordance with OSHA requirements.

Remove paint containing hazardous materials from designated areas shown on the plans or as directed. Comply with access limitations shown on the plans.

Provide power hand tools, equipped with high-efficiency particulate air filter vacuums to mechanically remove paint.

Contain, collect, store, transport, and dispose of all waste generated by cleaning operation in accordance with local, state, and federal requirements including 40 CFR 302. Properly characterize and dispose of all wastes. Manage any hazardous wastes in accordance with regulatory requirements and dispose in a facility authorized to accept such wastes. Provide copies of disposal manifests.

The work performed, materials furnished, equipment, labor, tools, and incidentals will be paid for in accordance with Item 446, "Field Cleaning and Painting Steel."

10.2. **Removal and Disposal of Painted Steel.** Painted steel will be disposed of at a steel recycling or smelting facility unless otherwise shown on the plans. If the paint contains hazardous materials, maintain and make available to the Engineer invoices and other records obtained from the facility showing the received weight of the steel and the facility name.

For steel that is dismantled by unbolting, no paint stripping will be required. Use care to not damage existing paint. When dismantling is performed using flame or saw-cutting methods to remove steel elements coated with paint containing hazardous materials, the plans will show stripping locations.

The work provided, materials furnished, equipment, labor, tools, and incidentals will be paid for in accordance with Item 496, "Removing Structures," and Item 497, "Sale of Salvagable Material."

10.3. **Asbestos Requirements.** The plans will indicate locations or elements where asbestos containing materials (ACM) have been found. For work at these locations, notify the Engineer of proposed dates of demolition or removal of structural elements with ACM at least 60 days before work is to begin to allow the Owner enough time to abate the asbestos.

The Department of State Health Services (DSHS), Asbestos Programs Branch, is responsible for administering the requirements of the National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61, Subpart M (NESHAP) and the Texas Asbestos Health Protection Rules (TAHPR). Based on EPA guidance and regulatory background information, bridges are considered to be a regulated "facility" under NESHAP. Therefore, federal standards for demolition and renovation apply.

DSHS requires that notifications be postmarked at least 10 working days before initiating demolition or renovation of each structure or load bearing member shown on the plans. If the actual demolition, renovation, or removal date is changed or delayed, notify the Engineer in writing of these revised dates in sufficient time to allow for the Owner's notification to DSHS to be postmarked at least 10 days in advance of the work.

Failure to provide the above information may require the temporary suspension of work under Article 8L.4., "Temporary Suspension of Work or Working Day Charges," due to reasons under the control of the Contractor. The Owner retains the right to determine the actual advance notice needed for the change in date to address post office business days and staff availability.

10.3.1. **Asbestos Removed by Third Party.** At locations where unknown ACM is discovered, the Owner will arrange for abatement by a third party.

10.3.2. **Asbestos Removed by the Contractor.** Maintain certification as Asbestos Abatement Contractor by the Texas Department of State Health Services for the duration of the Contract. Provide copies of audits and certification to the Engineer.

10.4. **Work Performed by a Third Party.** When the work for removal of paint or asbestos abatement is to be provided by a third party, coordinate and cooperate with the third party and the Owner. Continue other work detailed on the plans not directly involved in the paint removal or asbestos abatement work. Provide notice to the Owner regarding the progress of the work to allow the Owner enough time to schedule the third party work.

11. **SURPLUS MATERIALS**

Take ownership of surplus materials unless otherwise shown on the plans or as directed by the Engineer. Remove and dispose of materials in accordance with federal, state, and local regulations. If requested, provide an appropriate level of documentation to verify proper disposal. When materials are disposed of on private property, provide written authorization from the property owner for the use of the property for this purpose upon request.

Item 7L

Legal Relations and Responsibilities



1. SAFETY

- 1.1. **Point of Contact.** Designate a Contractor Safety Point of Contact (CSPOC). The Owner will assign an Owner employee for their point of contact designated as Owner's Safety Point of Contact OSPOC. The CSPOC will ensure that the Contractor's and Subcontractor's employees' use the appropriate personal protection equipment (hard hats, safety vests, protective toe footwear, etc.).

The CSPOC will ensure that crew leaders and foremen (including subcontractors) have attended the required training.

- 1.2. **Safety Preconstruction Meeting.** In cooperation with the Engineer, schedule and attend a safety preconstruction meeting (may be a part of the preconstruction conference in Article 4L.2., "Preconstruction Conference." Attendees for this safety preconstruction meeting will be:

- the Contractor,
- subcontractors,
- Owner,
- local law enforcement, and
- other personnel that play an active role on the project.

- 1.3. **Public Safety and Convenience.** Ensure the safety and convenience of the public and property as provided in the Contract and as directed by the Engineer. Keep existing roadways open to traffic or construct and maintain detours and temporary structures for safe public travel. Manage construction to minimize disruption to traffic. Maintain the roadway in a good and passable condition, including proper drainage and provide for ingress and egress to adjacent property.

Store all equipment not in use in a manner and at locations that will not interfere with the safe passage of traffic.

Provide qualified flaggers in accordance with Item 502.2.2., "Flaggers," for the safety and convenience of the traveling public and workers, as directed.

If the Engineer determines that any of the requirements of this article have not been met, the Engineer may take any necessary corrective action. This will not change the legal responsibilities set forth in the Contract. The cost to the Owner for this work will be deducted from any money due or to become due to the Contractor.

- 1.4. **Use of Blue Warning Lights.** Texas Transportation Code 547.105 authorizes the use of warning lights to promote safety and provides an effective means of gaining the travelling public's attention as they drive in areas where construction crews are present. In order to influence the public to move over when high risk construction activities are taking place, minimize the utilization of blue warning lights. These lights must be used only while performing work on or near the travel lanes or shoulder where the travelling public encounters construction crews that are not protected by a standard work zone set up such as a lane closure, shoulder closure, or one-way traffic control. Refrain from leaving the warning

lights engaged while travelling from one work location to another or while parked on the right of way away from the pavement or a work zone.

- 1.5. **Barricades, Warning and Detour Signs, and Traffic Handling.** Provide, install, move, replace, maintain, clean, and remove all traffic control devices in accordance with the traffic control devices specifications and as shown on the plans and as directed. If details are not shown on the plans, provide devices and work in accordance with the TMUTCD and as directed by the Engineer. When authorized or directed by the Engineer, provide additional signs or traffic control devices not required by the plans.

If an unexpected situation arises that causes the Contractor to believe that the traffic control should be changed, make all reasonable efforts to promptly contact the Engineer. Take prudent actions until the Engineer can be contacted.

The Engineer will make an inspection of the traffic control devices. Comply with the results of the inspection in the prescribed time frame.

- 1.5.1. **Contractor Responsible Person and Alternate.** Designate in writing, a Contractor's Responsible Person (CRP) and an alternate to be the representative of the Contractor who is responsible for taking or directing corrective measures regarding the traffic control. The CRP or alternate must be accessible by phone 24 hr. per day and able to respond when notified. The CRP and alternate must comply with the requirements of Section 7L.1.5.5., "Training."

- 1.5.2. **Flaggers.** Designate in writing, a flagger instructor who will serve as a flagging supervisor and is responsible for training and assuring that all flaggers are qualified to perform flagging duties. Before beginning work, provide a list of flaggers certified to perform flagging duties.

Provide flaggers as directed. Flaggers must be courteous and able to effectively communicate with the public. When directing traffic, flaggers must dress appropriately, wear high-visibility safety apparel, use flags, signs, stop-slow paddles, and other hand-signaling devices, and follow the flagging procedures in the TMUTCD. Comply with the requirements of Section 7L.1.5.5., "Training."

- 1.5.3. **Law Enforcement Personnel.** Provide uniformed law enforcement personnel with patrol vehicles as directed. Document the work zone traffic services provided in the manner prescribed by the Department. Law enforcement personnel providing work zone traffic services must be trained for the service they perform. Comply with Section 7L.1.5.5., "Training."

- 1.5.4. **Other Work Zone Personnel.** Workers involved with traffic control, including the maintenance of the traffic control, must comply with the requirements of Section 7L.1.5.5., "Training."

- 1.5.5. **Training.** Workers involved with the traffic control must be trained using Department-approved training, except in the case of Section 7L.1.5.4, "Other Work Zone Personnel" who may be trained using Contractor-developed Training in lieu of Department-approved Training.

Provide a copy of the certification of completion to the Engineer, except in the case of Contractor-developed Training. Ensure the certification of completion includes the following:

name of provider and course title,
name of participant,
date of completion, and
date of expiration.

For Contractor developed-Training, maintain a log of attendees. Make the log available upon request. Ensure the log is legible and includes the following:
print name and signature of participant,
name and title of trainer, and
date of training.

2. LAWS TO BE OBSERVED

Comply with all federal, state, and local laws, ordinances, and regulations that affect the performance of the work. Indemnify and save harmless the Owner and its representatives against any claim arising from violation by the Contractor of any law, ordinance, or regulation.

This Contract is between the Owner and the Contractor only. No person or entity may claim third-party beneficiary status under this Contract or any of its provisions, nor may any non-party sue for personal injuries or property damage under this Contract.

3. PERMITS, LICENSES, AND TAXES

Procure all permits and licenses; pay all charges, fees, and taxes; and give all notices necessary and incidental to the due and lawful prosecution of work, except for permits provided by the Owner and as specified in Article 7L.6., "Preservation of Cultural and Natural Resources and the Environment."

4. PATENTED DEVICES, MATERIAL, AND PROCESSES

Indemnify and save harmless the Owner from any claims for infringement from the Contractor's use of any patented design, device, material, process, trademark, or copyright selected by the Contractor and used in connection with the work. Indemnify and save harmless the Owner against any costs, expenses, or damages that it may be obliged to pay, by reason of this infringement, at any time during the prosecution or after the completion of the work.

5. PERSONAL LIABILITY OF PUBLIC OFFICIALS

Owner employees are agents and representatives of the Owner and will incur no liability, personal or otherwise, in carrying out the provisions of the Contract or in exercising any power or authority granted under the Contract.

6. PRESERVATION OF CULTURAL AND NATURAL RESOURCES AND THE ENVIRONMENT

If the Contractor initiates changes to the Contract and the Owner approves the changes, the Contractor is responsible for obtaining clearances and coordinating with the appropriate regulatory agencies.

6.1. **Cultural Resources.** Cease all work immediately if a site, building, or location of historical, archeological, educational, or scientific interest is discovered within the right of way. The site, building, or location will be investigated and evaluated by the Owner.

6.2. **Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3).** The Contractor will file the Notice of Intent (NOI) and the Notice of Termination (NOT) for work shown on the plans in the right of way. Adhere to all requirements of the SWP3.

- 6.3. **Work in Waters of the United States.** For work in the right of way, the Owner will obtain any required Section 404 permits from the U.S. Army Corps of Engineers before work begins. Adhere to all agreements, mitigation plans, and standard best management practices required by the permit. When Contractor-initiated changes in the construction method changes the impacts to waters of the U.S., obtain new or revised Section 404 permits.
- 6.4. **Work in Navigable Waters of the United States.** For work in the right of way, the Owner will obtain any required Section 9 permits from the U.S. Coast Guard before work begins. Adhere to the stipulations of the permits and associated best management practices. When Contractor-initiated changes in the construction method changes the impacts to navigable waters of the U.S., obtain new or revised Section 9 permits.
- 6.5. **Work Over the Recharge or Contributing Zone of Protected Aquifers.** Make every reasonable effort to minimize the degradation of water quality resulting from impacts relating to work over the recharge or contributing zones of protected aquifers, as defined and delineated by the TCEQ. Use best management practices and perform work in accordance with Contract requirements.
- 6.6. **Project-Specific Locations.** For all project-specific locations (PSLs) on or off the right of way (material sources, waste sites, parking areas, storage areas, field offices, staging areas, haul roads, etc.), signing the Contract certifies compliance with all applicable laws, rules, and regulations pertaining to the preservation of cultural resources, natural resources, and the environment as issued by the following or other agencies:
- Occupational Safety and Health Administration,
 - Texas Commission on Environmental Quality,
 - Texas Department of Transportation,
 - Texas Historical Commission,
 - Texas Parks and Wildlife Department,
 - Texas Railroad Commission,
 - U.S. Army Corps of Engineers,
 - U.S. Department of Energy,
 - U.S. Department of Transportation,
 - U.S. Environmental Protection Agency,
 - U.S. Federal Emergency Management Agency, and
 - U.S. Fish and Wildlife Service.
- All subcontractors must also comply with applicable environmental laws, rules, regulations, and requirements in the Contract. Maintain documentation of certification activities including environmental consultant reports, Contractor documentation on certification decisions and contacts, and correspondence with the resource agencies. Provide documentation upon request.
- Obtain written approval from the Engineer for all PSLs in the right of way not specifically addressed on the plans. Prepare an SWP3 for all Contractor facilities, such as asphalt or concrete plants located within public right of way. Comply with all TCEQ permit requirements for portable facilities, such as concrete batch plants, rock crushers, asphalt plants, etc. Address all environmental issues, such as Section 404 permits, wetland delineation, endangered species consultation requirements, or archeological and historic site impacts. Obtain all permits and clearances in advance.
- 6.7. **Contractor Responsibility.** If the Contractor initiates changes to the Contract and the Owner approves the changes, the Contractor is responsible for obtaining clearances and coordinating with appropriate regulatory agencies.

7. AGRICULTURAL IRRIGATION

Regulate the sequence of work and make provisions as necessary to provide for agricultural irrigation or drainage during the work. Meet with the Irrigation District or land owner to determine the proper time and sequence when irrigation demands will permit shutting-off water flows to perform work.

Unless otherwise provided on the plans, the work performed under this article will not be measured or paid for directly but will be subsidiary to pertinent items.

8. SANITARY PROVISIONS

Provide and maintain adequate, neat, and sanitary toilet accommodations for employees, including Owner employees, in compliance with the requirements and regulations of the Texas Department of Health or other authorities with jurisdiction.

9. ABATEMENT AND MITIGATION OF EXCESSIVE OR UNNECESSARY NOISE

Minimize noise throughout all phases of the Contract. Exercise particular and special efforts to avoid the creation of unnecessary noise impact on adjacent noise sensitive receptors in the placement of non-mobile equipment such as air compressors, generators, pumps, etc. Place mobile and stationary equipment to cause the least disruption of normal adjacent activities.

All equipment associated with the work must be equipped with components to suppress excessive noise and these components must be maintained in their original operating condition considering normal depreciation. Noise-attenuation devices installed by the manufacturer such as mufflers, engine covers, insulation, etc. must not be removed nor rendered ineffectual nor be permitted to remain off the equipment while the equipment is in use.

10. USING EXPLOSIVES

Do not endanger life or property. The contractor is required to submit a written Blasting Plan if required by the plans or requested by the Engineer. The Owner retains the right to reject the blasting plan. Store all explosives securely and clearly mark all storage places with "DANGER – EXPLOSIVES." Store, handle, and use explosives and highly flammable material in compliance with federal, state, and local laws, ordinances, and regulations. Assume liability for property damage, injury, or death resulting from the use of explosives.

Give at least a 48-hr. advance notice to the appropriate Road Master before doing any blasting work involving the use of electric blasting caps within 200 ft. of any railroad track.

11. RESPONSIBILITY FOR HAZARDOUS MATERIALS

Comply with the requirements of Article 6L.10., "Hazardous Materials." Indemnify and save harmless the Owner and its agents and employees from all suits, actions, or claims and from all liability and damages for any injury or damage to any person or property arising from the generation or disposition of hazardous materials introduced by the Contractor on any work done by the Contractor on Owner-owned or controlled sites. Indemnify and save harmless the Owner and its representatives from any liability or responsibility arising out of the Contractor's generation or disposition of any hazardous materials obtained, processed, stored, shipped, etc., on sites not owned or controlled by the Owner. Reimburse the Owner for all payments, fees, or restitution the Owner is required to make as a result of the Contractor's actions.

12. RESTORING SURFACES OPENED BY PERMISSION

Do not authorize anyone to make an opening in the highway for utilities, drainage, or any other reason without written permission by the Engineer. Repair all openings as directed by the Engineer. Payment for repair of surfaces opened by permission will be made in accordance with pertinent items or Article 4.4., "Changes in the Work." Costs associated with openings made with Contractor authorization but without Owner approval will not be paid.

13. PROTECTING ADJACENT PROPERTY

Protect adjacent property from damage. If any damage results from an act or omission on the part of or on behalf of the Contractor, take corrective action to restore the damaged property to a condition similar or equal to that existing before the damage was done.

14. RESPONSIBILITY FOR DAMAGE CLAIMS

Indemnify and save harmless the Owner and its agents and employees from all suits, actions, or claims and from all liability and damages for any injury or damage to any person or property due to the Contractor's negligence in the performance of the work and from any claims arising or amounts recovered under any laws, including workers' compensation and the Texas Tort Claims Act. Indemnify and save harmless the Owner and assume responsibility for all damages and injury to property of any character occurring during the prosecution of the work resulting from any act, omission, neglect, or misconduct on the Contractor's part in the manner or method of executing the work; from failure to properly execute the work; or from defective work or material.

Pipelines and other underground installations that may or may not be shown on the plans may be located within the right of way. Indemnify and save harmless the Owner from any suits or claims resulting from damage by the Contractor's operations to any pipeline or underground installation. Make available the scheduled sequence of work to the respective utility owners so that they may coordinate and schedule adjustments of their utilities that conflict with the proposed work.

15. HAULING AND LOADS ON ROADWAYS AND STRUCTURES

Comply with federal and state laws concerning legal gross and axle weights. Except for the designated Interstate system, vehicles with a valid yearly overweight tolerance permit may haul materials to the work locations at the permitted load. Provide copies of the yearly overweight tolerance permits to the Engineer upon request. Construction equipment is not exempt from oversize or overweight permitting requirements on roadways open to the traveling public.

Protect existing bridges and other structures that will remain in use by the traveling public during and after the completion of the Contract. Construction traffic on roadways, bridges, and culverts within the limits of the work, including any structures under construction that will remain in service during and after completion of the Contract is subject to legal size and weight limitations.

Additional temporary fill may be required by the Engineer for hauling purposes for the protection of certain structures. This additional fill will not be paid directly but will be subsidiary.

Replace or restore to original condition any structure damaged by the Contractor's operations.

The Engineer may allow equipment with oversize or non-divisible overweight loads to operate without a permit within the work locations on pavement structures not open to the traveling public. Submit Contractor-proposed changes to traffic control plans for approval, in accordance with Item 502,

“Barricades, Signs, and Traffic Handling.” The following sections further address overweight allowances. The Owner will make available to the Contractor any available plans and material reports for existing structures.

- 15.1. **Overweight Construction Traffic Crossing Structures.** The Engineer may allow crossing of a structure not open to the public within the work locations, when divisible or non-divisible loads exceed legal weight limitations, including limits for load-posted bridges. Obtain written permission to make these crossings. Submit for approval a structural analysis by a licensed professional engineer indicating that the excessive loads should be allowed. Provide a manufacturer’s certificate of equipment weight that includes the weight distribution on the various axles and any additional parts such as counterweights, the configuration of the axles, or other information necessary for the analysis. Submit the structural analysis and supporting documentation sufficiently in advance of the move to allow for review. Permission may be granted if the Engineer finds that no damage or overstresses in excess of those normally allowed for occasional overweight loads will result to structures that will remain in use after Contract completion. Provide temporary matting or other protective measures as directed.

Schedule loads so that only one vehicle is on any span or continuous unit at any time. Use barricades, fences, or other positive methods to prevent other vehicular access to structures at any time the overweight load is on any span or continuous unit.

- 15.2. **Construction Equipment Operating on Structures.** Cranes and other construction equipment used to perform construction operations that exceed legal weight limits may be allowed on structures. Before any operation that may require placement of equipment on a structure, submit for approval a detailed structural analysis prepared by a licensed professional engineer.

Submit the structural analysis and supporting documentation sufficiently in advance of the use to allow for review and approval. Include all axle loads and configurations, spacing of tracks or wheels, tire loads, outrigger placements, center of gravity, equipment weight, and predicted loads on tires and outriggers for all planned movements, swings, or boom reaches. The analysis must demonstrate that no overstresses will occur in excess of those normally allowed for occasional overweight loads.

- 15.3. **Loads on Structures.** Do not store or stockpile material on bridge structures without written permission. If required, submit a structural analysis and supporting documentation by a licensed professional engineer for review. Permission may be granted if the Engineer finds that no damage or overstresses in excess of those normally allowed for occasional overweight loads will result to structures that will remain in use after Contract completion. Provide temporary matting or other protective measures as directed.

- 15.4. **Hauling Divisible Overweight Loads on Pavement Within the Work Locations.** The Engineer may allow divisible overweight loads on pavement structures within the work locations not open to the traveling public. Obtain written approval before hauling the overweight loads. Include calculations to demonstrate that there will be no damage or overstress to the pavement structure.

16. CONTRACTOR’S RESPONSIBILITY FOR WORK

Until final acceptance of the Contract, take every precaution against injury or damage to any part of the work by the action of the elements or by any other cause, whether arising from the execution or from the nonexecution of the work. Protect all materials to be used in the work at all times, including periods of suspension.

When any roadway or portion of the roadway is in suitable condition for travel, it may be opened to traffic as directed. Opening of the roadway to traffic does not constitute final acceptance.

Repair damage to all work until final acceptance. Repair damage to existing facilities in accordance with the Contract or as directed. Repair damage to existing facilities or work caused by Contractor operations at the Contractor's expense. Repair work for damage that was not due to the Contractor's operations will not be paid for except as provided below.

- 16.1. **Reimbursable Repair.** Except for damage to appurtenances listed in Section 7L.16.2.1., "Unreimbursed Repair," the Contractor will be reimbursed for repair of damage caused by:
- motor vehicle, watercraft, aircraft, or railroad-train incident;
 - vandalism; or
 - Acts of God, such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomena of nature.

16.2. **Appurtenances.**

- 16.2.1. **Unreimbursed Repair.** Except for destruction (not reusable) due to hurricanes, reimbursement will not be made for repair of damage to the following temporary appurtenances, regardless of cause:
- signs,
 - barricades,
 - changeable message signs, and
 - other work zone traffic control devices.

Crash cushion attenuators and guardrail end treatments are the exception to the above listing and are to be reimbursed in accordance with Section 7L.16.2.2., "Reimbursed Repair."

For the devices listed in this section, reimbursement may be made for damage due to hurricanes. Where the Contractor retains replaced appurtenances after completion of the project, the Owner will limit the reimbursement to the cost that is above the salvage value at the end of the project.

- 16.2.2. **Reimbursed Repair.** Reimbursement will be made for repair of damage due to the causes listed in Section 7L.16.1., "Reimbursable Repair," to appurtenances (including temporary and permanent crash cushion attenuators and guardrail end treatments).

- 16.3. **Roadways and Structures.** Until final acceptance, the Contractor is responsible for all work constructed under the Contract. The Owner will not reimburse the Contractor for repair work to new construction, unless the failure or damage is due to one of the causes listed in Section 7L.16.1., "Reimbursable Repair."

The Owner will be responsible for the cost for repair of damage to existing roadways and structures not caused by the Contractor's operations.

- 16.4. **Detours.** The Contractor will be responsible for the cost of maintenance of detours constructed under the Contract, unless the failure or damage is due to one of the causes listed in Section 7L.16.1., "Reimbursable Repair." The Engineer may consider failures beyond the Contractor's control when determining reimbursement for repairs to detours constructed. The Owner will be responsible for the cost of maintenance of existing streets and roadways used for detours or handling traffic.

- 16.5. **Relief from Maintenance.** The Engineer may relieve the Contractor from responsibility of maintenance as outlined in this section. This relief does not release the Contractor from responsibility for defective materials or work or constitute final acceptance.

- 16.5.1. **Isolated Work Locations.** For isolated work locations, when all work is completed, including work for Article 5L.11., "Final Cleanup," the Engineer may relieve the Contractor from responsibility for maintenance.
- 16.5.2. **Work Except for Vegetative Establishment and Test Periods.** When all work for all or isolated work locations has been completed, including work for Article 5L.11., "Final Cleanup," with the exception of vegetative establishment and maintenance periods and test and performance periods, the Engineer may relieve the Contractor from responsibility for maintenance of completed portions of work.
- 16.5.3. **Work Suspension.** When all work is suspended for an extended period of time, the Engineer may relieve the Contractor from responsibility for maintenance of completed portions of work during the period of suspension.
- 16.5.4. **When Directed by the Engineer.** The Engineer may relieve the Contractor from the responsibility for maintenance when directed.
- 16.6. **Basis of Payment.** When reimbursement for repair work is allowed and performed, payment will be made in accordance with pertinent items or Article 4L.4., "Changes in the Work."

17. ELECTRICAL REQUIREMENTS

17.1. Definitions.

17.1.1. Electrical Work. Electrical work is work performed for:

- Item 610, "Roadway Illumination Assemblies,"
 - Item 614, "High Mast Illumination Assemblies,"
 - Item 616, "Performance Testing of Lighting Systems,"
 - Item 617, "Temporary Roadway Illumination,"
 - Item 618, "Conduit,"
 - Item 620, "Electrical Conductors,"
 - Item 621, "Tray Cable,"
 - Item 622, "Duct Cable,"
 - Item 628, "Electrical Services,"
 - Item 680, "Highway Traffic Signals,"
 - Item 681, "Temporary Traffic Signals,"
 - Item 684, "Traffic Signal Cables,"
 - Item 685, "Roadside Flashing Beacon Assemblies,"
 - other items that involve either the distribution of electrical power greater than 50 volts or the installation of conduit and duct banks,
 - the installation of conduit and wiring associated with Item 624, "Ground Boxes," and Item 656, "Foundations for Traffic Control Devices," and
- the installation of the conduit system for communication and fiber optic cable.

Electrical work does not include the installation of communications or fiber optic cable, or the connections for low voltage and inherently power limited circuits such as electronic or communications equipment. Assembly and placement of poles, structures, cabinets, enclosures, manholes, or other hardware will not be considered electrical work as long as no wiring, wiring connections, or conduit work is done at the time of assembly and placement.

17.1.2. **Specialized Electrical Work.** Specialized electrical work is work that includes the electrical service and feeders, sub-feeders, branch circuits, controls, raceways, and enclosures for the following:

- pump stations,
- moveable bridges,
- ferry slips,
- motor control centers,
- facilities required under Item 504, "Field Office and Laboratory,"
- rest area or other public buildings,
- weigh-in-motion stations,
- electrical services larger than 200 amps,
- electrical services with main or branch circuit breaker sizes not shown in the Contract, and
- any 3-phase electrical power.

17.1.3. **Certified Person.** A certified person is a person who has passed the test from the TxDOT course TRF450, "TxDOT Roadway Illumination and Electrical Installations," or other courses as approved by the Owner. Submit a current and valid certification upon request.

17.1.4. **Licensed Electrician.** A licensed electrician is a person with a current and valid unrestricted master electrical license, or unrestricted journeyman electrical license that is supervised or directed by an unrestricted master electrician. An unrestricted master electrician need not be on the work locations at all times electrical work is being done, but the unrestricted master electrician must approve work performed by the unrestricted journeyman. Licensed electrician requirements by city ordinances do not apply to on state system work.

The unrestricted journeyman and unrestricted master electrical licenses must be issued by the Texas Department of Licensing and Regulation or by a city in Texas with a population of 50,000 or greater that issues licenses based on passing a written test and demonstrating experience.

The Engineer may accept other states' electrical licenses. Submit documentation of the requirements for obtaining that license. Acceptance of the license will be based on sufficient evidence that the license was issued based on:

- passing a test based on the NEC similar to that used by Texas licensing officials, and sufficient electrical experience commensurate with general standards for an unrestricted master and unrestricted journeyman electrician in the State of Texas.

17.2. **Work Requirements.** The qualifications required to perform electrical work and specialized electrical work are listed in Table 2.

**Table 2
Work Requirements**

Type of Work	Qualifications to Perform Work
Electrical work with plans	Licensed electrician, certified person, or workers directly supervised by a licensed electrician or certified person
Electrical work without plans	Licensed electrician or workers directly supervised by a licensed electrician
Specialized electrical work	Licensed electrician or workers directly supervised by a licensed electrician
Replace lamps, starting aids, and changing fixtures	Licensed electrician, certified person, or workers directly supervised by a licensed electrician or certified person
Conduit in precast section with approved working drawings	Inspection by licensed electrician or certified person
Conduit in cast-in-place section	Inspection by licensed electrician or certified person
All other electrical work (troubleshooting, repairs, component replacement, etc.)	Licensed electrician or workers directly supervised by a licensed electrician

“Directly supervised by a licensed electrician” means that a licensed electrician is physically present during all electrical work. “Directly supervised by a licensed electrician or certified person” means that a licensed electrician or certified person is physically present during all electrical work.

A non-certified person may install conduit in cast-in-place concrete sections if the work is verified by a certified person before concrete placement.

When the plans specify IMSA certification, the requirements of Table 2 will still apply to the installation of the conduit, ground boxes, electrical services, pole grounding, and electrical conductors installed under Item 620, “Electrical Conductors.”

18. PAYROLLS

Ensure that employees, contract labor, and any subcontractor’s employees are paid at least the predetermined wage rates shown on the Contract.

Payroll records must contain the information required by law. As an option, form WH-347, “Payroll” is provided by the U.S. Department of Labor.

Maintain payroll and related records during the course of the Contract and preserve these records for a period of 3 years following the completion of the Contract or as required by law.

18.1. **Minimum Wage Requirements for Federally Funded Contracts.** Comply with the requirements of FHWA-1723, “Required Contract Provisions Federal-Aid Construction Contract.”

Submit payroll records to the Engineer in the manner prescribed by the Owner.

18.2. **Minimum Wage Requirements for State Funded Contracts.** Comply with the requirements of 29 USC 206 unless otherwise shown in the Contract.

Upon request, submit payroll records to the Engineer in the manner prescribed by the Owner.

Item 8L

Prosecution and Progress



1. PROSECUTION OF WORK

Unless otherwise shown in the Contract, begin work within 30 calendar days after the authorization date to begin work as shown on the Notice to Proceed. Prosecute the work continuously to completion within the working days specified. Unless otherwise shown in the Contract documents, work may be prosecuted in concurrent phases if no changes are required in the traffic control plan or if a revised traffic control plan is approved. Notify the Engineer at least 24 hr. before beginning work or before beginning any new operation. Do not start new operations to the detriment of work already begun. Minimize interference to traffic.

2. SUBCONTRACTING

Do not sublet any portion of a construction Contract without the Engineer's written approval. A subcontract does not relieve any responsibility under the Contract and bonds. Ensure that all subcontracted work complies with all governing labor provisions.

The Contractor certifies by signing the Contract that the Contractor will not enter into any subcontract with a subcontractor that is debarred or suspended by the Owner, or any state or federal agency.

For federally funded Contracts, ensure the required federal documents are physically attached to each subcontract agreement including all tiered subcontract agreements.

For all DBE/HUB/SBE subcontracts including all tiered DBE/HUB/SBE subcontracts, submit a copy of the executed subcontract agreement.

Submit a copy of the executed non-DBE subcontracts including all tiered non-DBE subcontracts when requested.

- 2.1. **Construction Contracts.** Perform work with own organization on at least 30% of the total original Contract cost (25% if the Contractor is an SBE on a wholly State or local funded Contract) excluding any items determined by the Engineer to be specialty items. Specialty items are those that require highly specialized knowledge, abilities, or equipment not usually available in the contracting firm expected to bid on the proposed Contract as a whole.

Specialty items will be shown on the plans or as determined by the Engineer. Bid cost of specialty items performed by subcontractors will be deducted from the total original Contract cost before computing the required amount of work to be performed by the Contractor's own organization.

The term "perform work with own organization" includes only:

- workers employed and paid directly by the Contractor or wholly owned subsidiary;
- equipment owned by the Contractor or wholly owned subsidiary;
- rented or leased equipment operated by the Contractor's employees or wholly owned subsidiary's employees;

- materials incorporated into the work if the majority of the value of the work involved in incorporating the material is performed by the Contractor's own organization, including a wholly owned subsidiary's organization; and
- labor provided by staff leasing firms licensed under Chapter 91 of the Texas Labor Code for nonsupervisory personnel if the Contractor or wholly owned subsidiary maintains direct control over the activities of the leased employees and includes them in the weekly payrolls.

When staff leasing firms provide materials or equipment, they are considered subcontractors. In these instances, submit staff leasing firms for approval as a subcontractor.

Copies of cancelled checks and certified statements may be required to verify compliance with the requirements of this section.

- 2.2. **Payments to Subcontractors.** Report payments for DBE/HUB/SBE subcontracts including tiered DBE/HUB/SBE subcontracts in the manner as prescribed by the Owner.
- 2.3. **Payment Records.** Make payment records, including but not limited to copies of cancelled checks, available for inspection by the Owner. Submit payment records upon request. Retain payment records for a period of 3 years following completion of the Contract work or as specified by the Owner.

Failure to submit this information to the Engineer by the 20th day of each month will result in the Owner taking actions, including, but not limited to, withholding payments and suspending the work. This work will not be measured or paid for directly but will be subsidiary to pertinent items.

- 2.4. **Payrolls.** Comply with Article 7L.19., "Payrolls."

3. COMPUTATION OF CONTRACT TIME FOR COMPLETION

The number of working days is established by the Contract. Working day charges will begin as prescribed in Article 8L.1., "Prosecution of Work." Working day charges will continue in accordance with the Contract.

Upon request, the Engineer will provide the conceptual time determination schedule to the Contractor for informational purposes only. The schedules assume generic resources, production rates, sequences of construction and average weather conditions based on historic data. The Owner will not adjust the number of working days and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions, or discrepancies found in the Owner's conceptual time schedule.

- 3.1. **Working Day Charges.** Working days will be charged in accordance with Section 8L.3.1.4., "Standard Workweek," unless otherwise shown in the Contract documents. Working days will be computed and charged in accordance with one of the following:
- 3.1.1. **Five-Day Workweek.** Working days will be charged Monday through Friday, excluding national holidays, regardless of weather conditions or material availability. The Contractor has the option of working on Saturdays. Provide sufficient advance notice when scheduling work on Saturdays. Work on Sundays and national holidays will not be permitted without written permission. If work requiring an Inspector to be present is performed on a Saturday, Sunday, or national holiday, and weather and other conditions permit the performance of work for 7 hr. between 7 A.M. and 6 P.M., a working day will be charged.

- 3.1.2. **Six-Day Workweek.** Working days will be charged Monday through Saturday, excluding national holidays, regardless of weather conditions or material availability. Work on Sundays and national holidays will not be permitted without written permission. If work requiring an Inspector to be present is performed on a Sunday or a national holiday, and weather or other conditions permit the performance of work for 7 hr. between 7 A.M. and 6 P.M., a working day will be charged.
- 3.1.3. **Seven-Day Workweek.** Working days will be charged Monday through Sunday, excluding national holidays, regardless of weather conditions or material availability. Work on national holidays will not be permitted without written permission. If work is performed on any of these holidays requiring an Inspector to be present, and weather or other conditions permit the performance of work for 7 hr. between 7 A.M. and 6 P.M., a working day will be charged.
- 3.1.4. **Standard Workweek.** Working days will be charged Monday through Friday, excluding national or state holidays, if weather or other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, for a continuous period of at least 7 hr. between 7 A.M. and 6 P.M., unless otherwise shown in the Contract. The Contractor has the option of working on Saturdays or state holidays. Provide sufficient advance notice to the Engineer when scheduling work on Saturdays. Work on Sundays and national holidays will not be permitted without written permission. If work requiring an Inspector to be present is performed on a Saturday, Sunday, or holiday, and weather or other conditions permit the performance of work for 7 hr. between 7 A.M. and 6 P.M., a working day will be charged.
- 3.1.5. **Calendar Day.** Working days will be charged Sunday through Saturday, including all holidays, regardless of weather conditions, material availability, or other conditions not under the control of the Contractor.
- 3.1.6. **Other.** Working days will be charged as shown in the Contract documents.
- 3.2. **Restricted Work Hours.** Restrictions on Contractor work hours and the related definition for working day charges are as prescribed in this article unless otherwise shown in the Contract documents.
- 3.3. **Nighttime Work.** Nighttime work is allowed only when shown in the Contract documents or as directed. Nighttime work is defined as work performed from 30 min. after sunset to 30 min. before sunrise.
- 3.3.1. **Five-, Six-, and Seven-Day Workweeks.** Nighttime work that extends past midnight will be assigned to the following day for the purposes of approval for allowing work on Sundays or national holidays.
- 3.3.2. **Standard Workweek.**
- 3.3.2.1. **Nighttime Work Only.** When nighttime work is allowed or required and daytime work is not allowed, working day charges will be made when weather and other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, for a continuous period of at least 7 hr. for the nighttime period, as defined in Section 8L.3.3., "Nighttime Work," unless otherwise shown in the Contract documents.
- 3.3.2.2. **Nighttime Work and Daytime Work Requiring Inspector.** When nighttime work is performed or required and daytime work is allowed, working day charges will be made when weather and other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, for a continuous period of at least 7 hr. for the nighttime period, as defined in Section 8L.3.3., "Nighttime Work," or for a continuous period of at least 7 hr. for the alternative daytime period unless otherwise shown in the Contract documents. Only one day will be charged for each 24-hr. time period. When the

Engineer agrees to restrict work hours to the nighttime period only, working day charges will be in accordance with Section 8L.3.3.2.1., "Nighttime Work Only."

- 3.4. **Time Statements.** The Engineer will furnish the Contractor a monthly time statement. Review the monthly time statement for correctness. Report protests in writing, no later than 30 calendar days after receipt of the time statement, providing a detailed explanation for each day protested. Not filing a protest within 30 calendar days will indicate acceptance of the working day charges and future consideration of that statement will not be permitted.

4. **TEMPORARY SUSPENSION OF WORK OR WORKING DAY CHARGES**

The Engineer may suspend the work, wholly or in part, and will provide notice and reasons for the suspension in writing. Suspend and resume work only as directed in writing.

When part of the work is suspended, the Engineer may suspend working day charges only when conditions not under the control of the Contractor prohibit the performance of critical activities. When all of the work is suspended for reasons not under the control of the Contractor, the Engineer will suspend working day charges.

5. **PROJECT SCHEDULES**

Prepare, maintain, and submit project schedules. Project schedules are used to convey the Contractor's intended work plan to the Owner. Prepare project schedules with a level of effort sufficient for the work being performed. Project schedules will not be used as a basis to establish the amount of work performed or for the preparation of the progress payments.

- 5.1. **Project Scheduler.** Designate an individual who will develop and maintain the progress schedule. The Project Scheduler will be prepared to discuss, in detail, the proposed sequence of work and methods of operation, and how that information will be communicated through the Progress Schedule at the Preconstruction Meeting. This individual will also attend the project meetings and make site visits to prepare, develop, and maintain the progress schedules.
- 5.2. **Progress Schedule.** Before starting work, prepare and submit a progress schedule based on the sequence of work and traffic control plan shown in the Contract documents. At a minimum, prepare the progress schedule as a Bar Chart or Critical Path Method (CPM), as shown on the plans. Include all planned work activities and sequences and show Contract completion within the number of working days specified. Incorporate major material procurements, known utility relocations, and other activities that may affect the completion of the Contract in the progress schedule. Show a beginning date, ending date, and duration in whole working days for each activity. Do not use activities exceeding 20 working days, except for agreed upon activities. Show an estimated production rate per working day for each work activity.
- 5.3. **Schedule Format.** Format all project schedules according to the following:
- Begin the project schedule on the date of the start of Contract time or start of activities affecting work on the project;
 - Show the sequence and interdependence of activities required for complete performance of the work. If using a CPM schedule, show a predecessor and a successor for each activity; and
 - Ensure all work sequences are logical and show a coordinated plan of the work.

CPM schedules must also include:

- Clearly and accurately identify the critical path as the longest continuous path;
- Provide a legend for all abbreviations, run date, data date, project start date, and project completion date in the title block of each schedule submittal; and
- Through the use of calendars, incorporate seasonal weather conditions into the schedule for work (e.g., earthwork, concrete paving, structures, asphalt, drainage, etc.) that may be influenced by temperature or precipitation. Also, incorporate non-work periods such as holidays, weekends, or other non-work days as identified in the Contract.

5.4. **Activity Format.** For each activity on the project schedule provide:

- A concise description of the work represented by the activity;
- An activity duration in whole working days;
- Code activities so that organized plots of the schedule may be produced.

CPM schedules must also include the quantity of work and estimated production rate for major items of work. Provide enough information for review of the work being performed.

5.5. **Schedule Types.**

5.5.1. **Bar Chart.** Seven calendar days before the preconstruction meeting, prepare and submit a hard copy of the schedule using the bar chart method.

5.5.1.1. **Progress Schedule Reviews.** Update the project schedule and submit a hard copy when changes to the schedule occur or when requested.

5.5.2. **Critical Path Method.** Prepare and submit the schedule using the CPM.

5.5.2.1. **Preliminary Schedule.** Seven calendar days before the preconstruction meeting, submit both the plotted and electronic copies of the project schedule showing work to be performed within the first 90 calendar days of the project.

5.5.2.2. **Baseline Schedule.** The baseline schedule will be considered the Contractor's plan to successfully construct the project within the time frame and construction sequencing indicated in the Contract. Submit both plotted and electronic copies of the baseline schedule. Submit 2 plots of the schedule: one organized with the activities logically grouped using the activity coding; and the other plot showing only the critical path determined by the longest path, not based on critical float.

Develop and submit the baseline schedule for review within the first 45 calendar days of the project unless the time for submission is extended.

5.5.2.2.1. **Review.** Within 15 calendar days of receipt of the schedule, the Engineer will evaluate, and inform the Contractor if the schedule has been accepted. If the schedule is not accepted, the Engineer will provide comments to the Contractor for incorporation. Provide a revised schedule based on the Engineer's comments, or reasons for not doing so within 10 calendar days. The Engineer's review and acceptance of the project schedule is for conformance to the requirements of the Contract documents only and does not relieve the Contractor of any responsibility for meeting the interim milestone dates (if specified) or the Contract completion date. Review and acceptance does not expressly or by implication warrant, acknowledge, or admit the reasonableness of the logic or durations of the project schedule. If the Contractor fails to define any element of work, activity, or logic and the Engineer's review does not detect this omission or error, the Contractor is responsible for correcting the error or omission.

Submit an acceptable baseline schedule before the 90th calendar day of the project unless the time for submission is extended.

5.5.2.3.

Progress Schedule. Maintain the project schedule for use by both the Contractor and the Engineer. Submit both the plotted and electronic copy as it will become an as-built record of the daily progress achieved on the project. If continuous progress of an activity is interrupted for any reason except non-work periods (such as holidays, weekend, or interference from temperature or precipitation), then the activity will show the actual finish date as that date of the start of the interruption and the activity will be broken into a subsequent activity (or activities, based on the number of interruptions) similarly numbered with successive alpha character as necessary. The original duration of the subsequent activity will be that of the remaining duration of the original activity. Relationships of the subsequent activity will match those of the original activity so that the integrity of the project schedule logic is maintained. Once established, the original durations and actual dates of all activities must remain unchanged. Revisions to the schedule may be made as necessary.

The project schedule must be revised when changes in construction phasing and sequencing occur or other changes that cause deviation from the original project schedule occur. Any revisions to the schedule must be listed in the monthly update narrative with the purpose of the revision and description of the impact on the project schedule's critical path and project completion date. Create the schedule revision using the latest update before the start of the revision.

Monthly updating of the project schedule will include updating of:

- The actual start dates for activities started;
- The actual finish dates for activities completed;
- The percentage of work completed and remaining duration for each activity started but not yet completed; and
- The calendars to show days actual work was performed on the various work activities.

The cut-off day for recording monthly progress will be the last day of each month. Submit the updated project schedule no later than the 20th calendar day of the following month. The Engineer will evaluate the updated schedule within 5 calendar days of receipt and inform the Contractor if it has or has not been accepted. If the schedule is not accepted, the Engineer will provide comments to the Contractor for incorporation. Provide a revised schedule based on the Engineer's comments, or reasons for not doing so within 5 calendar days.

Provide a brief narrative in a bulleted statement format for major items that have impacted the schedule. Notify the Engineer if resource-leveling is being used.

5.5.2.3.1.

Project Schedule Summary Report (PSSR). When shown on the plans, provide the PSSR instead of the narrative required in Section 8L.5.5.2.3., "Progress Schedule." The PSSR includes a listing of major items that have impacted the schedule as well as a summary of progress in days ahead or behind schedule. Include an explanation of the project progress for the period represented on the form provided by the Owner.

5.5.3.

Notice of Potential Time Impact. Submit a "Notice of Potential Time Impact" when a Contract time extension or adjustment of milestone dates may be justified or when directed.

Failure to provide this notice in the time frames outlined above will compromise the Owner's ability to mitigate the impacts and the Contractor forfeits the right to request a time extension or adjustment of milestone dates unless the circumstances are such that the Contractor could not reasonably have had knowledge of the impact at the time.

5.5.4.

Time Impact Analysis. When directed, provide a time impact analysis. A time impact analysis is an evaluation of the effects of impacts on the project. A time impact analysis consists of the following steps:

- **Step 1.** Establish the status of the project immediately before the impact.
- **Step 2.** Predict the effect of the impact on the schedule update used in Step 1.
- **Step 3.** Track the effects of the impact on the schedule during its occurrence.
- **Step 4.** Establish the status of the project after the impact's effect has ended and provide details identifying any mitigating actions or circumstances used to keep the project ongoing during the impact period.

Determine the time impact by comparing the status of the work before the impact (Step 1) to the prediction of the effect of the impact (Step 2), if requested, and to actual effects of the impact once it is complete (Step 4). Unless otherwise approved, Steps 1, 3, and 4, must be completed before consideration of a Contract time extension or adjustment of a milestone date will be provided. Time extensions will only be considered when delays that affect milestone dates or the Contract completion date are beyond the Contractor's control. Submit Step 4 no later than 15 calendar days after the impact's effects have ended or when all the information on the effect has been realized.

Submit one electronic backup copy of the complete time impact analysis and a copy of the full project schedule incorporating the time impact analysis. If the project schedule is revised after the submittal of a time impact analysis, but before its approval, indicate in writing the need for any modification to the time impact analysis.

The Engineer will review the time impact analysis upon completion of step 4. If this review detects revisions or changes to the schedule that had not been performed and identified in a narrative, the Engineer may reject the time impact analysis. If the Engineer is in agreement with the time impact analysis, a change order may be issued to grant additional working days, or to adjust interim milestones. Once a change order has been executed, incorporate the time impact analysis into the project schedule. The time impact analysis may also be used to support the settlement of disputes and claims. Compensation related to the time impact analysis may be provided at the completion of the analysis or the completion of the project to determine the true role the impact played on the final completion.

The work performed under this article will not be measured or paid for directly but will be subsidiary to pertinent items.

6. FAILURE TO COMPLETE WORK ON TIME

The time established for the completion of the work is an essential element of the Contract. If the Contractor fails to complete the work within the number of working days specified, working days will continue to be charged. Failure to complete the Contract, a separate work order, or callout work within the number of working days specified, including any approved additional working days, will result in liquidated damages for each working day charged over the number of working days specified in the Contract. The dollar amount specified in the Contract will be deducted from any money due or to become due the Contractor for each working day the Contract remains incomplete. This amount will be assessed not as a penalty but as liquidated damages.

7. DEFAULT OF THE CONTRACT

7.1. **Declaration of Default.** The Engineer may declare the Contractor to be in default of the Contract if the Contractor:

- fails to begin the work within the number of days specified,
- fails to prosecute the work to assure completion within the number of days specified,
- is uncooperative, disruptive or threatening,

- fails to perform the work in accordance with the Contract requirements,
- neglects or refuses to remove and replace rejected materials or unacceptable work,
- discontinues the prosecution of the work without the Engineer's approval,
- makes an unauthorized assignment,
- fails to resume work that has been discontinued within a reasonable number of days after notice to do so,
- fails to conduct the work in an acceptable manner, or
- commits fraud or other unfixable conduct as determined by the Owner.

If any of these conditions occur, the Engineer will give notice in writing to the Contractor and the Surety of the intent to declare the Contractor in default. If the Contractor does not proceed as directed within 10 days after the notice, the Owner will provide written notice to the Contractor and the Surety to declare the Contractor to be in default of the Contract. The Owner will also provide written notice of default to the Surety. If the Contractor provides the Owner written notice of voluntary default of the Contract, the Owner may waive the 10 day notice of intent to declare the Contractor in default and immediately provide written notice of default to the Contractor and the Surety. Working day charges will continue until completion of the Contract. The Owner may suspend work in accordance with Section 8L.4., "Temporary Suspension of Work or Working Day Charges," to investigate apparent fraud or other unfixable conduct before defaulting the Contractor. The Contractor may be subject to sanctions under the state and/or federal laws and regulations.

The Owner will determine the method used for the completion of the remaining work as follows:

- **Contracts without Performance Bonds.** The Owner will determine the most expeditious and efficient way to complete the work, and recover damages from the Contractor.
- **Contracts with Performance Bonds.** The Owner will, without violating the Contract, demand that the Contractor's Surety complete the remaining work in accordance with the terms of the original Contract. A completing Contractor will be considered a subcontractor of the Surety. The Owner reserves the right to approve or reject proposed subcontractors. Work may resume after the Owner receives and approves Certificates of Insurance as required in Section 3.4.3., "Insurance." Certificates of Insurance may be issued in the name of the completing Contractor. The Surety is responsible for making every effort to expedite the resumption of work and completion of the Contract. The Owner may complete the work using any or all materials at the work locations that it deems suitable and acceptable. Any costs incurred by the Owner for the completion of the work under the Contract will be the responsibility of the Surety.

From the time of notification of the default until work resumes (either by the Surety or the Owner), the Owner will maintain traffic control devices and will do any other work it deems necessary, unless otherwise agreed upon by the Owner and the Surety. All costs associated with this work will be deducted from money due to the Surety.

The Owner will hold all money earned but not disbursed by the date of default. Upon resumption of the work after the default, all payments will be made to the Surety. All costs and charges incurred by the Owner as a result of the default, including the cost of completing the work under the Contract, costs of maintaining traffic control devices, costs for other work deemed necessary, and any applicable liquidated damages or disincentives will be deducted from money due the Contractor for completed work. If these costs exceed the sum that would have been payable under the Contract, the Surety will be liable and pay the Owner the balance of these costs in excess of the Contract price. In case the costs incurred by the Owner are less than the amount that would have been payable under the Contract if the work had been completed by the Contractor, the Owner will be entitled to retain the difference.

Comply with Article 8L.2., "Subcontracting," and abide by the DBE/HUB/SBE commitments previously approved by the Owner .

No markups as defined in Article 9L.7., "Payment for Extra Work and Force Account Method," will be allowed for the Surety.

- 7.2. **Wrongful Default.** Submit a written request to the Owner within 14 calendar days of receipt of the notice of default for consideration of wrongful default.

The Owner will determine if the Contractor has been wrongfully defaulted, and will proceed with the following:

If the Owner determines the default is proper, the default will remain. If the Contractor is in disagreement, the Contractor may file a claim in accordance with Article 4L.7., "Dispute or Claims Procedure."

If the Owner determines it was a wrongful default, the Owner will terminate the Contract for convenience, in accordance with Article 8L.8., "Termination of the Contract."

8. TERMINATION OF THE CONTRACT

The Owner may terminate the Contract in whole or in part whenever:

- the Contractor is prevented from proceeding with the work as a direct result of an executive order of the President of the United States or the Governor of the State;
- the Contractor is prevented from proceeding with the work due to a national emergency, or when the work to be performed under the Contract is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor as the result of an order or a proclamation of the President of the United States;
- the Contractor is prevented from proceeding with the work due to an order of any federal authority;
- the Contractor is prevented from proceeding with the work by reason of a preliminary, special, or permanent restraining court order where the issuance of the restraining order is primarily caused by acts or omissions of persons or agencies other than the Contractor; or
- the Owner determines that termination of the Contract is in the best interest of the Owner or the public. This includes, but is not limited to, the discovery of significant hazardous material problems, right of way acquisition problems, or utility conflicts that would cause substantial delays or expense to the Contract.

- 8.1. **Procedures and Submittals.** The Engineer will provide written notice to the Contractor of termination specifying the extent of the termination and the effective date. Upon notice, immediately proceed in accordance with the following:

- stop work as specified in the notice;
- place no further subcontracts or orders for materials, services, or facilities, except as necessary to complete a critical portion of the Contract, as approved;
- terminate all subcontracts to the extent they relate to the work terminated;
- complete performance of the work not terminated;
- settle all outstanding liabilities and termination settlement proposals resulting from the termination for public convenience of the Contract;
- create an inventory report, including all acceptable materials and products obtained for the Contract that have not been incorporated in the work that was terminated (include in the inventory report a description, quantity, location, source, cost, and payment status for each of the acceptable materials and products); and
- take any action necessary, or that the Engineer may direct, for the protection and preservation of the materials and products related to the Contract that are in the possession of the Contractor and in which the Owner has or may acquire an interest.

8.2.

Settlement Provisions. Within 60 calendar days of the date of the notice of termination, submit a final termination settlement proposal, unless otherwise approved. The Engineer will prepare a change order that reduces the affected quantities of work and adds acceptable costs for termination. No claim for loss of anticipated profits will be considered. The Owner will pay reasonable and verifiable termination costs including:

- all work completed at the unit bid price and partial payment for incomplete work;
- the percentage of Item 500, "Mobilization," equivalent to the percentage of work complete or actual cost that can be supported by cost records, whichever is greater;
- expenses necessary for the preparation of termination settlement proposals and support data;
- the termination and settlement of subcontracts;
- storage, transportation, restocking, and other costs incurred necessary for the preservation, protection, or disposition of the termination inventory; and
- other expenses acceptable to the Owner.

Item 9L

Measurement and Payment



1. MEASUREMENT OF QUANTITIES

The Engineer will measure all completed work using United States standard measures, unless otherwise specified.

8.3. **Linear Measurement.** Unless otherwise specified, all longitudinal measurements for surface areas will be made along the actual surface of the roadway and not horizontally. No deduction will be made for structures in the roadway with an area of 9 sq. ft. or less. For all transverse measurements for areas of base courses, surface courses, and pavements, the dimensions to be used in calculating the pay areas will be the neat dimensions and will not exceed those shown on the plans, unless otherwise directed.

8.4. **Volume Measurement.** Transport materials measured for payment by volume in approved hauling vehicles. Display a unique identification mark on each vehicle. Furnish information necessary to calculate the volume capacity of each vehicle. The Engineer may require verification of volume through weight measurement. Use body shapes that allow the capacity to be verified. Load and level the load to the equipment's approved capacity. Loads not hauled in approved vehicles may be rejected.

8.5. **Weight Measurement.** Transport materials measured for payment by weight or truck measure in approved hauling vehicles. Furnish certified measurements, tare weights, and legal gross weight calculations for all haul units. Affix a permanent, legible number on the truck and on the trailer to correspond with the certified information. Furnish certified weights of loaded haul units transporting material if requested.

The material will be measured at the point of delivery. The cost of supplying these volume and weight capacities is subsidiary to the pertinent item. For measurement by the ton, in the field, provide measurements in accordance with Item 520, "Weighing and Measuring Equipment," except for items where ton measurements are measured by standard tables.

The Engineer may reject loads and suspend hauling operations for overloading.

8.5.1. **Hauling on Routes Accessible to the Traveling Public.** For payment purposes on haul routes accessible to the traveling public, the net weight of the load will be calculated as follows:

- If the gross vehicle weight is less than the maximum allowed by state law, including applicable yearly weight tolerance permit, the net weight of the load will be determined by deducting the tare weight of the vehicle from the gross weight.
- If the gross vehicle weight is more than the maximum allowed by state law, including applicable yearly weight tolerance permit, the net weight of the load will be determined by deducting the tare weight of the vehicle from the maximum gross weight allowed.

8.5.2. **Hauling on Routes Not Accessible to the Traveling Public.** For payment purposes on haul routes that are not accessible to the traveling public where advance permission is obtained in writing from the Engineer:

- If the gross vehicle weight is less than the maximum allowed, including applicable yearly weight tolerance permit, the net weight of the load will be determined by deducting the tare weight of the vehicle from the gross weight.
- If the gross vehicle weight is more than the maximum allowed, the net weight of the load will be determined by deducting the tare weight of the vehicle from the maximum gross weight allowed.

2. PLANS QUANTITY MEASUREMENT

Plans quantities may or may not represent the exact quantity of work performed or material moved, handled, or placed during the execution of the Contract. The estimated bid quantities are designated as final payment quantities, unless revised by the governing specifications or this article.

If the quantity measured as outlined under "Measurement" varies by more than 5% (or as stipulated under "Measurement" for specific Items) from the total estimated quantity for an individual item originally shown in the Contract, an adjustment may be made to the quantity of authorized work done for payment purposes.

When quantities are revised by a change in design approved by the Owner, by change order, or to correct an error on the plans, the plans quantity will be increased or decreased by the amount involved in the change, and the 5% variance will apply to the new plans quantity.

If the total Contract quantity multiplied by the unit bid price for an individual item is less than \$250 and the item is not originally a plans quantity item, then the item may be paid as a plans quantity item if the Engineer and Contractor agree in writing to fix the final quantity as a plans quantity.

For Contracts with callout work and work orders, plans quantity measurement requirements are not applicable.

3. ADJUSTMENT OF QUANTITIES

The party to the Contract requesting the adjustment will provide field measurements and calculations showing the revised quantity. When approved, this revised quantity will constitute the final quantity for which payment will be made. Payment for revised quantity will be made at the unit price bid for that item, except as provided for in Article 4L.4., "Changes in the Work."

4. SCOPE OF PAYMENT

Payment of the Contract unit price is full compensation for all materials, equipment, labor, tools, and supplies necessary to complete the item of work under the Contract. Until final acceptance in accordance with Article 5L.12., "Final Acceptance," assume liability for completing the work according to the Contract documents and any loss or damage arising from the performance of the work or from the action of the elements, infringement of patent, trademark, or copyright, except as provided elsewhere in the Contract.

The Owner will only pay for material incorporated into the work in accordance with the Contract. Payment of progress estimates will in no way affect the Contractor's obligation under the Contract to repair or replace any defective parts in the construction or to replace any defective materials used in the construction and to be responsible for all damages due to defects if the defects and damages are discovered on or before final inspection and acceptance of the work.

5. PROGRESS PAYMENTS

The Contractor will prepare a monthly estimate of the amount of work performed, including materials in place. Incomplete items of work may be paid at an agreed upon percentage as approved. Payment of the monthly estimate is determined at the Contract item prices less any withholdings or deductions in accordance with the Contract. Progress payments may be withheld for failure to comply with the Contract.

6. PAYMENT FOR MATERIAL ON HAND (MOH)

If payment for MOH is desired, request compensation for the invoice cost of acceptable nonperishable materials that have not been used in the work before the request, and that have been delivered to the work location or are in acceptable storage places. Nonperishable materials are those that do not have a shelf life or whose characteristics do not materially change when exposed to the elements. Include only materials that have been sampled, tested, approved, or certified, and are ready for incorporation into the work. Only materials which are completely constructed or fabricated on the Contractor's order for a specific Contract and are so marked and on which an approved test report has been issued are eligible. Payment for MOH may include the following types of items: concrete traffic barrier, precast concrete box culverts, concrete piling, reinforced concrete pipe, and illumination poles. Any repairs required after fabricated materials have been approved for storage will require approval of the Engineer before being made and will be made at the Contractor's expense. Include only those materials that have an invoice cost of at least \$1,000 in the request for MOH payment.

If the request is acceptable, the Contractor will include payment for MOH in a progress payment. Payment for MOH does not constitute acceptance of the materials. Payment will not exceed the actual cost of the material as established by invoice, or the total cost for the associated item less reasonable placement costs, whichever is less. Materials for which the Contractor does not have a paid invoice within 60 days will not be eligible for payment and will be removed from the estimate. Payment may be limited to a portion of the invoice cost or unit price if shown elsewhere in the Contract. Payment for precast products fabricated or constructed by the Contractor for which invoices or freight bills are not available may be made based on statements of actual cost.

Submit the request on forms provided by the Owner. These forms may be electronically reproduced, provided they are in the same format and contain all the required information and certifications. Continue to submit monthly MOH forms until the total value of MOH is \$0.

By submitting a request for MOH payment, the Contractor expressly authorizes the Owner to audit MOH records, and to perform process reviews of the record-keeping system. If the Owner determines noncompliance with any of the requirements of this provision, the Owner may exclude payment for any or all MOH for the duration of the Contract.

Maintain all records relating to MOH payment until final acceptance. Provide these records to the Engineer upon request.

7. PAYMENT FOR EXTRA WORK AND FORCE ACCOUNT METHOD

Payment for extra work directed, performed, and accepted will be made in accordance with Article 4L.4., "Changes in the Work." Payment for extra work may be established by agreed unit prices or by Force Account Method.

Agreed unit prices are unit prices that include markups and are comparable to recent bid prices for the same character of work. These unit prices may be established without additional breakdown justification.

When using Force Account Method, determine an estimated cost for the proposed work and establish labor and equipment rates and material costs. Maintain daily records of extra work and provide copies of these records daily, signed by the Contractor's representative, for verification by the Engineer. Request payment for the extra work no later than the 10th day of the month following the month in which the work was performed. Include copies of all applicable invoices. If the extra work to be performed has an estimated cost of less than \$10,000, submit for approval and payment an invoice of actual cost for materials, equipment, labor, tools, and incidentals necessary to complete the extra work.

- 7.1. **Markups.** Payment for extra work may include markups as compensation for the use of small tools, overhead expense, and profit.
- 7.1.1. **Labor.** Compensation will be made for payroll rates for each hour that the labor, foremen, or other approved workers are actually engaged in the work. In no case will the rate of wages be less than the minimum shown in the Contract for a particular category. An additional 25% of this sum will be paid as compensation for overhead, superintendence, profit, and small tools.
- 7.1.2. **Insurance and Taxes.** An additional 55% of the labor cost, excluding the 25% compensation provided in Section 9L.7.1.1., "Labor," will be paid as compensation for labor insurance and labor taxes including the cost of premiums on non-project-specific liability (excluding vehicular) insurance, workers compensation insurance, Social Security, unemployment insurance taxes, and fringe benefits.
- 7.1.3. **Materials.** Compensation will be made for materials associated with the work based on actual delivered invoice costs, less any discount. An additional 25% of this sum will be paid as compensation for overhead and profit.
- 7.1.4. **Equipment.** Payment will be made for the established equipment hourly rates for each hour that the equipment is involved in the work. An additional 15% of this sum will be paid as compensation for overhead and profit not included in the rates.

Transportation cost for mobilizing equipment will be included if the equipment is mobilized from an off-site location.

- 7.1.4.1. **Contractor-Owned Equipment.** For Contractor-owned machinery, trucks, power tools, or other equipment, use the FHWA rental rates found in the *Rental Rate Blue Book* multiplied by the regional adjustment factor and the rate adjustment factor to establish hourly rates. Use the rates in effect for each section of the *Rental Rate Blue Book* at the time of use.

If a rate has not been established for a particular piece of equipment in the *Rental Rate Blue Book*, the Engineer will allow a reasonable hourly rate. This price will include operating costs.

Payment for equipment will be made for the actual hours used in the work. The Owner reserves the right to withhold payment for low production or lack of progress. Payment will not be made for time lost for equipment breakdowns, time spent to repair equipment, or time after equipment is no longer needed.

If equipment is used intermittently while dedicated solely to the work, payment will be made for the duration the equipment is assigned to the work but no more than 8 hours will be paid during a 24-hour day, nor more than 40 hours per week, nor more than 176 hours per month, except when time is computed using a six-day or seven-day workweek. When using a six-day workweek, no more than 8 hours will be paid during a 24-hour day, nor more than 48 hours per week, nor more than 211 hours per month. When using a seven-day workweek, no more than 8 hours will be paid during a 24-hour day, nor more than 56 hours per week, nor more than 246 hours per month.

7.1.4.2. **Equipment Not Owned by the Contractor.** For equipment rented from a third party not owned by the Contractor, payment will be made at the invoice daily rental rate for each day the equipment is needed for the work. The Owner reserves the right to limit the daily rate to comparable *Rental Rate Blue Book* rates. When the invoice specifies that the rental rate does not include fuel, lubricants, repairs, and servicing, the *Rental Rate Blue Book* hourly operating cost for each hour the equipment is operated will be added.

When the invoice specifies equipment operators as a component of the equipment rental, payment will be made at the invoice rate for each operator for each day the equipment is needed for the work.

7.1.4.3. **Standby Equipment Costs.** Payment for standby equipment will be made in accordance with Section 9L.7.1.4., "Equipment," except that:

7.1.4.3.1. **Contractor-Owned Equipment.** For Contractor-owned machinery, trucks, power tools, or other equipment:

- Standby will be paid at 50% (to remove operating cost) of the FHWA rental rates found in the *Rental Rate Blue Book* multiplied by the regional adjustment factor and the rate adjustment factor.
- Standby costs will not be allowed during periods when the equipment would have otherwise been idle.

7.1.4.3.2. **Equipment Not Owned by the Contractor.** For equipment rented from a third party not owned by the Contractor:

- Standby will be paid at the invoice daily rental rate, excluding operating cost, which includes fuel, lubricants, repairs, and servicing. The Owner reserves the right to limit the daily standby rate to comparable FHWA rental rates found in the *Rental Rate Blue Book* multiplied by the regional adjustment factor and the rate adjustment factor.
- Standby will be paid for equipment operators when included on the invoice and equipment operators are actually on standby.
- Standby costs will not be allowed during periods when the equipment would have otherwise been idle.

7.1.5. **Subcontracting.** An additional 5% of the actual invoice cost will be paid to the Contractor as compensation for administrative cost, superintendence, and profit.

7.1.6. **Law Enforcement.** An additional 5% of the actual invoice cost will be paid as compensation for administrative costs, superintendence, and profit.

7.1.7. **Railroad Flaggers.** An additional 5% of the actual invoice cost will be paid as compensation for administrative cost, superintendence, and profit.

7.1.8. **Bond Cost.** An additional 1% of the total compensation provided in Article 9L.7., "Payment for Extra Work and Force Account Method," will be paid for the increase in bond.

8. RETAINAGE

The Owner shall within thirty (30) days pay the Contractor the total amount of the Engineer's statement, less (i) five percent (5%) of the amount thereof, for Contracts with a total Contract Price of four hundred thousand dollars (\$400,000.00) or more, or (ii) ten percent (10%) for contracts with a total Contract Price of less than four hundred thousand dollars (\$400,000.00), (which shall be retained until final payment).

9. PAYMENT PROVISIONS FOR SUBCONTRACTORS

For the purposes of this article only, the term subcontractor includes suppliers and the term work includes materials provided by suppliers at a location approved by the Engineer.

These requirements apply to all tiers of subcontractors. Incorporate the provisions of this article into all subcontract or material purchase agreements.

Pay subcontractors for work performed within 10 days after receiving payment for the work performed by the subcontractor. Also, pay any retainage on a subcontractor's work within 10 days after satisfactory completion of all of the subcontractor's work. Completed subcontractor work includes vegetative establishment, test, maintenance, performance, and other similar periods that are the responsibility of the subcontractor.

For the purpose of this section, satisfactory completion is accomplished when:

- the subcontractor has fulfilled the Contract requirements of both the Owner and the subcontract for the subcontracted work, including the submittal of all information required by the specifications and the Owner; and
- the work done by the subcontractor has been inspected, approved, and paid by the Owner.

Provide a certification of prompt payment in accordance with the Owner's prompt payment procedure to certify that all subcontractors and suppliers were paid from the previous months payments and retainage was released for those whose work is complete. Submit the completed form each month and the month following the month when final acceptance occurred at the end of the project.

The inspection and approval of a subcontractor's work does not eliminate the Contractor's responsibilities for all the work as defined in Article 7L.16., "Contractor's Responsibility for Work."

The Owner may pursue actions against the Contractor, including withholding of estimates and suspending the work, for noncompliance with the subcontract requirements of this section upon receipt of written notice with sufficient details showing the subcontractor has complied with contractual obligations.

10. FINAL PAYMENT

When the Contract has been completed, all work has been approved, final acceptance has been made in accordance with Article 5L.12., "Final Acceptance," and Contractor submittals have been received, the Engineer will prepare a final estimate for payment showing the total quantity of work completed and the money owed the Contractor. The final payment will reflect the entire sum due, less any sums previously paid.

II. PRE-BID CONFERENCE

A Pre-Bid Conference will be held for all bidders in the City Hall Building located at 13000 William Dodson Parkway, Farmers Branch, Texas 75234, on **June 26, 2025 at 2:00 p.m.** Any requests for substitute "or equal" products must be submitted in writing to The Engineer at this meeting. Therefore, although not mandatory, it is highly recommended that each entity submitting a bid have a representative at the pre-bid conference. Shop drawings, details, product data sheets or any other pertinent information to assist The Engineer in determining equivalency shall accompany the written request.

III. CONTRACTOR INFORMATION

The information in “Contractor’s Information” must be completed in its entirety and submitted to the City within twenty-four (24) hours (one working day) after the bid opening. Failure to submit the “Contractor’s Information” within twenty-four (24) hours (one working day) may cause the bid to be deemed non- responsive.

CONTRACTOR INFORMATION

Name of Firm: _____

Type of Firm: _____ *Corporation* _____ *Sole Proprietorship* _____ *Other*

PHYSICAL ADDRESS

(NOT P O BOX):

PHONE NUMBER: _____

FAX: _____

EMAIL: _____

Names and Titles of Principals:

I.R.S. Number: _____

EXPERIENCE RECORD

List of projects your organization has successfully completed:

List of projects your organization is now engaged in completing:

List of surety bonds in force on above uncompleted work:

	\$
	\$
	\$
	\$
	\$
	\$

Note:

To demonstrate qualification to perform the work, each bidder must be prepared to submit within Five (5) working days after bid opening upon Owner's request, additional detailed written evidence such as financial data, previous experience, present commitments, and disclosure of any legal action against the company.

DATA SHEET SUBMITTAL INFORMATION

List of equipment owned by bidder that is in serviceable condition and available for use on this Project:

Portions of work that bidder proposes to sublet in case of award of Contract, including subcontractor name, amount of work, and type:

Name and qualification of the superintendent:

IV. PROPOSAL & ADDENDA

**PROPOSAL
FOR
Farmers Branch Westside Art Trail**

Farmers Branch, Texas
_____, 2025

PROPOSAL OF _____

Check appropriate business entity:

A corporation organized and existing under the laws of the State of Texas.

A corporation organized and existing under the laws of the State of _____
(If a non-Texas Corporation, please attach a copy of the corporation's Articles of
Incorporation)

A partnership consisting of _____.

A sole proprietorship owned by _____, an individual.

To: THE CITY OF FARMERS BRANCH, TEXAS
P.O. BOX 819010
FARMERS BRANCH, TEXAS 75381-9010

The undersigned bidder, pursuant to the foregoing advertisement for bids, has carefully examined this proposal, the Contract documents, special provisions, general provisions, special specifications, and the specifications and will provide all necessary labor, superintendence, machinery, equipment, tools, materials, services and other facilities and complete fully all the work as provided for in the specifications and Contract documents; and binds himself upon formal acceptance of this proposal to execute a contract and bonds, according to the prescribed forms, for performing and completing the said work within the required time.

It is understood that the following quantities of work to be done are approximate only, and are intended principally to serve as a guide in figuring out the bids. It is further understood that the quantities of work to be done and materials to be furnished may be increased or decreased as may be considered necessary, in the opinion of the Engineer, to complete the work as fully planned and contemplated, and that all quantities of work whether increased or decreased, are to be performed at the unit prices set forth below except as provided for in the specifications.

Unit prices are to be shown in both words and figures. In the event of a discrepancy, the amount shown in words will govern.

The unit prices shall include all labor, materials, equipment, overhead, profit, insurance, etc., to cover the completed work as requested.

The work proposed to be done shall be accepted when fully completed and finished in accordance with the plans and specifications, to the satisfaction of the Owner.

The undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final.

The undersigned bidder hereby declares that he has visited the site of the work and has carefully examined the Contract documents and specifications pertaining to the work covered by the above bid, and he further agrees to commence work within ten (10) calendar days after the date of written notice to do so shall have been given to him, and to substantially complete the same within **270** calendar days after the date of written notice to commence work has been issued.

Enclosed with this proposal is a cashier's check in the amount of _____ dollars and _____ cents (\$ _____), or a bidder's bond in the sum of _____ dollars and _____ cents (\$ _____), which it is agreed shall be collected and retained by the Owner as liquidated damages in the event this proposal is accepted by the owner within Thirty (30) calendar days after the date bids are received and the undersigned bidder fails to execute the Contract and required bonds within ten (10) calendar days after the date said proposal is accepted. Otherwise said check or bond will be returned to the undersigned bidder upon demand.

In the event of the award of a Contract to the bidder, the bidder will furnish Performance and Payment Bonds for the full amount of the Contract, to secure proper compliance with the terms and provisions of the Contract, to insure and guarantee the work until final completion and acceptance, and to guarantee

payment of all lawful claims for labor performed and materials furnished in the fulfillment of the Contract.

Receipt is acknowledged of the following addenda:

Respectfully Submitted,

Name of Contractor _____

By: _____
Authorized Signature

Seal if bidder is a corporation

Name: _____

Address: _____

City: _____ **County:** _____

State: _____

Tel: _____

Fax: _____

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
BASE BID						
P1		PREPARING ROW	55	STA		
	0100 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P2		REMOVING CONC (PAV)	928	SY		
	0104 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P3		REMOVING CONC (RIPRAP)	740	SY		
	0104 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P4		REMOVING CONC (DRIVEWAYS)	643	SY		
	0104 6017	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P5		REMOVE CONC (RAIL)	1,446	LF		
	0104 6037	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P6		REMOVING STAB BASE & ASPH PAV (4" - 6")	158	SY		
	0105 6069	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P7		EXCAVATION (ROADWAY)	1,718	CY		
	0110 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P8		EMBANKMENT (FINAL)(DENS CONT)(TY C1)	2,503	CY		
	0132 6025	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P9		EMBANKMENT (FINAL)(DENS CONT)(TY C2)	472	CY		
	0132 6026	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P10		FL BS (CMP IN PLACE)(TY A GR 1-2)(8")	61	SY		
	0247 6230	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P11		LIME (HYDRATED LIME (DRY))	132	TON		
	0260 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P12		LIME TRT (SUBGRADE) (6")	8,275	SY		
	0260 6079	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P13		CONC PVMT (CONT REINF - CRCP) (10")	61	SY		
	0360 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P14		TEMPORARY SPL SHORING	3,200	SF		
	0403 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P15		DRILL SHAFT (RDWY ILL POLE) (30 IN)	40	LF		
	0416 6029	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P16		CL A CONC (FLUME)	1	CY		
	0420 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P17		CL C CONC (RAIL FOUNDATION)	2	CY		
	0420 6066	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P18		RETAINING WALL (CAST-IN-PLACE)	7,418	SF		
	0423 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P19		RIPRAP (MOW STRIP) (4 IN)	6	CY		
	0432 6045	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P20		STR STEEL (MISCELLANEOUS BRIDGE)	1,600	LB		
	0442 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P21		RAIL (TY T402)	143	LF		
	0450 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P22		RAIL (ORNAMENTAL FENCE)	2,502	LF		
	0450 6128	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P23		RETROFIT RAIL (TY T402)	1,446	LF		
	0451 6011	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P24		ADJUSTING MANHOLES	2	EA		
	0479 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P25		ADJUSTING MANHOLES (WATER VALVE BOX)	7	EA		
	0479 6005	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P26		ADJUSTING MANHOLES (WATER METER)	1	EA		
	0479 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P27		REMOV STR (DRILL SHAFT)	5	EA		
	0496 2035	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P28		MOBILIZATION	1	LS		
	0500 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P29		BARRICADES, SIGNS, AND TRAFFIC HANDLING	9	MO		
	0502 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P30		PORTABLE CTB (FUR & INST)(LOW PROF)(TY 1)	2,698	LF		
	0512 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P31		PORT CTB (FUR & INST)(LOW PROF)(TY 2)	40	LF		
	0512 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P32		PORTABLE CTB (REMOVE)(LOW PROF)(TY 1)	2,698	LF		
	0512 6057	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P33		PORT CTB (REMOVE)(LOW PROF)(TY 2)	40	LF		
	0512 6058	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P34		COLORED TEXTURED CONC (5")	1,186	SY		
	0528 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P35		CONC CURB & GUTTER (TY II)	1,138	LF		
	0529 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P36		DRIVEWAYS (CONC) (HES)	940	SY		
	0530 6017	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P37		CONC SIDEWALKS (5")	5,996	SY		
	0531 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P38		CURB RAMPS (TY 5)	1	EA		
	0531 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P39		CURB RAMPS (TY 7)	5	EA		
	0531 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P40		CURB RAMPS (TY 20)	1	EA		
	0531 6015	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P41		CONCRETE SIDEWALK WITH WALL	8	CY		
	0531 6052	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P42		MTL W-BEAM GD FEN (TIM POST)	200	LF		
	0540 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P43		MTL BEAM GD FEN TRANS (THRIE-BEAM)	2	EA		
	0540 6006	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P44		REMOVE METAL BEAM GUARD FENCE	2,097	LF		
	0542 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P45		GUARDRAIL END TREATMENT (INSTALL)	2	EA		
	0544 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P46		RELOCATE RD IL ASM (TRANS-BASE)	4	EA		
	0610 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P47		IN RD IL (TY SA) 30S-8-8 (250W EQ) LED	1	EA		
	0610 6155	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P48		CONDT (PVC) (SCH 40) (2") (BORE)	180	LF		
	0618 6024	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P49		ELEC CONDR (NO.8) BARE	180	LF		
	0620 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P50		ELEC CONDR (NO.8) INSULATED	360	LF		
	0620 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P51		GROUND BOX TY A (122311)	2	EA		
	0624 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P52		IN SM RD SN SUP&AM TY 10BWG(1)SA(P)	21	EA		
	0644 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P53		RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	408	LF		
	0666 6309	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P54		REFL PAV MRK TY I (W)24"(SLD)(100MIL)	311	LF		
	0666 6048	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P55		REFL PAV MRK TY I (W) (ARROW) (100MIL)	6	EA		
	0666 6054	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P56		REFL PAV MRK TY I (W)(WORD)(100MIL)	8	EA		
	0666 6078	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P57		REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)	2	EA		
	0666 6111	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P58		RE PM W/RET REQ TY I(W)4"(BRK)(100MIL)	440	LF		
	0666 6300	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P59		RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)	1,700	LF		
	0666 6303	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P60		RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)	150	LF		
	0666 6315	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P61		REFL PAV MRKR TY II-C-R	186	EA		
	0672 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P62		ELIM EXT PAV MRK & MRKS (4")	138	LF		
	0677 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P63		ELIM EXT PAV MRK & MRKS (24")	31	LF		
	0677 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P64		PAV SURF PREP FOR MRK (4")	2,290	LF		
	0678 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P65		PAV SURF PREP FOR MRK (6")	408	LF		
	0678 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P66		PAV SURF PREP FOR MRK (24")	311	LF		
	0678 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P67		PAV SURF PREP FOR MRK (ARROW)	6	EA		
	0678 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P68		PAV SURF PREP FOR MRK (WORD)	8	EA		
	0678 6016	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P69		PAV SURF PREP FOR MRK (BIKE SYMBOL)	2	EA		
	0678 6028	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P70		PORTABLE CHANGEABLE MESSAGE SIGN	4	EA		
	6001 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P71		PROJECT SIGN	6	EA		
	NCTCOG 107.21	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P72		REMOVE AND RELOCATE FIRE HYDRANT	2	EA		
	NCTCOG 502.3	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
P73		MONOLOTHIC MEDIAN NOSE	1	EA		
	COFB 6000	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P74		REFL PAV MRK TY I (W)18"(SLD)(100MIL)	58	LF		
	0666 6045	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
P75		PAV SURF PREP FOR MRK (18")	58	LF		
	0678 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D1		TRENCH EXCAVATION PROTECTION	517	LF		
	0402 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D2		CONC BOX CULV (4 FT X 2 FT)	258	LF		
	0462 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D3		CONC BOX CULV (7 FT X 3 FT)	20	LF		
	0462 6014	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D4		RC PIPE (CL III)(18 IN)	55	LF		
	0464 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D5		RC PIPE (CL III)(24 IN)	120	LF		
	0464 6005	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D6		RC PIPE (CL III)(30 IN)	64	LF		
	0464 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
D7		JCTBOX(COMPL)(PJB)(6FTX6FT)	1	EA		
	0465 6011	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D8		INLET (COMPL)(CURB)(TY 1)(MOD)	2	EA		
	0465 6200	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D9		SET (TY II) (30 IN) (RCP) (4: 1) (C)	2	EA		
	0467 6419	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D10		REMOVE STR (INLET)	1	EA		
	0496 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D11		REMOVE STR (SET)	4	EA		
	0496 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D12		REMOVE STR (HEADWALL)	1	EA		
	0496 6006	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D13		REMOVE STR (PIPE)	201	LF		
	0496 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D14		REMOVE STR (BOX CULVERT)	2	LF		
	0496 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D15		ROCK FILTER DAMS (INSTALL) (TY 1)	12	LF		
	0506 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
D16		ROCK FILTER DAMS (REMOVE)	12	LF		
	0506 6011	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D17		CONSTRUCTION EXITS (INSTALL)(TY 1)	625	SY		
	0506 6020	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D18		CONSTRUCTION EXITS (REMOVE)	625	SY		
	0506 6024	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D19		TEMP SEDMT CONT FENCE (INSTALL)	4,963	LF		
	0506 6038	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D20		TEMP SDMT CONT FENCE (INLET PROTECTION)	249	LF		
	0506 6047	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D21		TEMP SEDMT CONT FENCE (REMOVE)	4,963	LF		
	0506 6039	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D22		BIODEG EROSN CONT LOGS (INSTL) (8")	131	LF		
	0506 6040	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D23		BIODEG EROSN CONT LOGS (REMOVE)	131	LF		
	0506 6043	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
D24		STORM WATER POLLUTION PREVENTION PLAN	1	LS		
	NCTCOG 107.28	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
D25		3'x3' DROP INLET WITH CONCRETE APRON	2	EA		
	NCTCOG 702	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T1		DRILL SHAFT (TRF SIG POLE) (36 IN)	26	LF		
	0416 6032	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T2		CL C CONC (FOOTING)	4	CY		
	0420 6043	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T3		CONDT (PVC) (SCH 80) (2")	175	LF		
	0618 6046	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T4		CONDT (PVC) (SCH 80) (2") (BORE)	255	LF		
	0618 6047	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T5		CONDT (PVC) (SCH 80) (3")	330	LF		
	0618 6053	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T6		CONDT (PVC) (SCH 80) (3") (BORE)	340	LF		
	0618 6054	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T7		CONDT (PVC) (SCH 80) (4")	100	LF		
	0618 6058	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T8		CONDT (PVC) (SCH 80) (4") (BORE)	55	LF		
	0618 6059	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T9		ELEC CONDR (NO.6) BARE	1,065	LF		
	0620 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T10		ELEC CONDR (NO.6) INSULATED	200	LF		
	0620 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T11		ELEC CONDR (NO.8) INSULATED	380	LF		
	0620 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T12		ELEC CONDR (NO.12) INSULATED	160	LF		
	0620 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T13		TRAY CABLE (3 CONDR) (12 AWG)	240	LF		
	0621 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T14		GROUND BOX TY D (162922)W/APRON	6	EA		
	0624 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T15		GROUND BOX TY 2 (243636)W/APRON	1	EA		
	0624 6021	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T16		ELC SRV TY D 120/240 060(NS)SS(E)PS(U)	1	EA		
	0628 6144	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T17		INSTALL HWY TRF SIG (ISOLATED)	1	EA		
	0680 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T18		INSTALL HWY TRF SIG (UPGRADE)	2	EA		
	0680 6011	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T19		VEH SIG SEC (12")LED(GRN)	3	EA		
	0682 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T20		VEH SIG SEC (12")LED(GRN ARW)	4	EA		
	0682 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T21		VEH SIG SEC (12")LED(YEL)	4	EA		
	0682 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T22		VEH SIG SEC (12")LED(YEL ARW)	5	EA		
	0682 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T23		VEH SIG SEC (12")LED(RED)	4	EA		
	0682 6005	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T24		VEH SIG SEC (12")LED(RED ARW)	6	EA		
	0682 6006	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T25		PED SIG SEC (LED)(COUNTDOWN)	6	EA		
	0682 6018	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T26		BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM	4	EA		
	0682 6054	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T27		BACKPLATE W/REF BRDR(4 SEC)(VENT)ALUM	1	EA		
	0682 6055	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T28		BACKPLATE W/REF BRDR(5 SEC)(VENT)ALUM	2	EA		
	0682 6056	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T29		TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	285	LF		
	0684 6031	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T30		TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	110	LF		
	0684 6033	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T31		TRF SIG CBL (TY A)(14 AWG)(10 CONDR)	770	LF		
	0684 6036	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T32		TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	440	LF		
	0684 6046	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T33		TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	675	LF		
	0684 6079	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T34		INS TRF SIG PL AM(S)1 ARM(24')LUM	1	EA		
	0686 6027	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T35		INS TRF SIG PL AM(S)1 ARM(36')LUM	1	EA		
	0686 6039	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T36		INS TRF SIG PL AM(S)1 ARM(48')LUM	1	EA		
	0686 6054	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T37		PED POLE ASSEMBLY	6	EA		
	0687 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T38		PED DETECT PUSH BUTTON (APS)	6	EA		
	0688 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T39		PED DETECTOR CONTROLLER UNIT	3	EA		
	0688 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T40		REMOVAL OF GROUND BOXES	1	EA		
	0690 6006	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T41		REMOVAL OF CABLES	1	LS		
	0690 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T42		REMOVAL OF TRAFFIC SIGNAL POLE FND	1	EA		
	0690 6033	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T43		REMOVAL OF SIGNAL POLE ASSM	1	EA		
	0690 6051	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T44		CCTV FIELD EQUIPMENT (DIGITAL)	1	EA		
	6010 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T45		CCTV FIELD CONTROLLER	1	EA		
	6010 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T46		CCTV MOUNT (POLE)	1	EA		
	6010 6004	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T47		CONDUIT (PREPARE)	280	LF		
	6027 6003	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T48		GROUND BOX (PREPARE)	1	EA		
	6027 6008	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T49		GROUND BOX (ADJUST)	3	EA		
	6027 6009	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T50		INSTALL VIVDS CAMERA ASSEMBLY	1	EA		
	6052 6002	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T51		INSTALL VIVDS COMMUNICATION CABLE	325	LF		
	6052 6004	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T52		BBU SYSTEM (EXTERNAL BATT CABINET)	1	EA		
	6058 6001	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T53		RADAR COMMUNICATION CABLE	300	LF		
	6155 6002	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
T54		RVDS (PRESENCE AND ADVANCE DET) FURN & INS	3	EA		
	6292 6003	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
T55		PRE-EMPTION DETECTOR	1	EA		
	COFB 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
T56		PRE-EMPTION CABLE	320	LF		
	COFB 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L1		COMPOST MANUF TOPSOIL (4")	12,355	SY		
	0161 6017	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L2		BLOCK SODDING	2,182	SY		
	0162 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L3		BROADCAST SEED (PERM) (URBAN) (CLAY)	10,173	SY		
	0164 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L4		FERTILIZER	2	AC		
	0166 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L5		VEGETATIVE WATERING	100	MG		
	0168 6001	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L6		PLANT MATERIAL (1-GAL)	93	EA		
	0192 6002	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
L7		MULCH	22	CY		
	0192 6012	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
L8		PLANT MAINTENANCE	12	MO		
	0193 6001	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
IRR1		IRRIGATION SYSTEM	1	LS		
	0170 6001	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
IRR2		IRRIGATION SYSTEM OPER AND MAINT	12	MO		
	0193 6007	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	

TOTAL AMOUNT BID - BASE BID

(Total Amount Bid, Numerical Value)

and _____ Dollars
_____ Cents
(Total Amount Bid in Words)

***The Owner reserves the right to delete any bid items or portions thereof. If the Owner elects to delete any portions of the PROJECT from the contract, then the contract can be awarded on that basis.**

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
ALTERNATE BID						
A1		DRILLED SHAFT FOUNDATION (RDWY ILL POLE) (8 FEET LN X 30 INCHES DIA)	48	LF		
	416 6029	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A2		CONDT (PVC) (SCHD 40) (2")	390	LF		
	618 6023	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A3		CONDT (RM) (3/4")	450	LF		
	618 6062	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A4		ELECTRIC CONDR (NO. 8) BARE	840	LF		
	620 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A5		ELECTRIC CONDR (NO. 8) INSULATED	1,700	LF		
	620 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A6		GROUND BOX TY C (162911) W/ APRON	1	EA		
	624 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A7		ELECTRICAL SERVICE TY A (120/240)60(NS)AL(E)PS(U)	1	EA		
	628 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A8		SOLAR POWERED LIGHT POLE ASSEMBLY (GROUND MOUNTED)	6	EA		
	COFB 6003	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
A9		12" COLOR CHANGING LED FIXTURE	120	EA		
	COFB 6004	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A10		COLUMN WRAP LED LUMINAIRE LEADER CABLES	15	EA		
	COFB 6005	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A11		COLUMN WRAP LED LUMINAIRE 5' JUMPER CABLES	15	EA		
	COFB 6006	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A12		COLUMN WRAP LED LUMINAIRE 2' JUMPER CABLES	90	EA		
	COFB 6007	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A13		COLUMN WRAP LED LUMINAIRE CONTROL BOXES	15	EA		
	COFB 6008	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A14		ETC MOSAIC CONTROLS AND ONSITE COMMISSIONING AND PROGRAMMING	1	EA		
	COFB 6009	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A15		CLIMATE CONTROLLED STAINLESS STEEL NEMA 4X ENCLOSURE AND STRUT ASSEMBLY	1	EA		
	COFB 6010	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	
A16		LANDSCAPE AMENITY (CONCRETE SEATING)	9	EA		
	COFB 6011	Complete in Place, for the Sum of _____ Dollars and _____ Cents per unit			\$	

Item No.	Spec. Item	Name of Pay Item with Unit Price in Words	Est. Quantity	Unit	Unit Bid Price	Amount Bid
A17		LANDSCAPE AMENITY (TRASH RECEPTABLE)	2	EA		
	COFB 6012	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
A18		LANDSCAPE AMENITY (ART MESH WRAP)	15	EA		
	COFB 6013	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	
A19		MAINTENANCE BOND	1	LS		
	COFB 6014	Complete in Place, for the Sum of				
		_____ Dollars and _____ Cents per unit			\$	

TOTAL AMOUNT BID - ALTERNATE BID

\$ _____ -

(Total Amount Bid, Numerical Value)

and _____ Dollars
 _____ Cents
 (Total Amount Bid in Words)

***The Owner reserves the right to delete any bid items or portions thereof. If the Owner elects to delete any portions of the PROJECT from the contract, then the contract can be awarded on that basis.**

V. CERTIFICATIONS AND DISCLOSURES

**A. HOUSE BILL 793, PROHIBITION OF CONTRACTS WITH COMPANIES
BOYCOTTING ISREAL**

House Bill 89, Prohibition of Contracts with Companies Boycotting Israel

I, _____(Name of certifying official), the
_____ (title or position of certifying official) of
_____ (name of company), does hereby verify on
behalf of said company to the City that said company does not Boycott Israel and will not
Boycott Israel (as that term is defined in Texas Government Code Section 808.001, as amended)
during the term of this contract.

Signature of Certifying Official
Title:
Date:

B. SENATE BILL 252 PROHIBITION OF CONTRACTS WITH CERTAIN COMPANIES

Senate Bill 252 Prohibition of Contracts with Certain Companies

Senate Bill 252 amends Chapter 2252, Texas Government Code, effective September 1, 2017, by adding Subchapter F and, specifically, Tex. Govt. Code §2252.152, prohibiting cities and other governmental entities from entering into a governmental contract (defined to mean “a contract awarded by a governmental entity for general construction, an improvement, a service, or a public works project or for a purchase of supplies, materials, or equipment” and including contracts professional or consulting service subject to Texas Govt Code Ch. 2254, (the Professional Procurement Act¹) with a company that is identified on a list prepared and maintained by the Texas Comptroller and that does business with Iran, Sudan, or a foreign terrorist organization.

The new law will apply to contracts for: general construction work; an improvement; any professional or other service; a public works project; purchase of supplies; purchase of materials; and for the purchase of equipment.

Exception: A company that the United States government affirmatively declares to be excluded from its federal sanctions regime relating to Sudan, its federal sanctions regime relating to Iran, or any federal sanctions regime relating to a foreign terrorist organization is not subject to contract prohibition under this subchapter.

For purpose of the new law, “Company” means a sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, limited liability company, or other entity or business association whose securities are publicly traded, including a wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of those entities or business associations, that exists to make a profit.

A foreign terrorist organization is defined to mean an organization designated as a foreign terrorist organization by the United States secretary of state as authorized by 8 U.S.C. Section 1189.

Under the new law, the Texas Comptroller is required to prepare, maintain, and provide to each governmental entity in the state (including the City), a list of all companies known to have contracts with or provide supplies or services to a foreign terrorist organization.

Application of new requirements: The new requirements apply to a contract or purchase for which the governmental unit (including the City) first advertises or otherwise solicits bids, proposals, offers or qualifications on or after September 1, 2017. Thus, the new law does not apply to contracts for which bids, proposals, offers, or qualifications have already been solicited, even if the contract is not awarded on or after September 1, 2017.

While not required, the City may wish to consider adding to its solicitation for bids, proposals or offers a statement that the City is prohibited from entering a contract with a company that is identified on a list prepared and maintained by the Texas Comptroller and that does business with Iran, Sudan, or a foreign terrorist organization. The City will of course need to monitor the Comptroller list before award of such contracts to be sure that the bidder is not on the most recent version of the list.

C. CONFLICT OF INTEREST QUESTIONNAIRE

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 Name of vendor who has a business relationship with local governmental entity.

2 Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 Name of local government officer about whom the information is being disclosed.

 Name of Officer

4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

Yes No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

Yes No

5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

6 Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

 Signature of vendor doing business with the governmental entity

 Date

D. CERTIFICATE OF INTERESTED PARTIES (FORM 1295)

The qualified low bidder must electronically file Form 1295 and submit the notarized copy with certificate number to the City within seventy two (72) hours (3 working days) of the bid opening. Failure to submit the "Form 1295" within (72) hours (3 working day) may cause the bid to be deemed non- responsive.

Website: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
 Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 Check only if there is NO Interested Party.

6 UNSWORN DECLARATION

My name is _____, and my date of birth is _____.

My address _____
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20_____
(month) (year)

 Signature of authorized agent of contracting business entity
 (Declarant)

ADD ADDITIONAL PAGES AS NECESSARY

VI. TAX PAYER IDENTIFICATION NUMBER AND CERTIFICATION

Request for Taxpayer Identification Number and Certification

**Give Form to the
requester. Do not
send to the IRS.**

▶ Go to www.irs.gov/FormW9 for instructions and the latest information.

Print or type. See Specific Instructions on page 3.	<p>1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.</p> <p>2 Business name/disregarded entity name, if different from above</p> <p>3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.</p> <p><input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate</p> <p><input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____</p> <p>Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.</p> <p><input type="checkbox"/> Other (see instructions) ▶ _____</p>	<p>4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):</p> <p>Exempt payee code (if any) _____</p> <p>Exemption from FATCA reporting code (if any) _____</p> <p><small>(Applies to accounts maintained outside the U.S.)</small></p>
	<p>5 Address (number, street, and apt. or suite no.) See instructions.</p> <p>6 City, state, and ZIP code</p> <p>7 List account number(s) here (optional)</p>	<p>Requester's name and address (optional)</p>

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number													
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Employer identification number													
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Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	Signature of U.S. person ▶ _____	Date ▶ _____
------------------	----------------------------------	--------------

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

VII. STANDARD FORM OF AGREEMENT

CITY OF FARMERS BRANCH
STANDARD FORM OF AGREEMENT
FOR OWNER-CONTRACTOR PROJECTS

Approved as to Legal Form by
Legal Counsel

STATE OF TEXAS }

COUNTY OF DALLAS }

THIS AGREEMENT made and entered into this _____ day of _____, A.D. 2025, by and between THE CITY OF FARMERS BRANCH of the County of Dallas and State of Texas, acting through THE CITY MANAGER OF THE CITY OF FARMERS BRANCH, thereunto duly authorized so to do, Party of the First Part, hereinafter termed Owner, and _____, of the City of _____ County of _____ and the State of Texas, Party of the Second Part, hereinafter termed Contractor.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Party of the First Part (Owner), and under the conditions expressed in the bond bearing even date herewith, the said Part of the Second Part (Contractor), hereby agrees with the said Party of the First Part (Owner) to commence and complete the construction of certain improvements described as follows:

Farmers Branch Westside Art Trail and all extra work in connection therewith, under the terms as stated in the General Conditions of the Agreement and at his (or their) own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said construction, in accordance with the Notice to Contractors, General and Special Conditions of Agreement, Plans and other drawings and printed or written explanatory matter thereof, and the Specifications and addenda therefore, as prepared by **Kimley-Horn & Associates** herein entitled the Consultant Engineer, each of which has been identified by the Contractor and the Engineer, together with the Contractor's written proposal, the General Conditions of the Agreement, the Performance, Payment, and Maintenance Bonds hereto attached; all of which are made a part hereof and collectively evidence and constitute the entire Contract.

A. Contract Document and Order of Precedence

The Contract Documents shall consist of the following documents:

1. this Construction Agreement;
2. properly authorized change orders;
3. any listed and numbered addenda;
4. the Special Conditions;
5. the Special Provisions;

6. the General Conditions of Agreement;
7. Technical Specifications and Construction Drawings;
8. the Owner's Standard Construction Details;
9. the Texas Department Standard Specifications for Construction and Maintenance of Highways, Street and Bridges Adopted by the Texas Department of Transportation November 1, 2014;
10. the Standard Specifications for Public Works Construction" by North Central Texas Council of Governments (NCTCOG) most recent amendments;
11. the Owner's written notice to proceed to the contractor;
12. the Contractor's Bid Proposal;
13. the Performance, Payment, and Maintenance Bonds;
14. any other bid materials distributed by the Owner that relate to the Project.

The Contractor hereby agrees to commence work within ten (10) calendar days after the date written notice to do so shall have been given to him, and to substantially complete the same within **270** calendar days after the date of the written notice to commence work, subject to such extensions of time as are provided by the General and Special Conditions.

The Owner agrees to pay the Contractor in current funds the price or prices shown in the proposal, attached hereto and incorporated herein as part of this Contract, such payments to be subject to the General and Special Conditions of the Contract.

IN WITNESS WHEREOF, the parties to these presents have executed this Agreement in the year and day first above written.

City of Farmers Branch	
Party of the First Part (Owner)	Party of the Second Part (Contractor)
By: _____	By: _____
Name: <u>Ben Williamson</u>	Name: _____
Title: <u>City Manager</u>	Title: _____
Attest: _____	Attest: _____
<u>Stacy Henderson</u>	Name: _____
<u>City Secretary</u>	Title: _____

Approved As To Form:

 City Attorney

VIII. PERFORMANCE BOND

PERFORMANCE BOND

STATE OF TEXAS }

COUNTY OF DALLAS }

KNOW ALL MEN BY THESE PRESENTS: That _____, of the City of _____ County of _____, and State of _____ as principal, and _____ authorized under the laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto CITY OF FARMERS BRANCH, TEXAS (Owner), in the penal sum of

_____ Dollars (_____) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written Contract with the Owner dated the ____ day of _____, 2025, to **Farmers Branch Westside Art Trail** which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein. This bond shall automatically adjust in amount due to any change orders approved by the City.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Contract and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by said Contract agreed and covenanted by the Principal to be observed and performed, and according to the true intent and meaning of said Contract and the Plans and Specifications hereto annexed, then this obligation shall be void; otherwise to remain in full force and effect;

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with the provisions of said statute to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work performed thereunder, or the plans, specifications, or drawings accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder.

Surety holds a Certificate of Authority from the Department of the United States Treasury and is an acceptable surety on Federal Bonds or is an acceptable reinsurer and is in compliance with Texas Government Code, Section 2253.021, Texas Insurance Code, Sections 3503.001-.005 and any other applicable State or federal law, rule, or regulation, as amended.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this ___day of ____, 2025.

Principal

By: _____
Name: _____
Title: _____
Address: _____

Surety

By: _____
Name: _____
Title: _____
Address: _____

The name, address and phone number of the Resident Agent of Surety is:

IX. PAYMENT BOND

PAYMENT BOND

STATE OF TEXAS }

COUNTY OF DALLAS }

KNOW ALL MEN BY THESE PRESENTS: That _____, of the City of _____, County of _____, and State of _____ as Principal, and _____ authorized under the laws of the State of Texas to act as Surety on bonds for Principals, are held and firmly bound unto City of Farmers Branch, Texas (Owner), in the penal sum of _____ Dollars (_____) of the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written Contract with the Owner, dated the ___ day of _____, 2025, to **Farmers Branch Westside Art Trail** which Contract is hereby referred to and made a part hereto as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said Contract, then, this obligation shall be void; otherwise to remain in full force and effect;

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Statute to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to Contract performed thereunder, or the plans, specifications or drawings accompanying the same, shall in anywise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder.

Surety holds a Certificate of Authority from the Department of the United States Treasury and is an acceptable surety on Federal Bonds or is an acceptable reinsurer and is in compliance with Texas Government Code, Section 2253.021, Texas Insurance Code, Sections 3503.001-.005 and any other applicable State or federal law, rule, or regulation, as amended.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 2025.

Principal

Surety

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Address: _____

Address: _____

The name, address and phone number of the Resident Agent of Surety is:

X. MAINTENANCE BOND

Contractor shall provide a maintenance bond to the Owner for a term of one (1) year from date of Final Acceptance by the Owner. The amount of this maintenance bond shall be one hundred percent (100%) of the final Contract Price.

MAINTENANCE BOND

THE STATE OF TEXAS }

COUNTY OF DALLAS }

KNOW ALL MEN BY THESE PRESENT:

That _____, hereinafter called Contractor, as Principal, and _____ as Surety, do hereby acknowledge themselves to be held and bound to pay unto the City of Farmers Branch, Texas, hereafter “the City”, the penal sum of _____ Dollars (\$_____), which is one-hundred percent (100%) of said Contract amount in lawful money of the United States, for the payment of which sum well and truly to be made unto said City of Farmers Branch, Texas, and its successors, said Contractor and Surety do hereby bind themselves, their heirs, executors, administrators and assigns and successors, jointly and severally and firmly by these presents:

This obligation is conditioned, however, that whereas, said Contractor entered into a written contract on the ___ day of _____, 2025, with the City for the construction of **Farmers Branch Westside Art Trail** with miscellaneous construction in the City as provided in said Contract and specifications which are expressly made a part hereof, as though written herein in full and, Whereas, in said Contract, the Contractor binds itself to use first class materials and workmanship and of such kind and quality that for a period of one (1) year from the completion and final acceptance of the improvements by the City, the said improvements shall require no repairs, the necessity for which shall be occasioned by defects in workmanship or materials and during the period of one (1) year following the date of the final acceptance of the work by the City, the Contractor binds itself to repair or reconstruct the said improvements in whole or part at any time within said period of process employed in the construction of such improvements and that it will upon receiving notice, repair or reconstruct said improvements within such period of time from the date of such notice as the Engineer of said City shall determine to be necessary for the preservation of public health, safety, or welfare. If said Contractor does not repair or reconstruct the improvements within the time period designated then the City shall be entitled to have said repairs made and charge said Contractor and/or Surety the cost of same under the terms of this maintenance bond.

Now, therefore, if said Contractor shall keep and perform its said work and keep the same in repair for the said maintenance period of one (1) year, as provided, then these presents shall be null and void, and have no further effect, but if default shall be made by said work then these presents shall have full force and effect, and the City, shall have and recover from the said Contractor and its Surety, damages in the premises as provided in plans and specifications and contract.

Provided, however, that the Contractor hereby holds harmless and indemnifies said City from any claim or liability for personal injury or property damage caused by and occurring during the performance of said maintenance and repair operation. However, there shall be no liability on the Surety for and damages resulting from fire, acts of God, accident, or careless or malicious handling.

Surety holds a Certificate of Authority from the Department of the United States Treasury and is an acceptable surety on Federal Bonds or is an acceptable reinsurer and is in compliance with Texas Government Code,

Section 2253.021, Texas Insurance Code, Sections 3503.001-.005 and any other applicable State or federal law, rule, or regulation as amended.

IN WITNESS WHEREOF, this instrument is executed this the _____ day of _____, 2025.

Principal

By: _____
Name: _____

Title: _____

Address: _____

Surety

By: _____
Name: _____

Title: _____

Address: _____

The name, address and phone number of the Resident Agent of Surety is:

XI. CERTIFICATION OF INSURANCE

Certificate of Insurance

(Please Use This Form Or Approved Equal)

To: _____ **Date:** _____

Owner: _____ **Project No.:** _____

Address: _____ **Type of Project:** _____

THIS IS TO CERTIFY _____

(Name and address of insured)

is, at the date of this certificate, insured by this Company with respect to the business operations hereinafter described, for the types of Insurance and in accordance with the provisions of the standard policies used by this Company, and further hereinafter described. Exceptions to standard policy noted on reverse side hereof.

TYPE OF INSURANCE				
DESCRIPTION	POLICY #	EFFECTIVE	EXPIRES	LIMITS OF LIABILITY
WORKER'S COMPENSATION				
PUBLIC LIABILITY				
CONTINGENT LIABILITY				
PROPERTY DAMAGE				
BUILDER'S RISK				
AUTOMOBILE				
OTHER				

The foregoing policies (do) (do not) cover all sub-contractors.

Locations Covered: _____

Descriptions of Operations Covered: _____

The above referenced policies may not be changed, cancelled, or reduced in coverage without at least thirty (30) days advance written notice of such change or cancellation being given to the Owner. Where applicable local laws or regulations require more than thirty (30) days actual notice of change or cancellation to the insured, the above policies contain such special requirements, either in the body thereof or by appropriate endorsement thereto attached.

Name of Insurer: _____ **Title:** _____

By: _____

XII. AFFIDAVIT OF CONTRACTOR

STATE OF TEXAS }
COUNTY OF DALLAS }

AFFIDAVIT OF CONTRACTOR

I hereby certify that all bills for labor and materials due Subcontractors on the following City of Farmers Branch, Texas Project **Farmers Branch Westside Art Trail** have been paid by the undersigned and that no outstanding bills for labor or materials exist on the above referenced Project.

IN CONSIDERATION OF RECEIVING FINAL PAYMENT, AND UPON RECEIPT OF FINAL PAYMENT, THE UNDERSIGNED DOES HEREBY HOLD HARMLESS AND INDEMNIFY THE CITY OF FARMERS BRANCH, TEXAS, FROM ANY AND ALL LIABILITY, AND WILL REIMBURSE THE CITY OF FARMERS BRANCH, TEXAS, FOR ALL ITS COSTS, EXPENSES, COURT COSTS, REASONABLE ATTORNEYS' FEES AND DAMAGES, ON ANY SUCH CLAIMS OR LAWSUITS HEREINAFTER MADE IN CONNECTION WITH THE ABOVE PROJECT FOR ANY SUBCONTRACTOR FOR SUPPLYING OF LABOR OR MATERIALS ON SAID PROJECT.

I sign this affidavit with full authority and knowledge of the facts contained herein.

By:

Its:

SUBSCRIBED AND SWORN to before me by this _____ day
of _____, 2025.

Notary Public, State of Texas

(SEAL)

My Commission Expires:

XIII. SPECIAL PROVISIONS

FORM FHWA – 1273

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.* Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901-3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention*. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required*. Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits*. Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) *Additional records relating to apprenticeship*. Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission*. The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required*. The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance*. Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347*. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices* (1) *Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeymen under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

* * * * *

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**
This provision is applicable to all Federal-aid projects funded
under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

WAGE RATES

The wage rates listed herein are those predetermined by the Secretary of Labor and State Statute and listed in the United States Department of Labor's (USDOL) General Decisions dated 01-03-2025 and are the minimum wages to be paid accordingly for each specified classification. To determine the applicable wage rate zone, a list entitled "TEXAS COUNTIES IDENTIFIED BY WAGE RATE ZONES" is provided in the contract. Any wage rate that is not listed in the USDOL's general decision, must be requested by the contractor through the completion of an Additional Classification and Wage Rate Request and be submitted for approval. A blank cell indicates that the classification and wage rate are not listed on the USDOL's general decision and therefore must be requested by the contractor through the completion of an Additional Classification and Wage Rate Request. IMPORTANT NOTICE FOR STATE PROJECTS: only the controlling wage rate zone applies to the contract. Effective 01-03-2025.

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE TX02 *(TX20250002)	ZONE TX03 *(TX20250003)	ZONE TX04 *(TX20250004)	ZONE TX05 *(TX20250005)	ZONE TX06 *(TX20250006)	ZONE TX07 *(TX20250007)	ZONE TX08 *(TX20250008)	ZONE TX24 *(TX20250024)	ZONE TX25 *(TX20250025)	ZONE TX27 *(TX20250027)	ZONE TX28 *(TX20250028)	ZONE TX29 *(TX20250029)	ZONE TX30 *(TX20250030)	ZONE TX37 *(TX20250037)	ZONE TX38 *(TX20250038)	ZONE TX42 *(TX20250042)
1428	Agricultural Tractor Operator						\$12.69					\$12.35			\$11.75		
1300	Asphalt Distributor Operator	\$14.87	\$13.48	\$13.88	\$15.72	\$15.58	\$15.55	\$15.72	\$13.28	\$15.32	\$15.62	\$14.36	\$14.25	\$14.03	\$13.75	\$14.06	\$14.40
1303	Asphalt Paving Machine Operator	\$13.40	\$12.25	\$12.35	\$13.87	\$14.05	\$14.36	\$14.20	\$13.26	\$13.99	\$14.68	\$12.92	\$13.44	\$12.53	\$14.00	\$14.32	\$12.99
1106	Asphalt Raker	\$12.28	\$10.61	\$12.02	\$14.21	\$11.65	\$12.12	\$11.64	\$11.44	\$12.69	\$12.05	\$11.34	\$11.67	\$11.40	\$12.59	\$12.36	\$11.78
1112	Batching Plant Operator, Asphalt																
1115	Batching Plant Operator, Concrete																
1214	Blaster																
1615	Boom Truck Operator						\$18.36										
1444	Boring Machine Operator																
1305	Broom or Sweeper Operator	\$11.21	\$10.33	\$10.08	\$11.99		\$11.04	\$11.62		\$11.74	\$11.41	\$10.30		\$10.23	\$10.60	\$12.68	\$11.05
1144	Communications Cable Installer																
1124	Concrete Finisher, Paving and Structures	\$13.55	\$12.46	\$13.16	\$12.85	\$12.64	\$12.56	\$12.77	\$12.44	\$14.12	\$13.04	\$13.38	\$12.64	\$12.80	\$12.79	\$12.98	\$13.32
1318	Concrete Pavement Finishing Machine Operator				\$16.05		\$15.48			\$16.05		\$19.31				\$13.07	
1315	Concrete Paving, Curing, Float, Texturing Machine Operator											\$16.34				\$11.71	
1333	Concrete Saw Operator				\$14.67					\$14.48	\$17.33					\$13.99	
1399	Concrete/Gunite Pump Operator																
1344	Crane Operator, hydraulic 80 tons or less				\$18.22		\$18.36			\$18.12	\$18.04	\$20.21			\$18.63	\$13.86	
1345	Crane Operator, Hydraulic Over 80 Tons																
1342	Crane Operator, Lattice Boom 80 Tons or Less	\$16.82	\$14.39	\$13.85	\$17.27		\$15.87			\$17.27		\$14.67			\$16.42	\$14.97	\$13.87
1343	Crane Operator, Lattice Boom Over 80 Tons				\$20.52		\$19.38			\$20.52		\$17.49			\$25.13	\$15.80	
1306	Crawler Tractor Operator	\$13.96	\$16.63	\$13.62	\$14.26		\$15.67			\$14.07	\$13.15	\$13.38			\$14.60	\$13.68	\$13.50
1351	Crusher or Screen Plant Operator																
1446	Directional Drilling Locator						\$11.67										
1445	Directional Drilling Operator				\$20.32		\$17.24										
1139	Electrician	\$20.96		\$19.87	\$19.80		\$26.35		\$20.27	\$19.80		\$20.92				\$27.11	\$19.87
1347	Excavator Operator, 50,000 pounds or less	\$13.46	\$12.56	\$13.67	\$17.19		\$12.88	\$14.38	\$13.49	\$17.19		\$13.88			\$14.09	\$12.71	\$14.42
1348	Excavator Operator, Over 50,000 pounds		\$15.23	\$13.52	\$17.04		\$17.71			\$16.99	\$18.80	\$16.22				\$14.53	\$13.52
1150	Flagger	\$9.30	\$9.10	\$8.50	\$10.28	\$8.81	\$9.45	\$8.70		\$10.06	\$9.71	\$9.03	\$8.81	\$9.08	\$9.90	\$10.33	\$8.10
1151	Form Builder/Setter, Structures	\$13.52	\$12.30	\$13.38	\$12.91	\$12.71	\$12.87	\$12.38	\$12.26	\$13.84	\$12.98	\$13.07	\$13.61	\$12.82	\$14.73	\$12.23	\$12.25
1160	Form Setter, Paving & Curb	\$12.36	\$12.16	\$13.93	\$11.83	\$10.71	\$12.94			\$13.16	\$12.54	\$11.33	\$10.69		\$13.33	\$12.34	\$13.93
1360	Foundation Drill Operator, Crawler Mounted				\$17.99					\$17.99						\$17.43	
1363	Foundation Drill Operator, Truck Mounted		\$16.86	\$22.05	\$21.51		\$16.93			\$21.07	\$20.20	\$20.76		\$17.54	\$21.39	\$15.89	\$22.05
1369	Front End Loader Operator, 3 CY or Less	\$12.28	\$13.49	\$13.40	\$13.85		\$13.04	\$13.15	\$13.29	\$13.69	\$12.64	\$12.89			\$13.51	\$13.32	\$12.17
1372	Front End Loader Operator, Over 3 CY	\$12.77	\$13.69	\$12.33	\$14.96		\$13.21	\$12.86	\$13.57	\$14.72	\$13.75	\$12.32			\$13.19	\$13.17	\$13.02
1329	Joint Sealer																
1172	Laborer, Common	\$10.30	\$9.86	\$10.08	\$10.51	\$10.71	\$10.50	\$10.24	\$10.58	\$10.72	\$10.45	\$10.30	\$10.25	\$10.03	\$10.54	\$11.02	\$10.15
1175	Laborer, Utility	\$11.80	\$11.53	\$12.70	\$12.17	\$11.81	\$12.27	\$12.11	\$11.33	\$12.32	\$11.80	\$11.53	\$11.23	\$11.50	\$11.95	\$11.73	\$12.37
1346	Loader/Backhoe Operator	\$14.18	\$12.77	\$12.97	\$15.68		\$14.12			\$15.18	\$13.58	\$12.87		\$13.21	\$14.13	\$14.29	\$12.90
1187	Mechanic	\$20.14	\$15.47	\$17.47	\$17.74	\$17.00	\$17.10			\$17.68	\$18.94	\$18.58	\$17.00	\$16.61	\$18.46	\$16.96	\$17.47

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE TX02 *(TX20250002)	ZONE TX03 *(TX20250003)	ZONE TX04 *(TX20250004)	ZONE TX05 *(TX20250005)	ZONE TX06 *(TX20250006)	ZONE TX07 *(TX20250007)	ZONE TX08 *(TX20250008)	ZONE TX24 *(TX20250024)	ZONE TX25 *(TX20240025)	ZONE TX27 *(TX20250027)	ZONE TX28 *(TX20250028)	ZONE TX29 *(TX20250029)	ZONE TX30 *(TX20250030)	ZONE TX37 *(TX20250037)	ZONE TX38 *(TX20250038)	ZONE TX42 *(TX20250042)
1380	Milling Machine Operator Motor Grader Operator,	\$15.54	\$14.64	\$12.22	\$14.29		\$14.18			\$14.32	\$14.35	\$12.86			\$14.75	\$13.53	\$12.80
1390	Fine Grade	\$17.49	\$16.52	\$16.88	\$17.12	\$18.37	\$18.51	\$16.69	\$16.13	\$17.19	\$18.35	\$17.07	\$17.74	\$17.47	\$17.08	\$15.69	\$20.01
1393	Motor Grader Operator, Rough	\$16.15	\$14.62	\$15.83	\$16.20	\$17.07	\$14.63	\$18.50		\$16.02	\$16.44	\$15.12	\$16.85	\$14.47	\$17.39	\$14.23	\$15.53
1413	Off Road Hauler			\$10.08	\$12.26		\$11.88			\$12.25		\$12.23			\$13.00	\$14.60	
1196	Painter, Structures Pavement Marking Machine Operator					\$21.29	\$18.34						\$21.29			\$18.62	
1396		\$16.42		\$13.10	\$13.55		\$19.17	\$12.01		\$13.63	\$14.60	\$13.17		\$16.65	\$10.54	\$11.18	\$13.10
1443	Percussion or Rotary Drill Operator																
1202	Piledriver															\$14.95	
1205	Pipelayer		\$11.87	\$14.64	\$13.17	\$11.17	\$12.79		\$11.37	\$13.24	\$12.66	\$13.24	\$11.17	\$11.67		\$12.12	\$14.64
1384	Reclaimer/Pulverizer Operator	\$12.85			\$11.90		\$12.88			\$11.01		\$10.46					
1500	Reinforcing Steel Worker	\$13.50	\$14.07	\$17.53	\$16.17		\$14.00			\$16.18	\$12.74	\$15.83		\$17.10		\$15.15	\$17.72
1402	Roller Operator, Asphalt	\$10.95		\$11.96	\$13.29		\$12.78	\$11.61		\$13.08	\$12.36	\$11.68			\$11.71	\$11.95	\$11.50
1405	Roller Operator, Other	\$10.36		\$10.44	\$11.82		\$10.50	\$11.64		\$11.51	\$10.59	\$10.30		\$12.04	\$12.85	\$11.57	\$10.66
1411	Scraper Operator	\$10.61	\$11.07	\$10.85	\$12.88		\$12.27		\$11.12	\$12.96	\$11.88	\$12.43		\$11.22	\$13.95	\$13.47	\$10.89
1417	Self-Propelled Hammer Operator																
1194	Servicer	\$13.98	\$12.34	\$14.11	\$14.74		\$14.51	\$15.56	\$13.44	\$14.58	\$14.31	\$13.83		\$12.43	\$13.72	\$13.97	\$14.11
1513	Sign Erector Slurry Seal or Micro-Surfacing Machine Operator																
1708																	
1341	Small Slipform Machine Operator									\$15.96							
1515	Spreader Box Operator	\$12.60		\$13.12	\$14.71		\$14.04			\$14.73	\$13.84	\$13.68		\$13.45	\$11.83	\$13.58	\$14.05
1705	Structural Steel Welder															\$12.85	
1509	Structural Steel Worker						\$19.29									\$14.39	
1339	Subgrade Trimmer																
1143	Telecommunication Technician																
1145	Traffic Signal/Light Pole Worker Trenching Machine Operator,						\$16.00										
1440	Heavy						\$18.48										
1437	Trenching Machine Operator, Light																
1609	Truck Driver Lowboy-Float	\$14.46	\$13.63	\$13.41	\$15.00	\$15.93	\$15.66			\$16.24	\$16.39	\$14.30	\$16.62	\$15.63	\$14.28	\$16.03	\$13.41
1612	Truck Driver Transit-Mix				\$14.14					\$14.14							
1600	Truck Driver, Single Axle Truck Driver, Single or Tandem Axle Dump Truck	\$12.74	\$10.82	\$10.75	\$13.04	\$11.61	\$11.79	\$13.53	\$13.16	\$12.31	\$13.40	\$10.30	\$11.61		\$11.97	\$11.46	\$10.75
1606	Truck Driver, Tandem Axle Tractor with Semi Trailer	\$11.33	\$14.53	\$11.95	\$12.95		\$11.68		\$14.06	\$12.62	\$11.45	\$12.28		\$13.08	\$11.68	\$11.48	\$11.10
1607	Tunneling Machine Operator, Heavy	\$12.49	\$12.12	\$12.50	\$13.42		\$12.81	\$13.16		\$12.86	\$16.22	\$12.50			\$13.80	\$12.27	\$12.50
1441	Tunneling Machine Operator, Light																
1706	Welder		\$14.02		\$14.86		\$15.97		\$13.74	\$14.84					\$13.78		
1520	Work Zone Barricade Servicer	\$10.30	\$12.88	\$11.46	\$11.70	\$11.57	\$11.85	\$10.77		\$11.68	\$12.20	\$11.22	\$11.51	\$12.96	\$10.54	\$11.67	\$11.76

Notes:

*Represents the USDOL wage decision.

Any worker employed on this project shall be paid at the rate of one and one half (1-1/2) times the regular rate for every hour worked in excess of forty (40) hours per week.

For reference, the titles and descriptions for the classifications listed here are detailed further in the AGC of Texas' *Standard Job Classifications and Descriptions for Highway, Heavy, Utilities, and Industrial Construction in Texas* posted on the AGC's Web site for any contractor.

**TEXAS COUNTIES IDENTIFIED BY
WAGE RATE ZONES: 2, 3, 4, 5, 6, 7, 8, 24, 25, 27, 28, 29, 30, 37, 38, 42**

County Name	Zone	County Name	Zone	County Name	Zone	County Name	Zone
Anderson	28	Donley	37	Karnes	27	Reagan	37
Andrews	37	Duval	30	Kaufman	25	Real	37
Angelina	28	Eastland	37	Kendall	7	Red River	28
Aransas	29	Ector	2	Kenedy	30	Reeves	8
Archer	25	Edwards	8	Kent	37	Refugio	27
Armstrong	2	El Paso	24	Kerr	27	Roberts	37
Atascosa	7	Ellis	25	Kimble	37	Robertson	7
Austin	38	Erath	28	King	37	Rockwall	25
Bailey	37	Falls	28	Kinney	8	Runnels	37
Bandera	7	Fannin	28	Kleberg	27	Rusk	4
Bastrop	7	Fayette	27	Knox	37	Sabine	28
Baylor	37	Fisher	37	Lamar	28	San Augustine	28
Bee	27	Floyd	37	Lamb	37	San Jacinto	38
Bell	7	Foard	37	Lampasas	7	San Patricio	29
Bexar	7	Fort Bend	38	LaSalle	30	San Saba	37
Blanco	27	Franklin	28	Lavaca	27	Schleicher	37
Borden	37	Freestone	28	Lee	27	Scurry	37
Bosque	28	Frio	27	Leon	28	Shackelford	37
Bowie	4	Gaines	37	Liberty	38	Shelby	28
Brazoria	38	Galveston	38	Limestone	28	Sherman	37
Brazos	7	Garza	37	Lipscomb	37	Smith	4
Brewster	8	Gillespie	27	Live Oak	27	Somervell	28
Briscoe	37	Glasscock	37	Llano	27	Starr	30
Brooks	30	Goliad	29	Loving	37	Stephens	37
Brown	37	Gonzales	27	Lubbock	2	Sterling	37
Burleson	7	Gray	37	Lynn	37	Stonewall	37
Burnet	27	Grayson	25	Madison	28	Sutton	8
Caldwell	7	Gregg	4	Marion	28	Swisher	37
Calhoun	29	Grimes	28	Martin	37	Tarrant	25
Callahan	25	Guadalupe	7	Mason	27	Taylor	2
Cameron	3	Hale	37	Matagorda	27	Terrell	8
Camp	28	Hall	37	Maverick	30	Terry	37
Carson	2	Hamilton	28	McCulloch	37	Throckmorton	37
Cass	28	Hansford	37	McLennan	7	Titus	28
Castro	37	Hardeman	37	McMullen	30	Tom Green	2
Chambers	38	Hardin	38	Medina	7	Travis	7
Cherokee	28	Harris	38	Menard	37	Trinity	28
Childress	37	Harrison	42	Midland	2	Tyler	28
Clay	25	Hartley	37	Milam	28	Upshur	4
Cochran	37	Haskell	37	Mills	37	Upton	37
Coke	37	Hays	7	Mitchell	37	Uvalde	30
Coleman	37	Hemphill	37	Montague	37	Val Verde	8
Collin	25	Henderson	28	Montgomery	38	Van Zandt	28
Collingsworth	37	Hidalgo	3	Moore	37	Victoria	6
Colorado	27	Hill	28	Morris	28	Walker	28
Comal	7	Hockley	37	Motley	37	Waller	38
Comanche	37	Hood	28	Nacogdoches	28	Ward	37
Concho	37	Hopkins	28	Navarro	28	Washington	28
Cooke	37	Houston	28	Newton	28	Webb	3
Coryell	7	Howard	37	Nolan	37	Wharton	27
Cottle	37	Hudspeth	8	Nueces	29	Wheeler	37
Crane	37	Hunt	25	Ochiltree	37	Wichita	5
Crockett	8	Hutchinson	37	Oldham	37	Wilbarger	37
Crosby	2	Irion	2	Orange	38	Willacy	30
Culberson	8	Jack	28	Palo Pinto	28	Williamson	7
Dallam	37	Jackson	27	Panola	28	Wilson	7
Dallas	25	Jasper	28	Parker	25	Winkler	37
Dawson	37	Jeff Davis	8	Parmer	37	Wise	25
Deaf Smith	37	Jefferson	38	Pecos	8	Wood	28
Delta	25	Jim Hogg	30	Polk	28	Yoakum	37
Denton	25	Jim Wells	27	Potter	2	Young	37
DeWitt	27	Johnson	25	Presidio	8	Zapata	30
Dickens	37	Jones	25	Rains	28	Zavala	30
Dimmit	30			Randall	2		

PROHIBITION ON CERTAIN TELECOMMUNICATIONS EQUIPMENT OR SERVICES

Prohibition on Certain Telecommunications Equipment or Services

The Federal Register Notice issued the Final Rule and states that the amendment to 2 CFR 200.216 is effective on August 13, 2020. The new 2 CFR 200.471 regulation provides clarity that the telecommunications and video surveillance costs associated with 2 CFR 200.216 are unallowable for services and equipment from these specific providers. [OMB's Federal Register Notice](#) includes the new 2 CFR 200.216 and 2 CFR 200.471 regulations.

Per the Federal Law referenced above, use of services, systems, or services or systems that contain components produced by any of the following manufacturers is strictly prohibited for use on this project. Therefore, for any telecommunications, CCTV, or video surveillance equipment, services or systems cannot be manufactured by, or have components manufactured by:

- Huawei Technologies Company,
- ZTE Corporation (any subsidiary and affiliate of such entities),
- Hyatera Communications Corporation,
- Hangzhou Hikvision Digital Technology Company,
- Dahua Technology Company (any subsidiary and affiliate of such entities).

Violation of this requirement will require replacement of the equipment at the contractor's expense.

CHILD SUPPORT BUSINESS OWNERSHIP FORM

State of Texas Child Support Business Ownership Form

County: _____

Project Name: _____

TxDOT CSJ: _____

LG Project Number: _____

Business Entity Submitting Bid: _____

Section 231.006, Family Code, requires a bid for a contract paid from state funds to include the names and social security number of individuals owning 25% or more of the business entity submitting the bid.

1. In the spaces below please provide the names and social security number of individuals owning 25% or more of the business.

Name	Social Security Number
_____	_____
_____	_____
_____	_____
_____	_____

2. Please check the box below if no individual owns 25% or more of the business.

No individual own 25% or more of the business.

Except as provided by Section 231.302(d), Family Code, a social security number is confidential and may be disclosed only for the purpose of responding to a request for information from an agency operating under the provisions of Part A and D to Title IV of the Federal Social Security Act (42 USC Section 601-617 and 651-699).

Under Section 231.006, Family Code, the vendor or applicant certifies that the individual or business entity named in this contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate.

The information collected on this form will be maintained by City of Farmers Branch. With few exceptions, you are entitled on request to be informed about the information collected about you. Under Sections 552.021 and 552.023 of the Texas Government Code, you also are entitled to receive and review the information. Under Section 559.004 of the Government Code, you are also entitled to have information about you corrected that you believe is incorrect.

Signature

Date

Printed Name

IF THIS PROJECT IS A JOINT VENTURE,
ALL PARTIES TO THE JOINT VENTURE MUST PROVIDE A COMPLETED FORM.

CHILD SUPPORT STATEMENT

CHILD SUPPORT STATEMENT

Under Section 231.006, Family Code, the vendor or applicant certifies that the individual or business entity names in this contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate.

CONTRACTOR'S ASSURANCE

**CONTRACTOR'S ASSURANCE
(Subcontracts – Federal Aid Projects)**

By signing this Contract, the Contractor is giving assurances that all subcontract agreements of \$10,000 or more on this project will incorporate the following provisions:

**Special Provision
SP 000-003L**

“Certification of Nondiscrimination in Employment”

**Special Provision
SP 000-004L
11246)**

**“Notice of Requirement for Affirmative Action to Ensure
Equal Employment Opportunity” (Executive Order**

**Special Provision
SP 000-005L
11246)**

**“Standard Federal Equal Employment Opportunity
Construction Contract Specifications (Executive Order**

Form FHWA 1273

**“Required Contract Provisions Federal-Aid Construction
Contracts” (From FHWA 1273 must also be physically
attached to subcontracts and purchase orders of \$10,000
or more)**

NON-COLLUSION STATEMENT

NON-COLLUSION STATEMENT

The undersigned affirms that they are duly authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other BIDDER, and that the contents of this bid as to prices, terms or conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

Vendor: _____

Address: _____

City, State, Zip Code: _____

Phone: _____

Fax: _____

Authorized Rep. (Name): _____

Signature of Authorized Rep.: _____

Position with Company: _____

E-Mail (if available) _____

EXCEPTIONS (IF ANY) FROM BID SPECIFICATIONS:

DISADVANTAGED BUSINESS ENTERPRISES REQUIREMENTS

Control: 0918-47-272
Project: Westside Art Trail
Highway: VA
County: Dallas

DISADVANTAGED BUSINESS ENTERPRISES REQUIREMENTS

The following goal for disadvantaged business enterprises is established:

DBE: 6%

Special Provision to Item 000 Nondiscrimination



1. DESCRIPTION

All recipients of federal financial assistance are required to comply with various nondiscrimination laws, including Title VI of the Civil Rights Act of 1964, as amended (Title VI). Title VI forbids discrimination against anyone in the United States on the grounds of race, color, or national origin by any agency receiving federal funds.

The Owner, as a recipient of federal financial assistance, and under Title VI and related statutes, ensures that no person will on the grounds of race, religion (where the primary objective of the financial assistance is to provide employment in accordance with 42 USC 2000d-3), color, national origin, sex, age, or disability be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any of Owner's programs or activities.

2. DEFINITION OF TERMS

Where the term "Contractor" appears in the following six nondiscrimination clauses, the term "Contractor" is understood to include all parties to Contracts or agreements with the Owner.

3. NONDISCRIMINATION PROVISIONS

During the performance of this Contract, the Contractor agrees as follows.

- 3.1. **Compliance with Regulations.** The Contractor must comply with the Regulations pertinent to nondiscrimination in federally assisted programs of the United States Department of Transportation 49 CFR 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.
- 3.2. **Nondiscrimination.** The Contractor, regarding the work performed during the Contract, must not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor must not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.
- 3.3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment.** In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, the Contractor must notify each potential subcontractor or supplier of the Contractor's obligations under this Contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- 3.4. **Information and Reports.** The Contractor must provide all information and reports required by the Regulations or directives issued pursuant thereto, and must permit access to its books, records, accounts, other sources of information, and facilities as may be determined by the Recipient or the Owner to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where

any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor must so certify to the Owner, or the Texas Department of Transportation as appropriate, and must set forth what efforts it has made to obtain the information.

- 3.5. **Sanctions for Noncompliance.** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the Owner must impose such Contract sanctions as it or the Owner may determine to be appropriate, including, but not limited to actions defined in Article 5.1., "Authority of Engineer."
- 3.6. **Incorporation of Provisions.** The Contractor must include the provisions of Sections 3.1–3.6 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Contractor must take such action with respect to any subcontract or procurement as the Owner may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that, in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the Owner to enter into such litigation to protect the interests of the Owner, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

Special Provision to Item 000 Certification of Nondiscrimination in Employment



1. GENERAL

By signing this proposal, the Bidder certifies that it has participated in a previous Contract or subcontract subject to the equal opportunity clause, as required by Executive Order (EO) 10925, 11114, or 11246, or if it has not participated in a previous Contract of this type, or if it has had previous Contracts or subcontracts and has not filed, it will file with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity (EEO), all reports due under the applicable filing requirements.

Note—The above certification is required by the EEO Regulations of the Secretary of Labor [41 CFR 60-1.7(b)(1)], and must be submitted by Bidders and proposed subcontractors only in connection with Contracts and subcontracts that are subject to the equal opportunity clause. Contracts and subcontracts that are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only Contracts or subcontracts of \$10,000 or less are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the EOs or their implementing regulations.

Proposed prime Contractors and subcontractors that have participated in a previous Contract or subcontract subject to the EO and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of Contracts and subcontracts unless such Contractor submits a report covering the delinquent period or such other period specified by FHWA or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

Special Provision 000 Cargo Preference Act Requirements in Federal Aid Contracts



1. DESCRIPTION

All recipients of federal financial assistance are required to comply with the U.S. Department of Transportation's (DOT) Cargo Preference Act Requirements, 46 CFR Part 381, Use of United States-Flag Vessels.

This requirement applies to material or equipment that is acquired specifically for a Federal-aid highway project. It is not applicable to goods or materials that come into inventories independent of a Federal Highway Administration (FHWA) funded contract.

When oceanic shipments are necessary for materials or equipment acquired for a specific Federal-aid construction project, the contractor agrees to:

- Utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- Furnish a legible copy of a rated, on-board commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of 46 CFR Part 381 Section 7, "Federal Grant, Guaranty, Loan and Advance of Funds Agreements," within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, to both the Engineer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- Insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

Special Provision to Item 000 – Schedule of Liquidated Damages



The dollar amount of daily contract administration Liquidated Damages per Calendar Day is \$500.

Special Provision to Item 000 – Disadvantaged Business Enterprise in Federal-Aid Contracts



1. DESCRIPTION

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's (DOT) policy of ensuring nondiscrimination in the award and administration of DOT-assisted Contracts and creating a level playing field on which firms owned and controlled by individuals who are determined to be socially and economically disadvantaged can compete fairly for DOT-assisted Contracts.

2. DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL-AID CONTRACTS

2.1. **Policy.** It is the policy of the DOT and the Texas Department of Transportation (Department) that DBEs, as defined in 49 CFR Part 26, Subpart A, and the Department's DBE Program, will have the opportunity to participate in the performance of Contracts financed in whole or in part with federal funds. The DBE requirements of 49 CFR Part 26, and the Department's DBE Program, apply to this Contract as follows.

The Contractor will solicit DBEs through reasonable and available means, as defined in 49 CFR Part 26, Appendix A, and the Department's DBE Program, or show a good faith effort to meet the DBE goal for this Contract.

The Contractor, subrecipient, or subcontractor will not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. Carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted Contracts. Failure to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the recipient deems appropriate.

The requirements of this Special Provision must be physically included in any subcontract.

By signing the Contract proposal, the Bidder is certifying that the DBE goal as stated in the proposal will be met by obtaining commitments from eligible DBEs or that the Bidder will provide acceptable evidence of good faith effort to meet the commitment.

2.2. Definitions.

2.2.1. **Administrative Reconsideration.** A process by which the low bidder may request reconsideration when the Department determines the good faith effort (GFE) requirements have not been met.

2.2.2. **Commercially Useful Function (CUF).** A CUF occurs when a DBE has the responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing, and supervising the work.

2.2.3. **Disadvantaged Business Enterprise (DBE).** A for-profit small business certified through the Texas Unified Certification Program in accordance with 49 CFR Part 26, that is at least 51% owned by one or more socially and economically disadvantaged individuals, or in the case of a publicly owned business, in which is at least 51% of the stock is owned by one or more socially and economically disadvantaged individuals, and whose management and daily business operations are controlled by one or more of the individuals who own it.

- 2.2.4. **DBE Joint Venture.** An association of a DBE firm and one or more other firms to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills, and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the Contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.
- 2.2.5. **DOT.** The U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA).
- 2.2.6. **Federal-Aid Contract.** Any Contract between the Owner and a Contractor that is paid for in whole or in part with DOT financial assistance.
- 2.2.7. **Good Faith Effort.** All necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts are evaluated prior to award and throughout performance of the Contract. For guidance on good faith efforts, see 49 CFR Part 26, Appendix A.
- 2.2.8. **North American Industry Classification System (NAICS).** A designation that best describes the primary business of a firm. The NAICS is described in the North American Industry Classification Manual—United States, which is available on the Internet at the U.S. Census Bureau website: <http://www.census.gov/eos/www/naics/>.
- 2.2.9. **Race-Conscious.** A measure or program that is focused specifically on assisting only DBEs, including women-owned businesses.
- 2.2.10. **Race-Neutral DBE Participation.** Any participation by a DBE through customary competitive procurement procedures.
- 2.2.11. **Texas Unified Certification Program (TUCP) Directory.** An online directory listing all DBEs currently certified by the TUCP. The Directory identifies DBE firms whose participation on a Contract may be counted toward achievement of the assigned DBE Contract goal.
- 2.3. **Contractor's Responsibilities.**
- 2.3.1. **DBE Liaison Officer.** Designate a DBE liaison officer who will administer the Contractor's DBE program and who will be responsible for maintenance of records of efforts and contacts made to subcontract with DBEs.
- 2.3.2. **Compliance Tracking System (CTS).** This Contract is subject to Contract compliance tracking. Contractors and DBEs are required to provide any noted and requested Contract compliance-related data to the Owner. This includes, but is not limited to, commitments, payments, substitutions, and good faith efforts. Contractors and DBEs are responsible for responding by any noted response date or due date to any instructions or request for information by the Owner.
- 2.3.3. **Apparent Low Bidder.** The apparent low bidder must submit DBE commitments to satisfy the DBE goal or submit good faith effort Form 2603 and supporting documentation demonstrating why the goal could not be achieved, in whole or part, no later than 5 calendar days after bid opening. The means of

transmittal and the risk of timely receipt of the information will be the bidder's responsibility and no extension of the 5-calendar-day timeframe will be allowed for any reason.

- 2.3.4. **DBE Contractor.** A DBE Contractor may receive credit toward the DBE goal for work performed by its own forces and work subcontracted to DBEs. In the event a DBE subcontracts to a non-DBE, that information must be reported monthly.
- 2.3.5. **DBE Committal.** Only those DBEs certified by the TUCP are eligible to be used for goal attainment. The Directory can be accessed at the following Internet address:
<https://txdot.txdotcms.com/FrontEnd/VendorSearchPublic.asp?TN=txdot&XID=2340>.

A DBE must be certified on the day the commitment is considered and at time of subcontract execution. It is the Contractor's responsibility to ensure firms identified for participation are approved certified DBE firms.

The Bidder is responsible to ensure that all submittals are checked for accuracy. Any and all omissions, deletions, and/or errors that may affect the end result of the commitment package are the sole liabilities of the bidder.

Commitments in excess of the goal are considered race-neutral commitments.

- 2.3.6. **Good Faith Effort Requirements.** A Contractor who cannot meet the Contract goal, in whole or in part, must make adequate good faith efforts to obtain DBE participation as so stated and defined in 49 CFR Part 26, Appendix A.
- 2.3.6.1. **Administrative Reconsideration.** If the Owner determines that the apparent low bidder has failed to satisfy the good faith efforts requirement, the Owner will notify the Bidder of the failure and will give the Bidder an opportunity for administrative reconsideration.

The Bidder must request an administrative reconsideration of that determination within 3 days of the date of receipt of the notice. The request must be submitted directly to the Owner.

If a reconsideration request is timely received, the reconsideration decision will be made by the Owner's DBE liaison officer or, if the DBE liaison officer took part in the original determination that the Bidder failed to satisfy the good faith effort requirements, an Owner employee who holds a senior leadership position and reports directly to the executive officer, and who did not take part in the original determination will act as an administrative hearing officer. The Bidder may provide written documentation or argument concerning whether the assigned DBE contract goal was met or whether adequate good faith efforts were made to meet the Contract goal.

The DBE liaison or other Owner employee making the reconsideration determination may request a meeting with the Bidder to discuss whether the goal commitments were met or whether adequate good faith efforts were made to obtain the commitments to meet the Contract goal.

The meeting must be held within 7 days of the date of the request submitted under this section. If the Bidder is unavailable to meet during the 7-day period, the reconsideration decision will be made on the written information provided by the Bidder.

The Owner will provide to the Bidder a written decision that explains the basis for finding that the Bidder did not meet the Contract goal or did not make adequate good faith efforts to meet the Contract goal, within 7 days of the date of the notice issued in this section.

The reconsideration decision is final and not subject to administrative appeal.

2.3.7. **Determination of DBE Participation.** The work performed by the DBE must be reasonably construed to be included in the work area and NAICS work code identified by the Contractor in the approved commitment.

Participation by a DBE on a Contract will not be counted toward DBE goals until the amount of the participation has been paid to the DBE.

Payments made to a DBE that was not on the original commitment may be counted toward the Contract goal if that DBE was certified as a DBE before the execution of the subcontract and has performed a Commercially Useful Function.

The total amount paid to the DBE for work performed with its own forces is counted toward the DBE goal. When a DBE subcontracts part of the work of its Contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the subcontractor is itself a DBE.

DBE Goal credit for the DBE subcontractors leasing of equipment or purchasing of supplies from the Contractor or its affiliates is not allowed. Project materials or supplies acquired from an affiliate of the Contractor cannot directly or indirectly (second or lower tier subcontractor) be used for DBE goal credit.

If a DBE firm is declared ineligible due to DBE decertification after the execution of the DBE's subcontract, the DBE firm may complete the work and the DBE firm's participation will be counted toward the Contract goal. If the DBE firm is decertified before the DBE firm has signed a subcontract, the Contractor is obligated to replace the ineligible DBE firm or demonstrate that it has made good faith efforts to do so.

The Contractor may count 100% of its expenditure to a DBE manufacturer. According to 49 CFR 26.55(e)(1)(i), a DBE manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the Contract and of the general character described by the specifications.

The Contractor may count only 60% of its expenditure to a DBE regular dealer. According to 49 CFR 26.55(e)(2)(i), a DBE regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment of the general character described by the specifications and required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A firm may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business if the firm both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment must be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. A long-term lease with a third-party transportation company is not eligible for 60% goal credit.

With respect to materials or supplies purchased from a DBE that is neither a manufacturer nor a regular dealer, the Contractor may count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site.

A Contractor may count toward its DBE goal a portion of the total value of the Contract amount paid to a DBE joint venture equal to the distinct, clearly defined portion of the work of the Contract performed by the DBE.

2.3.8. **Commercially Useful Function.** It is the Contractor's obligation to ensure that each DBE used on federal-assisted contracts performs a commercially useful function on the Contract.

The Owner will monitor performance during the Contract to ensure each DBE is performing a CUF.

Under the terms established in 49 CFR 26.55, a DBE performs a CUF when it is responsible for execution of the work of the Contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved.

With respect to material and supplies used on the Contract, a DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.

With respect to trucking, the DBE trucking firm must own and operate at least one fully licensed, insured, and operational truck used on the Contract. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract. The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services on the Contract provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement.

A DBE does not perform a CUF when its role is limited to that of an extra participant in a transaction, Contract, or project through which funds are passed in order to obtain the appearance of DBE participation. The Owner will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant.

If a DBE does not perform or exercise responsibility for at least 30% of the total cost of its Contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, the Owner will presume that the DBE is not performing a CUF.

If the Owner determines that a DBE is not performing a CUF, no work performed by such DBE will count as eligible participation. The denial period of time may occur before or after a determination has been made by the Owner.

In case of the denial of credit for non-performance, the Contractor will be required to provide a substitute DBE to meet the Contract goal or provide an adequate good faith effort when applicable.

- 2.3.8.1. **Rebuttal of a Finding of No Commercially Useful Function.** Consistent with the provisions of 49 CFR 26.55(c)(4)&(5), before the Owner makes a final finding that no CUF has been performed by a DBE, the Owner will notify the DBE and provide the DBE the opportunity to provide rebuttal information.

CUF determinations are not subject to administrative appeal.

- 2.3.9. **Joint Check.** The use of joint checks between a Contractor and a DBE is allowed with Owner approval. To obtain approval, the Contractor must submit a completed Form 2178, "DBE Joint Check Approval," to the Owner.

The Owner will closely monitor the use of joint checks to ensure that such a practice does not erode the independence of the DBE nor inhibit the DBE's ability to perform a CUF. When joint checks are utilized, DBE credit toward the Contract goal will be allowed only when the subcontractor is performing a CUF in accordance with 49 CFR 26.55(c)(1).

Long-term or open-ended joint checking arrangements may be a basis for further scrutiny and may result in the lack of participation towards the Contract goal requirement if DBE independence cannot be established.

Joint checks will not be allowed simply for the convenience of the Contractor.

If the proper procedures are not followed or the Owner determines that the arrangements result in a lack of independence for the DBE involved, no credit for the DBE's participation as it relates to the material cost will be used toward the Contract goal requirement, and the Contractor will need to make up the difference elsewhere on the project.

2.3.10. **DBE Termination and Substitution.** No DBE named in the commitment submitted under Section 2.3.5. will be terminated for convenience, in whole or part, without the Owner's approval. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

Unless consent is provided, the Contractor will not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

The Contractor, prior to submitting its request to terminate, must first give written notice to the DBE of its intent to terminate and the reason for the termination. The Contractor will copy the Owner on the Notice of Intent to terminate.

The DBE has 5 calendar days to respond to the Contractor's notice and will advise the Contractor and the Owner of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Owner should not approve the prime Contractor's request for termination.

The Owner may provide a shorter response time if required in a particular case as a matter of public necessity.

The Owner will consider both the Contractor's request and DBE's stated position prior to approving the request. The Owner may provide a written approval only if it agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate the DBE. If the Owner does not approve the request, the Contractor must continue to use the committed DBE firm in accordance with the Contract. For guidance on what good cause includes, see 49 CFR 26.53.

Good cause does not exist if the Contractor seeks to terminate, reduce, or substitute a DBE it relied upon to obtain the Contract so that the Contractor can self-perform the work for which the DBE firm was engaged.

When a DBE subcontractor is terminated, make good faith efforts to find, as a substitute for the original DBE, another DBE to perform, at least to the extent needed to meet the established Contract goal, the work that the original DBE was to have performed under the Contract.

Submit the completed Form 2228, "DBE Termination Substitution Request," within seven (7) days, which may be extended for an additional 7 days if necessary at the request of the Contractor. The Owner will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

2.3.11. **Reports and Records.** By the 15th of each month and after work begins, report payments to meet the DBE goal and for DBE race-neutral participation on projects with or without goals. These payment reports will be required until all DBE subcontracting or material supply activity is completed. Negative payment reports are required when no activity has occurred in a monthly period.

Notify the Owner if payment to any DBE subcontractor is withheld or reduced.

Before receiving final payment from the Owner, the Contractor must indicate a final payment on the compliance tracking system. The final payment is a summary of all payments made to the DBEs on the project.

All records must be retained for a period of 3 years following completion of the Contract work, and must be available at reasonable times and places for inspection by authorized representatives of the Owner, Texas Department of Transportation or the DOT. Provide copies of subcontracts or agreements and other documentation upon request.

2.3.12. **Failure to Comply.** If the Owner determines the Contractor has failed to demonstrate good faith efforts to meet the assigned goal, the Contractor will be given an opportunity for reconsideration by the Owner.

A Contractor's failure to comply with the requirements of this Special Provision will constitute a material breach of this Contract. In such a case, the Owner reserves the right to terminate the Contract; to deduct the amount of DBE goal not accomplished by DBEs from the money due or to become due the Contractor; or to secure a refund, not as a penalty but as liquidated damages, to the Owner or such other remedy or remedies as the Owner deems appropriate.

2.3.13. **Investigations.** The Owner may conduct reviews or investigations of participants as necessary. All participants, including, but not limited to, DBEs and complainants using DBE Subcontractors to meet the Contract goal, are required to cooperate fully and promptly with compliance reviews, investigations, and other requests for information.

2.3.14. **Falsification and Misrepresentation.** If the Owner determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by the Owner to be unallowable, or if the Contractor engages in repeated violations, falsification, or misrepresentation, the Owner may:

- refuse to count any fraudulent or misrepresented DBE participation;
- withhold progress payments to the Contractor commensurate with the violation;
- refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; and/or
- seek any other available contractual remedy.

Special Provision to Item 6L Control of Materials



Item 6L, "Control of Materials" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Section 1.1. "Buy America. And Section 1.2., "Buy America Exceptions" This section is voided and replaced by the following:

- 1.1. **Buy America.** Comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law and applicable CFR, which restrict funds being made available from Federal financial assistance programs unless all the iron products, steel products, manufactured products, and construction materials used in the project are produced in the United States. Use iron or steel products, manufactured products, or construction materials produced in the United States for all permanently installed materials and products except when defined in Section 1.1.5., "Buy America Exceptions."

A material is solely classified based on its status at the time it is brought to the work site as either an iron or steel product, construction material, manufactured product, or Section 70917(c) material. Refer to the Buy America Material Classification Sheet found at <https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html> for additional clarification on material classification.

- 1.1.1. **Iron or Steel.** Iron or steel products means articles, materials, or supplies that consist of iron or steel or a combination of both. For iron or steel products, manufacturing includes any process that modifies the chemical content, physical shape or size, or final finish of a product. The manufacturing process begins with initial melting and mixing and continues through fabrication (cutting, drilling, welding, bending, etc.) and coating (paint, galvanizing, epoxy, etc.).

For iron or steel products submit a notarized original FORM D-9-USA-1 (Department Form 1818) with the proper attachments for verification of compliance.

- 1.1.2. **Section 70917(c) Materials.** Section 70917(c) materials mean cement and cementitious material; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. Section 70917(c) materials do not require domestic sourcing or Buy America certification.

- 1.1.3. **Construction Materials.** Construction materials are classified as articles, materials, or supplies that consist of only one of the items listed in bullets below. Minor additions (as determined by plans or Engineer) to any of the items listed is still a construction material.

- non-ferrous metals,
- plastic and polymer-based products (including polyvinyl chloride, composite building materials, and polymers used in fiber optic cables),
- glass (including optic glass),
- fiber optic cable (including drop cable),
- optical fiber,
- lumber,
- engineered wood, or
- drywall.

For construction materials, submit a Construction Material Buy America Certification Form (Department Form 2806) for verification of compliance that all manufacturing processes, as required, occurred in the United States. Each construction material has specific certification requirements stated below. Provide additional documentation as requested.

Details shown on the plans provide additional clarification on Buy America requirements.

For non-ferrous metals, certification requires all manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.

For plastic and polymer-based products (including polyvinyl chloride, composite building materials, and polymers used in fiber optic cables), certification requires all manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.

For glass (including optic glass), certification requires all manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.

For fiber optic cable (including drop cable), certification requires all manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.

For optical fiber, certification requires all manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.

For lumber, certification requires all manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.

For engineered wood, certification requires all manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

For drywall, certification requires all manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.

1.1.4. **Manufactured Products.** Materials classified as a manufactured product are currently waived from Buy America requirements by an FHWA general waiver and are not required to be domestically sourced. However, iron or steel products incorporated into manufactured products must meet iron and steel compliance requirements.

1.1.5. **Buy America Exceptions.** Use of iron, steel, construction materials, and manufactured products manufactured in the United States is required unless the material meets an exception below.

- A waiver exists exempting the material from Buy America compliance.
- The total value of the non-compliant products (other than iron or steel products) is no more than the lesser of \$1,000,000 or 5% of Total Applicable Costs for the project. Total Applicable Cost means the actual cost of all materials requiring Buy America compliance including iron, steel, or other materials that are within the scope of existing waivers. Contractor must provide documentation showing under threshold in advance for Engineer's consideration.
- The total value of foreign iron and steel products, including delivery, does not exceed 0.1% of the total Contract cost or \$2,500, whichever is greater. Contractor must provide documentation showing under threshold in advance for Engineer's consideration.
- Foreign steel may be allowed when the Contract contains an alternate item for a foreign source iron or steel product and the Contract is awarded based on the alternate item.
- The materials are temporarily installed or are supplies, tools and equipment not incorporated into the project. Temporarily installed means the materials and products must be removed at the end of the project or may be removed at the contractor's convenience with Engineers approval.

Special Provision to Item 7L – Legal Relations and Responsibilities



Item 7L, "Legal Relations and Responsibilities," of the Standard Specifications is amended with respect to the clauses cited below.

Section 1.5.2., "Flaggers," the first paragraph is voided and replaced by the following:

1.5.2 **Flaggers.** Designate in writing, a flagger instructor who will serve as a flagging supervisor and is responsible for training and assuring that all flaggers are qualified to perform flagging duties. Certify to the Engineer that all flaggers will be trained and make available upon request a list of flaggers trained to perform flagging duties.

Section 1.5.5., "Training," is voided and replaced by the following:

1.5.5 **Training.** Train workers involved with the traffic control using Department-approved training as shown on the "Traffic Control Training" Material Producer List.

Coordinate enrollment, pay associated fees, and successfully complete Department-approved training or Contractor-developed training. Training is valid for the period prescribed by the provider. Except for law enforcement personnel training, refresher training is required every 4 yr. from the date of completion unless otherwise specified by the course provider. The Engineer may require training at a frequency instead of the period prescribed based on the Department's needs. Training and associated fees will not be measured or paid for directly but are considered subsidiary to pertinent Items.

Certify to the Engineer that workers involved in traffic control and other work zone personnel have been trained and make available upon request a copy of the certification of completion to the Engineer. Ensure the following is included in the certification of completion:

- name of provider and course title,
- name of participant,
- date of completion, and
- date of expiration.

Where Contractor-developed training or a Department-approved training course does not produce a certification, maintain a log of attendees. Make the log available upon request. Ensure the log is legible and includes the following:

- printed name and signature of participant,
- name and title of trainer, and
- date of training.

1.5.5.1. **Contractor-developed Training.** Develop and deliver Contractor-developed training meeting the minimum requirements established by the Department. The outline for this training must be submitted to the Engineer for approval at the preconstruction meeting. The CRP or designated alternate may deliver the training instead of the Department-approved training. The work performed and materials furnished to develop and deliver the training will not be measured or paid for directly but will be considered subsidiary to pertinent Items.

1.5.5.1.1. **Flagger Training Minimum Requirements.** A Contractor's certified flagging instructor is permitted to train other flaggers.

1.5.5.1.2.

Optional Contractor-developed Training for Other Work Zone Personnel. For other work zone personnel, the Contractor may provide training meeting the curriculum shown below instead of Department-approved training.

Minimum curriculum for Contractor-provided training is as follows:

Contractor-developed training must provide information on the use of personnel protection equipment, occupational hazards and health risks, and other pertinent topics related to traffic management. The type and amount of training will depend on the job duties and responsibilities. Develop training applicable to the work being performed. Develop training to include the following topics.

- The Life You Save May Be Your Own (or other similar company safety motto).
- Purpose of the training.
 - It's the Law.
 - To make work zones safer for workers and motorists.
 - To understand what is needed for traffic control.
 - To save lives including your own.
- Personal and Co-Worker Safety.
 - **High Visibility Safety Apparel.** Discuss compliant requirements; inspect regularly for fading and reduced reflective properties; if night operations are required, discuss the additional and appropriate required apparel in addition to special night work risks; if moving operations are underway, discuss appropriate safety measures specific to the situation and traffic control plan.
 - **Blind Areas.** A blind area is the area around a vehicle or piece of construction equipment not visible to the operators, either by line of sight or indirectly by mirrors. Discuss the "Circle of Safety" around equipment and vehicles; use of spotters; maintain eye contact with equipment operators; and use of hand signals.
 - **Runovers and Backovers.** Remain alert at all times; keep a safe distance from traffic; avoid turning your back to traffic and if you must then use a spotter; and stay behind protective barriers, whenever possible. Note: It is not safe to sit on or lean against a concrete barrier, these barriers can deflect four plus feet when struck by a vehicle.
 - Look out for each other, warn co-workers.
 - Be courteous to motorists.
 - Do not run across active roadways.
 - Workers must obey traffic laws and drive courteously while operating vehicles in the work zones.
 - Workers must be made aware of company distracted driving policies.
- **Night Time Operations.** Focus should be placed on projects with a nighttime element.
- **Traffic Control Training.** Basics of Traffic Control.
 - Identify work zone traffic control supervisor and other appropriate persons to report issues to when they arise.

- Emphasize that work zone traffic control devices must be in clean and in undamaged condition. If devices have been hit but not damaged, put back in their correct place and report to traffic control supervisor. If devices have been damaged, replace with new one and report to traffic control supervisor. If devices are dirty, faded or have missing or damaged reflective tape clean or replace and report to traffic control supervisor. Show examples of non-acceptable device conditions. Discuss various types of traffic control devices to be used and where spacing requirements can be found.
- **Channelizing Devices and Barricades with Slanted Stripes.** Stripes are to slant in the direction you want traffic to stay or move to; demonstrate this with a device.
- **Traffic Queuing.** Workers must be made aware of traffic queuing and the dangers created by it. Workers must be instructed to immediately notify the traffic control supervisor and other supervisory personnel if traffic is queuing beyond advance warning sign and devices or construction limits.
- **Signs.** Signs must be straight and not leaning. Report problems to the traffic control supervisor or other as designated for immediate repair. Covered signs must be fully covered. If covers are damaged or out of place, report to traffic control supervisor or other as designated.

XIV. SPECIAL CONDITIONS

SPECIAL CONDITIONS

1. GENERAL

The provisions of this section of the specifications shall govern in the event of any conflict between them and the General Conditions.

2. ENGINEER

The "Engineer" as referred to in this Contract is to be understood as referring to the Director of Public Works, City of Farmers Branch, Texas, or such other Engineer, Supervisor or Inspector as may be authorized by said Owner to act in any particular instance. The Engineer's representative for preparation of the plans and technical specifications is Kimley-Horn & Associates and shall be included within the meaning of "Consultant Engineer".

3. CONTRACT DOCUMENTS

All items listed are part of the Contract Documents:

- A. **Farmers Branch Westside Art Trail** Contract Documents and Specifications.
- B. Plans for the Construction **Westside Art Trail** consisting of sheets 1 through 289 inclusive.
- C. Geotechnical Reports
Title: Geotechnical Engineering Study
KHA: Westside Trail – Phase I
Farmers Branch, Texas
Firm: Kleinfelder Project No.: 20214410.001A
Date: December 29, 2022

All modifications thereof incorporated in any of the documents.

4. GENERAL SPECIFICATIONS

All work shall comply with the Texas Department Standard Specifications for Construction and Maintenance of Highways, Street and Bridges Adopted by the Texas Department of Transportation November 1, 2014, unless otherwise noted.

5. WORK ON SATURDAY, SUNDAY & HOLIDAYS

Work will be performed using the standard workweek in accordance with TxDOT 8L 3.1.4. When work must be performed on Saturday, Sunday, or Holidays, the Contractor must request permission to work at least forty-eight (48) hours in advance. The Contractor shall bear the entire cost of inspection (4 hour minimum) for this work with said amount to be withheld from any monies to be due or to become due to the Contractor upon completion of this Contract. Any additional costs associated with working on these days shall be borne by the Contractor.

6. MATERIAL STORAGE

Materials may be stockpiled at locations approved by the Engineer. All stockpiling methods must be approved by the Owner.

The storage site shall be determined at the preconstruction meeting after the award of Contract.

Contractor shall be fully responsible for the storage site.

If necessitated, Contractor shall erect a temporary fence and store materials inside of the fenced area.

The Contractor shall maintain the storage area in a neat and orderly manner. If, in the opinion of the Engineer, the storage site becomes unsightly, the Contractor shall clean up the storage site within two (2) days of notification to do so.

At the completion of the Contract, the Contractor shall remove the temporary storage fence and all debris in the area. The Contractor shall restore the storage site to the original condition, including, if necessary, grading and turf re-establishment.

7. **SITE**

The Contractor shall limit his work to the right-of-ways, easements, or construction limits shown on the Drawings.

8. **WARNING DEVICES**

The Contractor shall have the responsibility to provide and maintain all warning devices and take all precautionary measures required by law to protect persons and property while said persons or property are approaching, leaving or within the work site or any area adjacent to said work site. No separate compensation will be paid to the Contractor for the installation or maintenance of any warning devices, barricades, lights, signs or any other precautionary measures required by law for the protection of persons or property.

The Contractor shall assume all duties owned by the Owner to the general public in connection with the general public's immediate approach to and travel through the work site and the area adjacent to said work site.

Where the work is carried on, in, or adjacent to, any street, alley, sidewalk, public right-of-way or public place, the Contractor shall, at his own cost and expense, provide such flagmen and watchmen and furnish, erect and maintain such warning devices, barricades, signs, and lights, and other precautionary measures shall not cease until the project shall have been accepted by the Owner.

If the Engineer discovers that the Contractor has failed to comply with the applicable Federal and State law (by failing to furnish the necessary flagmen, warning devices, barricades, lights, signs or other precautionary measures for the protection of persons or property), the Engineer may order such additional precautionary measures, as required by law, to be taken to protect persons and property, and to be reimbursed by the Contractor for any expense incurred by the Owner, in ordering such additional precautionary measures.

In addition, the Contractor will be held responsible for all damages to the work and other public or private property due to the failure of warning devices, barricades, signs, lights, or other precautionary measures in protecting said property, and whenever evidence is found of such damage, the Owner may order the damaged portion immediately removed and replaced by, and at the cost and expense of, the Contractor. All of this work is considered incidental and shall not be separate pay items.

9. **EXISTING UTILITIES, STRUCTURES AND OTHER PROPERTY**

The Contractor's attention is directed to the necessity of taking adequate measures to protect all existing structures, improvements and utilities which may be encountered. These may include, but are not limited to the following:

- a. Utilities: Including water mains and services, water meter boxes, oil and air lines, gas mains and services, sanitary sewers and service connections, storm sewers, telephone conduits, and electric conduits.
- b. Street and Drives: Contractor shall at all times maintain streets and drives in a condition which will provide easy ingress and egress.

It shall be the responsibility of the Contractor to cooperate with the Owners of all utilities to locate, prior to opening trench, existing underground facilities and to notify the Engineer at once of any conflicts in grades and alignment. Every effort will be made by the Engineer to control alignment and grading to avoid conflict with existing utilities but should change in alignment and grade be necessary, such changes will be made by the Contractor at his expense and no extra payment beyond the unit prices bid will be allowed by the Owner.

Where excavation endangers adjacent structures and utilities, the Contractor shall at his own expense carefully support and protect all such structures and/or utilities so that there will be no failure due to settlement, where it is necessary to move services, poles, guy and he shall cooperate with the utility owner.

Except as indicated on the drawings that utilities are to be moved by others, any costs of temporarily or permanently relocating utilities shall be borne by the Contractor without extra compensation from the Owner. In case damage to an existing structure or utility occurs, whether failure or settlement; the Contractor shall restore the structure or utility to its original condition and position without compensation from the Owner. Before beginning work on this project the Contractor shall submit, for approval by the Engineer, a plan of construction operations outlining in detail a sequence of work to be followed, setting out the method of handling traffic.

The Contractor shall, plan his construction phasing in such a manner as to cause minimal interference with traffic during the construction operations.

The Contractor shall provide, construct and maintain barricades and signs in accordance with the "Texas Manual on Uniform Control Devices for Streets and Highways" and "Standard Highway Signs for Texas."

The Contractor shall keep travelled surfaces clean and free of debris and other materials of construction.

To facilitate shifting, barricades and signs used in lane closure or traffic staging may be erected and mounted on portable supports, the design of these being subject to the approval of the Engineer.

10. LOCATE OF CITY-OWNED LINES

The Public Works Department, Utility Division (972.919-2597), shall be contacted to locate City-owned water lines and sanitary sewer lines. The Parks and Recreation Department (972.919-2620) shall be contacted to locate City-owned irrigation lines and electric (lighting) lines. The Public Works Department, Traffic Division (972.919-2597) shall be contacted to locate City-owned fiber optic lines and traffic signal lines.

When the City-owned lines are located by any City department, the locates shall be considered valid up to two weeks, after which new locates shall be required. Unless the lines are physically uncovered, surface locates of City-owned lines shall be considered to be approximate. For any facilities to be constructed within 3 feet of the surface locates, additional subsurface investigation should be considered to ensure that the City-owned lines are appropriately located.

11. RECORD OF EXISTING CONDITIONS

Prior to the start of construction, the Contractor shall videotape, in DVD or VHS format, the area of construction in its entirety. The DVD or tape will be indexed with the date and time. Identifying physical structures such as street signs and house numbers shall be shown in order to identify locations. This tape will be given to the Owner for its approval prior to the start of construction. This will become the record of existing project conditions.

12. TESTING

Unless specified otherwise, testing and laboratory services will be performed by independent testing agencies selected and paid by the Owner. All initial material testing shall be performed at the direction and expense of the Owner. In the event certain materials of construction do not measure up to the required standards and certain performance obligations are not met, the defective material and/or work shall be removed and replaced and the Contractor shall pay all subsequent testing and related work necessitated by the replacement.

The failure of the Owner to make any tests of materials shall in no way relieve the Contractor of his responsibility of furnishing materials conforming to the contract documents.

Tests, unless otherwise specified, shall be made in accordance with the latest methods of the American Society for Testing and Materials. The Contractor shall provide such facilities as the Owner may require for collecting and forwarding samples and shall not use the materials represented by the samples until tests have been made. The Contractor shall furnish adequate samples without charge.

The inspections and tests made by the Owner, its inspectors or agents shall ordinarily be made without cost to the Contractor unless otherwise expressly specified in the Contract Documents. The Contractor shall furnish without additional cost to the Owner such materials for testing as may be reasonably necessary. Retesting after failure to pass tests shall be at the expense of the Contractor. Should the percentage of rejected material or equipment be unreasonably large, the additional cost of such inspection and tests resulting therefrom shall be borne by the Contractor. The Owner shall judge what warrants extra inspection and shall determine the additional cost incurred thereby and payable by the Contractor.

13. MAINTENANCE PROVISIONS FULFILLMENT

Prior to the expiration of the specified maintenance period provided for in the Contract, the Owner will make a detailed inspection of the project and will advise the Contractor and his Surety of the items that require correction. The Owner will make subsequent inspection and if the corrections have been properly performed, the Owner will issue a letter of release on the maintenance stipulations to the Contractor and his Surety. If, for any reason, the Contractor has not made the required corrections before the expiration of the maintenance period, the maintenance stipulations, as provided for in the Contract, shall remain in effect until the corrections have been properly performed and a letter of release issued.

14. LIQUIDATED DAMAGES

The Contractor agrees that time is of the essence of this Contract, and that for each day of delay beyond the number of calendar days herein agreed upon for the completion of the work herein specified and contracted for (after due allowance for such extension of time as is provided for extension of time hereinabove), the Owner may withhold permanently from the Contract's total compensation as stipulated liquidated damages for such delay, the sum indicated by the following table:

AMOUNT OF CONTRACT	AMOUNT OF LIQUIDATED DAMAGE PER DAY
Less than \$ 5,000	\$ 60.00
\$ 5,000.00 to \$ 14,999.99	\$ 80.00
\$ 15,000.00 to \$ 24,999.99	\$ 100.00
\$ 25,000.00 to \$ 49,999.99	\$ 120.00
\$ 50,000.00 to \$99,999.99	\$ 160.00
\$100,000.00 to \$1,000,000.00	\$ 240.00
More than \$1,000,000.00	\$ 500.00

The sum of money thus deducted for such delay, failure of non-completion is not to be considered as a penalty, but shall be deemed, taken and treated as reasonable liquidated damages, since it would be impracticable and extremely difficult to fix the actual damages. No plea of ignorance of conditions that exist or may hereafter exist, or of conditions or difficulties that may be encountered in the execution of the work under this Contract, as a result of failure to make the necessary examinations and investigations, shall be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill, in every detail, all requirements of the Contract Documents, or will be accepted as a basis for any claims whatsoever for extra compensation or for an extension of time.

15. CHANGE ORDERS

The City Council of the City of Farmers Branch, Texas does hereby give the City Manager the authorization to execute change orders to this Contract in an amount not to exceed fifty thousand dollars (\$50,000). Change orders to this Contract in the amount of or greater than fifty thousand dollars (\$50,000) must be authorized by the City Council of the City of Farmers Branch, Texas. Those change orders include additions and deletions.

16. ACCESS TO PROPERTY

To the fullest extent practicable, the Contractor shall conduct his operations and work in such a manner that necessary ingress and egress will be provided to the tenants of both residential and commercial property. During all construction operations bridges; or other means of crossing trenches, ditches, and the Contractor at his expense shall provide other excavation and all operations shall be conducted in a manner which will result in a minimum of inconvenience to tenants of property adjacent to the work.

17. NOTIFICATION OF RESIDENTS - UTILITIES

The Contractor shall notify in writing all residents and businesses that about the limits of the project, forty eight (48) hours in advance of work that may cause interruption to utility service regardless of the length of interruption. The notice shall include the approximate time construction is to begin and the estimated length of the anticipated interruption. No resident shall have any utility interrupted for more than two hours in a twenty-four (24) hour period.

18. NOTIFICATION OF RESIDENTS

The Contractor shall notify in writing all residents and businesses that about the street to be resurfaced or reconstructed, forty-eight (48) hours in advance of any work.

19. SPECIAL MEETING

Five (5) days prior to any landscaping work, the Contractor shall notify the Engineering Inspector for a special meeting. The meeting will be held with the Parks and Public Works Departments to discuss the landscaping portion of the Contract.

20. LANDSCAPE & TREE TREATMENTS

Where trees, plants, shrubbery, etc., are adjacent to the line of the work and are not to be removed or are to be removed and replaced, the Contractor shall protect such trees, plants, shrubbery, etc., by substantial wooden boxes or guards to be installed beyond the dripline, and shall not permit machinery or employees to scrape, tear the limbs from, damage or attach guy cables to them and if, in the opinion of the Engineer, such trees, plants, shrubbery, etc., would be damaged by machinery, etc., hand excavation may be required. The Contractor shall be responsible for all damages to adjacent trees, plants, shrubbery, etc.

Existing trees, plants, shrubbery, etc., encountered on the site, which are not indicated on the plans, shall be considered as trees to remain and shall be protected. If these trees are in conflict with construction, the Contractor shall relocate the trees to an approved location, unless otherwise directed by the Engineer, at no additional cost to the Owner.

All disturbed turf shall be reestablished to original condition prior to completion of construction. This Turf re-establishment shall not be a separate pay item and shall be subsidiary to the entire project, unless noted otherwise.

21. MOWING AND DEBRIS MAINTENANCE

During construction and through to final acceptance, the Contractor, at his expense, shall be responsible for maintaining the existing turf areas within the easements and rights-of-way as shown on the plans. The Contractor shall mow these areas as often as necessary to maintain the turf areas, at a two to two and one-half inches (2" to 2 ½") maximum height. Minimum cutting height for the turf shall be one and one-half inches (1 ½"). At no time shall weeds within the maintenance limits reach a height greater than twelve inches (12") in compliance with City Ordinance 908.

If, in the opinion of the Engineer, the site becomes unsightly, the Contractor shall mow the site within two (2) days after notification from Engineer to do so.

The Contractor at all times shall keep the construction site free from accumulation of waste materials, rubbish, debris, etc. Caused by his operations. Waste materials, rubbish, debris, etc. Shall be cleaned up daily and removed from the project site at least once a week.

No payment will be made for this work, its cost being subsidiary to the entire project.

22. INCIDENTAL WORK

All minor details of work which are not shown on the plans, as well as such items which are not specifically mentioned in the specifications, but are obviously necessary for the proper completion of the work, shall be considered as incidental, and as being a part of and included with the work for which prices are given in the proposal, and no extra compensation shall be allowed the Contractor for the performance thereof.

23. DUST CONTROL

Water Sprinkling as ordered by the Engineer to allay dust on this project will not be paid for directly but shall be considered subsidiary to the various bid items.

24. TRADE NAMES AND ALTERNATIVES

For convenience in designation on the plans or in the specifications, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and its catalogue information. The use of an alternative article or material which is of equal quality and of

required characteristics for the purpose intended, will be permitted subject to the following requirements:

The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor, and the Contractor shall furnish all necessary information required by the engineer. The Owner shall be the sole judge as to the quality and suitability of alternative articles or materials, and the Owner's decision shall be final.

Whenever the specifications permit the substitution of a similar or equivalent material or article, no test or action relating to the approval of such substitution will be made until the request for substitution is made in writing by the Contractor, accompanied by the complete data as to the quality of the material or article proposed. Such request shall be made in accordance with the section of these documents entitled **PRE-BID CONFERENCE**.

25. SITE DRAINAGE

The Contractor shall maintain adequate site drainage at all times. Drainage runoff will be confined to the limits of the construction project and shall not be diverted over private property. Any runoff presently traversing private property shall not be increased by cause of construction.

26. WATER SERVICE INTERRUPTION

Water service shall not be interrupted for any reason. The Contractor shall be responsible for maintaining adequate water service for the duration of the project.

27. SEWER SERVICE INTERRUPTION

Sewer service shall not be interrupted for any reason. The Contractor shall be responsible for maintaining adequate sewage removal for the duration of the project.

28. TIME & ORDER OF COMPLETION

The Contractor will not be authorized to work on more than one location at a time, unless he provides separate work crews and receives authorization from the Engineer. The Contractor, under this contract, shall substantially complete the work at one location before relocating to a second location.

29. CONSTRUCTION PHASING

A recommended procedure for construction phasing is shown in the construction plans. The Contractor shall submit to the owner for approval a schedule outlining the Contractor's construction operations at the pre-construction meeting. Start of work shall be contingent upon approved construction phasing. All work and material necessary for barricading the project will not be paid for directly, but shall be considered as subsidiary to various bid items.

30. CONSTRUCTION SEQUENCING

The Contractor shall submit a construction sequence plan to the Engineer in accordance with Article 4L. Start of work shall be contingent upon approval of the construction sequencing.

It is of utmost importance that the Contractor maintain access to the businesses by keeping at least one driveway open to each establishment at all time. Driveways that are allowed to be open cut per the plans shall be backfilled and topped with crushed rock or steel plated over at the end of each day to return the driveways to use.

The Contractor shall stage his activities to maintain access to and thru fire lanes at all times.

31. EMBANKMENT CONSTRUCTION

Failed slopes shall be cut back beyond the limits of the slide area with embankment construction beginning at the bottom of the slope. The slopes shall be reconstructed according to the plans and specifications section of this document. The Contractor shall slope and terrace excavated areas as necessary to maintain safe working conditions and eliminate potential additional slope failures.

32. FILL OR EXCAVATION REQUIRED TO MAKE GRADE

Any excavation or fill required to make grade after removing the existing concrete pavement, curbs, and drive approaches will not be a pay item. Payment for this work should be included in the concrete pavement pay item.

33. DISPOSAL OF EXCESS SPOIL EXCAVATION

All excess excavation not used in backfill shall be offered the right of refusal to the owner. If refused, the spoil shall be disposed of by the Contractor daily, at his own expense, outside the limits of the right of way. If accepted, the spoil shall be delivered by the Contractor, at his own expense, as directed and approved by the Engineer.

34. OBJECTS WITHIN THE TEMPORARY CONSTRUCTION EASEMENT

The Contractor shall not relocate, remove or otherwise damage any existing structures, fences, shrubs, plants or trees within the temporary construction easement. Should it become necessary to relocate or remove any above mentioned item, not specifically detailed on the construction plans, the Contractor shall notify the Engineer before commencing with work in that area.

35. REMOVAL OF PARKED VEHICLES

The Contractor shall notify, in writing, the City of Farmers Branch Police Department, 3723 Valley View Lane, forty-eight (48) hours prior to performing any work within a residential area. Any removal of vehicles, which are parked within the limits of the work area, will be the responsibility of the Police Department.

36. REMOVAL OF PAVEMENT MARKINGS

All pavement markings, including raised markings, will be removed prior to placement of any overlay materials. This item is considered incidental and shall not be a separate pay item. All raised pavement markers that are removed intact and in a reusable condition, will become the property of the Owner.

37. PAVEMENT REMOVAL

All of the existing old pavement material to be removed on this project will become the property of the Contractor and be disposed of by him outside the limits of the right-of-way at his own expense.

38. CONCRETE REMOVAL

All of the existing old concrete material to be removed on this project will become the property of the Contractor and be disposed of by him outside the limits of the right-of-way at his own expense.

39. LIMITS OF PLACEMENT

No asphaltic material or asphaltic concrete pavement shall be placed between November 1 to May 1 except by written permission of the Engineer.

40. INSTALLATION OF UTILITY ADJUSTING RINGS

The Contractor shall be responsible for installation of all utility adjustment rings. In the case of a standard adjusting ring assembly being of an unacceptable height, the Contractor shall be responsible for the work required to make the ring to an acceptable height.

41. OPENING PAVEMENT TO TRAFFIC

After concrete in any sections has obtained 3600 PSI, the Contractor shall open these sections to all traffic. On those sections of the pavement open to traffic, all joints shall be first cleaned, the pavement sealed, earth placed against the pavement edges and all other work performed as required for the safety of traffic. Such openings, however, shall in no manner relieve the contractor from his responsibility for the work.

42. TRENCH SAFETY

The Contractor shall install a trench safety system to provide safety for all trenches exceeding a depth of five (5) feet as per Occupational Safety and Health Administration (OSHA) requirements, Texas House Bill 1569 effective as of September 1, 1989 as amended. It shall be the responsibility of the Contractor to provide and maintain a viable trench safety system at all times during construction activities. The Contractor is directed to become knowledgeable and familiar with the standards as set forth by OSHA for trench safety that will be in effect during the period of construction of the project and the Contractor is responsible for conforming to such regulations as prescribed by OSHA standards.

The Contractor is responsible for obtaining any additional borings and soil analysis as required for determining Trench Safety and Support and accepts sole responsibility for compliance with all applicable safety requirements.

The Contractor's attention is directed to Bid Item Trench Safety and Support, under which full compensation at unit bid price will be made for all materials, equipment, and labor required to furnish, install, and remove the trench safety system.

43. FENCING

All areas, which have greater than a five (5) foot vertical drop, or where designated on the plans shall be protected by the Contractor installing an orange plastic safety fence (Up to 400 LF). The cost of the fence shall be subsidiary to other items of the project.

44. OZONE ACTION DAYS

The Owner can require the Contractor to suspend until 12:00 noon, any work activity which would contribute to the production of ozone on any day designated as an Ozone Action Day by the Texas Commission on Environmental Quality (TCEQ). Such work may include, but is not limited to, lane closures, the use of gasoline-powered engines and the use of petroleum distillates. The Contractor will be notified of any suspension of work before 3:30 p.m. on the day prior to an Ozone Action Day. The Contract shall be extended one calendar day for each Ozone Action Day in which work is suspended.

45. BORING IN CITY R.O.W. AND EASEMENT

All boring in City of Farmers Branch rights-of-way and easements must be performed with a steerable, traceable boring machine.

46. PROJECT SIGN

The Contractor shall furnish a maximum of two (2) project signs at the beginning and end of the project. The location of each sign shall be within the project limits and at the locations specified by the Engineer. The project signs must be erected within fourteen (14) calendar days of the date of the Notice to Proceed.

The project signs shall be constructed as shown on Exhibit "Project Sign". Stickers are available from the Public Works Department.

47. CONSTRUCTION MATERIAL TESTING

It is the contractor's responsibility to hire a professional engineering company for the

Construction Material Testing Services in connection with the project. The cost of the Construction Material Testing Services shall be included in the Contract price and not a separate pay item.

48. BID ITEM DESCRIPTIONS

The following descriptions are intended to clarify the nature of the work required for this project. The provisions of the standard specifications shall apply, except as otherwise noted herein.

Only items in the Proposal are Pay Items. Other specification items will be complied with; however, their measurement and payment provisions are hereby deleted.

The price bid shall cover all work required by the Contract Documents. All costs in connection with the proper and successful completion of the work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the Proposal shall be considered a subsidiary obligation of the contractor and all costs in connection therewith shall be included in the prices bid.

All items shall be measured, complete and in place, in accordance with the units listed in the bid form.

Work that is subsidiary to Pay Items includes, but is not limited to, mobilization, insurance and bonds; surveying and construction staking; establishment of a growth of grass in areas outside of pay limits; removal of waste material from the site; replacement of property markers or monuments disturbed; dewatering as required; legal, offsite disposal of spoils; coordination with City and Franchise Utility personnel; coordination with property owners if necessary, clean up; sealing of masonry and concrete joints and all other work required to complete the project and restore the areas of construction to their preconstruction condition.

All items shall be measured by the unit listed in the Proposal.

BID ITEM P1 - PREPARING ROW

This item shall be constructed and measured and paid for in accordance with TxDOT Item 100. The unit of measurement shall be station (STA).

BID ITEM P2 - REMOVING CONC (PAV)

BID ITEM P3 - REMOVING CONC (RIPRAP)

BID ITEM P4 - REMOVING CONC (DRIVEWAYS)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 104. The unit of measurement shall be square yards (SY).

BID ITEM P5 - REMOVE CONC (RAIL)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 104. The unit of measurement shall be linear feet (LF).

BID ITEM P6 - REMOVING STAB BASE & ASPH PAV (4" - 6")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 105. The unit of measurement shall be square yards (SY).

BID ITEM P7 - EXCAVATION (ROADWAY)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 110. The unit of measurement shall be cubic yards (CY).

BID ITEM P8 - EMBANKMENT (FINAL)(DENS CONT)(TY C1)

BID ITEM P9 - EMBANKMENT (FINAL)(DENS CONT)(TY C2)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 132. The unit of measurement shall be cubic yards (CY).

BID ITEM P10 - FL BS (CMP IN PLACE) (TY A GR 1-2)(8")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 247. The unit of measurement shall be square yards (SY).

BID ITEM P11 - LIME (HYDRATED LIME (DRY))

This item shall be constructed and measured and paid for in accordance with TxDOT Item 260. The unit of measurement shall be tons (TON).

BID ITEM P12 - LIME TRT (SUBGRADE)(6")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 260. The unit of measurement shall be square yards (SY).

BID ITEM P13 – CONC PVMT (CONT REINF – CRCP) (10")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 360. The unit of measurement shall be square yards (SY).

BID ITEM P14 - TEMPORARY SPL SHORING

This item shall be constructed and measured and paid for in accordance with TxDOT Item 403. The unit of measurement shall be square feet (SF).

BID ITEM P15 - DRILL SHAFT (RDWY ILL POLE) (30 IN)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 416. The unit of measurement shall be linear feet (LF).

BID ITEM P16 – CL A CONC (FLUME)
BID ITEM P17 – CL C CONC (RAIL FOUNDATION)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 420. The unit of measurement shall be cubic yards (CY).

BID ITEM P18 - RETAINING WALL (CAST-IN-PLACE)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 423. The unit of measurement shall be square feet (SF).

This item includes subgrade preparation for the retaining wall in accordance with the geotechnical report project no. 20214410.001A by Kleinfelder dated 12/29/22.

BID ITEM P19 - RIPRAP (MOW STRIP) (4 IN)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 432. The unit of measurement shall be cubic yards (CY).

BID ITEM P20 - STR STEEL (MISCELLANEOUS BRIDGE)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 442. The unit of measurement shall be pounds (LB).

BID ITEM P21 - RAIL (TY T402)
BID ITEM P22 - RAIL (ORNAMENTAL FENCE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 450. The unit of measurement shall be linear feet (LF).

BID ITEM P23 - RETROFIT RAIL (TY T402)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 451. The unit of measurement shall be linear feet (LF).

BID ITEM P24 - ADJUSTING MANHOLES
BID ITEM P25 - ADJUSTING MANHOLES (WATER VALVE BOX)
BID ITEM P26 - ADJUSTING MANHOLES (WATER METER)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 479. The unit of measurement shall be each (EA).

BID ITEM P27 – REMOV STR (DRILL SHAFT)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 496. This item is for the removal of illumination pole foundations. The unit of measurement shall be each (EA).

BID ITEM P28 MOBILIZATION

This item shall be constructed and measured and paid for in accordance with TxDOT Item 500. The unit of measurement shall be lump sum (LS).

BID ITEM P29 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

This item shall be constructed and measured and paid for in accordance with TxDOT Item 502. The unit of measurement shall be month (MO).

BID ITEM P30 - PORTABLE CTB (FUR & INST)(LOW PROF)(TY 1)

BID ITEM P31 - PORT CTB (FUR & INST)(LOW PROF)(TY 2)

BID ITEM P32 - PORTABLE CTB (REMOVE)(LOW PROF) (TY 1)

BID ITEM P33 - PORT CTB (REMOVE)(LOW PROF)(TY 2)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 512. The unit of measurement shall be linear feet (LF).

BID ITEM P34 - COLORED TEXTURED CONC (5")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 528. The unit of measurement shall be square yards (SY).

BID ITEM P35 - CONC CURB & GUTTER (TY II)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 529. The unit of measurement shall be linear feet (LF).

BID ITEM P36 - DRIVEWAYS (CONC) (HES)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 530. The unit of measurement shall be square yards (SY).

BID ITEM P37 - CONC SIDEWALKS (5")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 531. The unit of measurement shall be square yards (SY).

This item shall include the removal of existing sidewalks in accordance with the payment section of TxDOT Item 531.

BID ITEM P38 - CURB RAMPS (TY5)

BID ITEM P39 - CURB RAMPS (TY 7)

BID ITEM P40 - CURB RAMPS (TY 20)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 531. The unit of measurement shall be each (EA).

BID ITEM P41 - CONCRETE SIDEWALK WITH WALL

This item shall be constructed and measured and paid for in accordance with TxDOT Item 531. The unit of measurement shall be cubic yard (CY).

BID ITEM P42 - MTL W-BEAM GD FEN (TIM POST)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 540. The unit of measurement shall be linear feet (LF).

BID ITEM P43 - MTL BEAM GD FEN TRANS (THRIE-BEAM)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 540. The unit of measurement shall be each (EA).

BID ITEM P44 - REMOVE METAL BEAM GUARD FENCE

This item shall be constructed and measured and paid for in accordance with TxDOT Item 542. The unit of measurement shall be linear feet (LF).

BID ITEM P45 - GUARDRAIL END TREATMENT (INSTALL)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 544. The unit of measurement shall be each (EA).

BID ITEM P46 - RELOCATE RD IL ASM (TRANS-BASE)

BID ITEM P47 - IN RD IL (TY SA) 30S-8-8 (250W EQ) LED

These items shall be constructed and measured and paid for in accordance with TxDOT Item 610. The unit of measurement shall be each (EA).

BID ITEM P48 - CONDT (PVC) (SCH 40) (2") (BORE)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 618. The unit of measurement shall be linear feet (LF).

BID ITEM P49 - ELEC CONDR (NO.8) BARE

BID ITEM P50 - ELEC CONDR (NO.8) INSULATED

These items shall be constructed and measured and paid for in accordance with TxDOT Item 620. The unit of measurement shall be linear feet (LF).

BID ITEM P51 - GROUND BOX TY A (122311)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 624. The unit of measurement shall be each (EA).

BID ITEM 52 - IN SM RD SN SUP&AM TY10BWG(1)SA(P)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 644. The unit of measurement shall be each (EA).

BID ITEM P53 - REFL PAV MRK TY I (W)6"(SLD)(100MIL)

BID ITEM P54 - REFL PAV MRK TY I (W)24"(SLD)(100MIL)

BID ITEM P58 - RE PM W/RET REQ TY I(W)4"(BRK)(100MIL)

BID ITEM P59 - RE PM W/RET REQ TY I(W)4"(SLD)(100MIL)

BID ITEM P60 - RE PM W/RET REQ TY I(Y)4"(SLD)(100MIL)

BID ITEM P74 - REFL PAV MRK TY I (W)18"(SLD)(100MIL)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 666. The unit of measurement shall be linear feet (LF).

BID ITEM P55 - REFL PAV MRK TY I (W) (ARROW) (100 MIL)

BID ITEM P56 - REFL PAV MRK TY I (W)(WORD)(100MIL)

BID ITEM P57 - REFL PAV MRK TY I(W)(BIKE SYML)(100MIL)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 666. The unit of measurement shall be each (EA).

BID ITEM P61 - REFL PAV MRKR TY II-C-R

This item shall be constructed and measured and paid for in accordance with TxDOT Item 672. The unit of measurement shall be each (EA).

BID ITEM P62 - ELIM EXT PAV MRK & MRKS (4")

BID ITEM P63 - ELIM EXT PAV MRK & MRKS (24")

These items shall be constructed and measured and paid for in accordance with TxDOT Item 677. The unit of measurement shall be linear feet (LF).

BID ITEM P64 - PAV SURF PREP FOR MRK (4")

BID ITEM P65 - PAV SURF PREP FOR MRK (8")

BID ITEM P66 - PAV SURF PREP FOR MRK (24")

BID ITEM P75 - PAV SURF PREP FOR MRK (18")

These items shall be constructed and measured and paid for in accordance with TxDOT Item 678. The unit of measurement shall be linear feet (LF).

BID ITEM P67 - PAV SURF PREP FOR MRK (ARROW)

BID ITEM P68 - PAV SURF PREP FOR MRK (WORD)

BID ITEM P69 - PAV SURF PREP FOR MRK (BIKE SYMBOL)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 678. The unit of measurement shall be each (EA).

BID ITEM P70 - PORTABLE CHANGEABLE MESSAGE SIGN

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6001. The unit of measurement shall be each (EA).

The portable changeable message sign will be placed on the project as needed throughout construction to provide advance warning to the traveling public. The total number of portable changeable message boards listed in the contract will be the maximum amount of message boards needed at any one time.

BID ITEM P71 - PROJECT SIGN

This item shall be constructed in accordance with the appropriate specification, details, notes, including NCTCOG Item 107.21.

Measurement and payment shall be made on the basis of price bid per each (EA).

BID ITEM P72- REMOVE AND RELOCATE FIRE HYDRANT

This work includes removing and relocating the existing fire hydrant as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, notes, including NCTCOG Item 502.3.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, excavation, embedment, lead lines, polywrap, embedment, thrust blocks, bends, appurtenances and incidentals to complete all work in accordance with the construction plans.

BID ITEM P73 - MONOLITHIC MEDIAN NOSE

This work includes the limits of the monolithic median nose as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and notes.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, backfill, reinforced median pavement and pay lines as shown in the details, appurtenances and incidentals to complete all work in accordance with the construction plans.

BID ITEM D1 - TRENCH EXCAVATION PROTECTION

This item shall be constructed and measured and paid for in accordance with TxDOT Item 402. The unit of measurement shall be linear feet (LF).

BID ITEM D2 - CONC BOX CULV (4 FT X 2 FT)

BID ITEM D3 - CONC BOX CULV (7 FT X 3 FT)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 462. The unit of measurement shall be linear feet (LF).

BID ITEM D4 - RC PIPE (CL III)(18 IN)
BID ITEM D5 - RC PIPE (CL III)(24 IN)
BID ITEM D6 - RC PIPE (CL III)(30 IN)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 464. The unit of measurement shall be linear feet (LF).

BID ITEM D7 - JCTBOX(COMPL)(PJB)(6FTX6FT)
BID ITEM D8 - INLET (COMPL)(CURB)(TY 1)(MOD)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 465. The unit of measurement shall be each (EA).

BID ITEM D9 - SET (TY II) (30 IN) (RCP) (4: 1) (C)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 467. The unit of measurement shall be each (EA).

BID ITEM D10 - REMOVE STR (INLET)
BID ITEM D11 - REMOVE STR (SET)
BID ITEM D12 - REMOVE STR (HEADWALL)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 496. The unit of measurement shall be each (EA).

BID ITEM D13 - REMOVE STR (PIPE)
BID ITEM D14 - REMOVE STR (BOX CULVERT)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 496. The unit of measurement shall be linear feet (LF).

BID ITEM D15 - ROCK FILTER DAMS (INSTALL) (TY 1)
BID ITEM D16 - ROCK FILTER DAMS (REMOVE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 506. The unit of measurement shall be linear feet (LF).

BID ITEM D17 - CONSTRUCTION EXITS (INSTALL)(TY 1)
BID ITEM D18 - CONSTRUCTION EXITS (REMOVE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 506. The unit of measurement shall be square yards (SY).

BID ITEM D19 - TEMP SEDMT CONT FENCE (INSTALL)
BID ITEM D20 - TEMP SDMT CONT FENCE (INLET PROTECTION)
BID ITEM D21 - TEMP SEDMT CONT FENCE (REMOVE)
BID ITEM D22 - BIODEG EROSN CONT LOGS (INSTL) (8")
BID ITEM D23 - BIODEG EROSN CONT LOGS (REMOVE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 506. The unit of measurement shall be linear feet (LF).

BID ITEM D24 - STORM WATER POLLUTION PREVENTION PLAN

This bid item governs the preparation the TPDES Permitting on behalf of all primary operators, prior to beginning construction, and shall be done in accordance with NCTCOG Item 107.28 and Item 202. The City shall be copied on all Notices required by the General Permit.

Measurement and Payment for this item shall be by the contract unit price bid per lump sum (LS) and shall be full compensation to complete and file a SWPPP, inspection of the project in accordance with the SWPPP and TCEQ General Permit and maintain the SWPPP document current during the construction until the site is stabilized. Also included is submittal of completed Construction Site Notice form to the City.

BID ITEM D25 - 3'x3' DROP INLET WITH CONCRETE APRON

This work includes the construction of the 3'x3' drop inlet with concrete apron as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, notes, including NCTCOG Item 702.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, excavation, subgrade preparation, formwork, embedment, reinforcing steel, concrete, curing, manhole lids and rings, grates, backfill, appurtenances and incidentals to complete all work in accordance with the construction plans.

BID ITEM T1 - DRILL SHAFT (TRF SIG POLE) (36 IN)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 416. The unit of measurement shall be linear feet (LF).

BID ITEM T2 - CL C CONC (FOOTING)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 420. The unit of measurement shall be cubic yards (CY).

BID ITEM T3 - CONDT (PVC) (SCH 80) (2")

BID ITEM T4 - CONDT (PVC) (SCH 80) (2") (BORE)

BID ITEM T5 - CONDT (PVC) (SCH 80) (3")

BID ITEM T6 - CONDT (PVC) (SCH 80) (3") (BORE)

BID ITEM T7 - CONDT (PVC) (SCH 80) (4")

BID ITEM T8 - CONDT (PVC) (SCH 80) (4") (BORE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 618. The unit of measurement shall be linear feet (LF).

BID ITEM T9 - ELEC CONDR (NO.6) BARE
BID ITEM T10 - ELEC CONDR (NO. 6) INSULATED
BID ITEM T11 - ELEC CONDR (NO. 8) INSULATED
BID ITEM T12 - ELEC CONDR (NO. 12) INSULATED

These items shall be constructed and measured and paid for in accordance with TxDOT Item 620. The unit of measurement shall be linear feet (LF).

BID ITEM T13 - TRAY CABLE (3 CONDR) (12 AWG)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 621. The unit of measurement shall be linear feet (LF).

BID ITEM T14 - GROUND BOX TY D (162922) W/APRON
BID ITEM T15 - GROUND BOX TY 2 (243636)W/APRON

This item shall be constructed and measured and paid for in accordance with TxDOT Item 624. The unit of measurement shall be each (EA).

BID ITEM T16 – ELC SRV TY D 120/240 070(NS)SS(E)PS(U)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 628. The unit of measurement shall be each.

BID ITEM T17 - INSTALL HWY TRF SIG (ISOLATED)
BID ITEM T18 - INSTALL HWY TRF SIG (UPGRADE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 680. The unit of measurement shall be each (EA).

BID ITEM T19 - VEH SIG SEC (12")LED(GRN)
BID ITEM T20 - VEH SIG SEC (12")LED(GRN ARW)
BID ITEM T21 - VEH SIG SEC (12")LED(YEL)
BID ITEM T22 - VEH SIG SEC (12")LED(YEL ARW)
BID ITEM T23 - VEH SIG SEC (12")LED(RED)
BID ITEM T24 - VEH SIG SEC (12")LED(RED ARW)
BID ITEM T25 - PED SIG SEC (LED)(COUNTDOWN)
BID ITEM T26 - BACKPLATE W/REF BRDR(3 SEC)(VENT)ALUM
BID ITEM T27 - BACKPLATE W/REF BRDR (4 SEC) (VENT)ALUM
BID ITEM T28 - BACKPLATE W/REF BRDR(5 SEC)(VENT)ALUM

These items shall be constructed and measured and paid for in accordance with TxDOT Item 682. The unit of measurement shall be each (EA).

BID ITEM T29 - TRF SIG CBL (TY A)(14 AWG)(5 CONDR)
BID ITEM T30 - TRF SIG CBL (TY A) (14 AWG) (7 CONDR)
BID ITEM T31 - TRF SIG CBL (TY A)(14 AWG)(10 CONDR)
BID ITEM T32 - TRF SIG CBL (TY A)(14 AWG)(20 CONDR)
BID ITEM T33 - TRF SIG CBL (TY C)(12 AWG)(2 CONDR)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 684. The unit of measurement shall be linear feet (LF).

BID ITEM T34 - INS TRF SIG PL AM(S)1 ARM (24')LUM

BID ITEM T35 - INS TRF SIG PL AM(S)1 ARM(36')LUM

BID ITEM T36 - INS TRF SIG PL AM(S)1 ARM(48')LUM

These items shall be constructed and measured and paid for in accordance with TxDOT Item 686. The unit of measurement shall be each (EA).

BID ITEM T37 - PED POLE ASSEMBLY

These items shall be constructed and measured and paid for in accordance with TxDOT Item 687. The unit of measurement shall be each (EA).

BID ITEM T38 - PED DETECT PUSH BUTTON (APS)

BID ITEM T39 - PED DETECTOR CONTROLLER UNIT

These items shall be constructed and measured and paid for in accordance with TxDOT Item 688. The unit of measurement shall be each (EA).

BID ITEM T40 - REMOVAL OF GROUND BOXES

BID ITEM T42 - REMOVAL OF TRAFFIC SIGNAL POLE FND

BID ITEM T43 - REMOVAL OF SIGNAL POLE ASSM

These items shall be constructed and measured and paid for in accordance with TxDOT Item 690. The unit of measurement shall be each (EA).

BID ITEM T41 - REMOVAL OF CABLES

This item shall be constructed and measured and paid for in accordance with TxDOT Item 690. The unit of measurement shall be lump sum (LS).

This item includes the removal of all cables necessary to complete the traffic signal work.

BID ITEM T44 - CCTV FIELD EQUIPMENT (DIGITAL)

BID ITEM T45 - CCTV FIELD CONTROLLER

BID ITEM T46 - CCTV MOUNT (POLE)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 6010. The unit of measurement shall be each (EA).

BID ITEM T47 - CONDUIT (PREPARE)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6027. The unit of measurement shall be linear feet (LF).

BID ITEM T48 - GROUND BOX (PREPARE)

BID ITEM T49 - GROUND BOX (ADJUST)

These items shall be constructed and measured and paid for in accordance with TxDOT Item 6027. The unit of measurement shall be each (EA).

BID ITEM T50 INSTALL VIVDS CAMERA ASSEMBLY

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6052. The unit of measurement shall be each (EA).

BID ITEM T51 - INSTALL VIVDS COMMUNICATION CABLE

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6052. The unit of measurement shall be linear feet (LF).

BID ITEM T52 - BBU SYSTEM (EXTERNAL BATT CABINET)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6058. The unit of measurement shall be each (EA).

BID ITEM T53 – RADAR COMMUNICATION CABLE

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6155. The unit of measurement shall be linear feet (LF).

BID ITEM T54 - RVDS (PRESENCE AND ADVANCE DET) FURN & INS

This item shall be constructed and measured and paid for in accordance with TxDOT Item 6292. The unit of measurement shall be each (EA).

BID ITEM T55 - PRE-EMPTION DETECTOR

This work includes the construction of the pre-emption detectors as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and notes.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

BID ITEM T56 - PRE-EMPTION CABLE

This work includes the construction of the pre-emption cables as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and notes.

Measurement and payment shall be made on the basis of price bid per linear feet (LF) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

BID ITEM L1 – COMPOST MANUF TOPSOIL (4")

This item shall be constructed and measured and paid for in accordance with TxDOT Item 161. The unit of measurement shall be square yards (SY).

BID ITEM L2 - BLOCK SODDING

This item shall be constructed and measured and paid for in accordance with TxDOT Item 162. The unit of measurement shall be square yards (SY).

BID ITEM L3 - BROADCAST SEED (PERM) (URBAN) (CLAY)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 164. The unit of measurement shall be square yards (SY).

BID ITEM L4 – FERTILIZER

This item shall be constructed and measured and paid for in accordance with TxDOT Item 166. The unit of measurement shall be acres (AC).

BID ITEM L5 - VEGETATIVE WATERING

This item shall be constructed and measured and paid for in accordance with TxDOT Item 168. The unit of measurement shall be per 1,000 gallons (MG).

BID ITEM L6 - PLANT MATERIAL (1-GAL)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 192. The unit of measurement shall be each (EA).

BID ITEM L7 – MULCH

This item shall be constructed and measured and paid for in accordance with TxDOT Item 192. The unit of measurement shall be cubic yard (CY).

BID ITEM L8 - PLANT MAINTENANCE

This item shall be constructed and measured and paid for in accordance with TxDOT Item 193. The unit of measurement shall be months (MO).

BID ITEM IRR1 - IRRIGATION SYSTEM

This item shall be constructed and measured and paid for in accordance with TxDOT Item 170. The unit of measurement shall be lump sum (LS).

BID ITEM IRR2 - IRRIGATION SYSTEM OPER AND MAINT

This item shall be constructed and measured and paid for in accordance with TxDOT Item 193. The unit of measurement shall be months (MO).

ALTERNATE BID ITEM A1 - DRILLED SHAFT FOUNDATION (RDWY ILL POLE) (8 FEET LN X 30 INCHES DIA)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 416. The unit of measurement shall be linear feet (LF).

ALTERNATE BID ITEM A2 - CONDT (PVC) (SCHD 40) (2")
ALTERNATE BID ITEM A3 - CONDT (RM) (3/4")

These items shall be constructed and measured and paid for in accordance with TxDOT Item 618. The unit of measurement shall be linear feet (LF).

ALTERNATE BID ITEM A4 - ELECTRIC CONDR (NO. 8) BARE
ALTERNATE BID ITEM A5 - ELECTRIC CONDR (NO. 8) INSULATED

These items shall be constructed and measured and paid for in accordance with TxDOT Item 620. The unit of measurement shall be linear feet (LF).

ALTERNATE BID ITEM A6 - GROUND BOX TY C (162911) W/ APRON

This item shall be constructed and measured and paid for in accordance with TxDOT Item 624. The unit of measurement shall be each (EA).

ALTERNATE BID ITEM A7 - ELECTRICAL SERVICE TY A (120/240)60(NS)AL(E)PS(U)

This item shall be constructed and measured and paid for in accordance with TxDOT Item 628. The unit of measurement shall be each (EA).

ALTERNATE BID ITEM A8 – SOLAR POWERED LIGHT POLE ASSEMBLY (GROUND MOUNTED)

This work includes the installation of the item above as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and product data. Refer to Product Information in the Construction Specifications for sheet specification.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

ALTERNATE BID ITEM A9 – 12” COLOR CHANGING LED FIXTURE
ALTERNATE BID ITEM A10 – COLUMN WRAP LED LUMINAIRE LEADER CABLES
ALTERNATE BID ITEM A11 – COLUMN WRAP LED LUMINAIRE 5' JUMPER CABLES
ALTERNATE BID ITEM A12 – COLUMN WRAP LED LUMINAIRE 2' JUMPER CABLES
ALTERNATE BID ITEM A13 – COLUMN WRAP LED LUMINAIRE CONTROL BOXES
ALTERNATE BID ITEM A14 – ETC MOSAIC CONTROLS AND ONSITE COMMISSIONING AND PROGRAMMING

This work includes the installation of the item above as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and product data. Refer to Product Information in the Construction Specifications for installation schematic.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

ALTERNATE BID ITEM A15 – CLIMATE CONTROLLED STAINLESS STEEL NEMA 4X ENCLOSURE AND STRUT ASSEMBLY

This work includes the installation of the item above as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and product data. This item shall include Type 4X enclosure, T15 compact outdoor sealed enclosure cooling air conditioner, and B-line series strut system (including channel, two hole splice plate, post base, nuts, bolts, and fittings). Refer to Product Information in the Construction Specifications for sheet specifications.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

ALTERNATE BID ITEM A16 - LANDSCAPE AMENITY (CONCRETE SEATING)
ALTERNATE BID ITEM A17 - LANDSCAPE AMENITY (TRASH RECEPTABLE)
ALTERNATE BID ITEM A18 - LANDSCAPE AMENITY (ART MESH WRAP)

This work includes the installation of the item above as shown in the drawings. This item shall be constructed in accordance with the appropriate specification, details, and product data.

Measurement and payment shall be made on the basis of price bid per each (EA) and shall be total compensation for the furnishing of labor, materials, tools, equipment, appurtenances, and incidentals to complete all work in accordance with the construction plans.

ALTERNATE BID ITEM A19 – MAINTENANCE BOND

Contractor shall provide a maintenance bond to the Owner for a term of one (1) year from date of Final Acceptance by the Owner. The amount of this maintenance bond shall be one hundred percent (100%) of the final Contract Price.

The unit of measurement shall be lump sum (LS).

XV. CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

For this project, the Texas Department Standard Specifications for Construction and Maintenance of Highways, Street and Bridges Adopted by the Texas Department of Transportation November 1, 2014, Standard Specifications for Public Works Construction" by North Central Texas Council of Governments (NCTCOG) most recent amendments shall govern all work to be done, together with any additional product information, and technical specifications included herein.

TxDOT Standard Specifications

The Texas Department of Transportation *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* Adopted by the Texas Department of Transportation November 1, 2014 are included in the contract by reference and are available as a separate document from TxDOT at the following link: <https://www.txdot.gov/business/resources/txdot-specifications.html>)

The following is a listing of technical specifications that are anticipated for use on this project.

Item 100	Preparing Right of Way
Item 104	Removing Concrete
Item 105	Removing Treated and Untreated Base and Asphalt Pavement
Item 110	Excavation
Item 132	Embankment
Item 161	Compost
Item 162	Sodding for Erosion Control
Item 164	Seeding for Erosion Control
Item 166	Fertilizer
Item 168	Vegetative Watering
Item 192	Landscape Planting
Item 193	Landscape Establishment
Item 260	Lime Treated (Road-Mixed)
Item 402	Trench Excavation Protection
Item 403	Temporary Special Shoring
Item 416	Drilled Shaft Foundation
Item 420	Concrete Substructures
Item 423	Retaining Walls
Item 432	Riprap
Item 442	Metal for Structures
Item 450	Railing
Item 462	Concrete Box Culverts and Drains
Item 464	Reinforced Concrete Pipe
Item 465	Junction Boxes, Manholes, and Inlets
Item 467	Safety End Treatments
Item 479	Adjusting Manholes and Inlets
Item 496	Removing Structures
Item 500	Mobilization
Item 502	Barricades, Signs, and Traffic Handling
Item 506	Temporary Erosion, Sedimentation, and Environmental Controls
Item 512	Portable Traffic Barrier
Item 528	Colored Textured Concrete and Landscape Pavers
Item 529	Concrete Curb, Gutter, and Combined Curb and Gutter
Item 530	Intersection, Driveways, and Turnouts
Item 531	Sidewalks

Item 540	Metal Beam Guard Fence
Item 542	Removing Metal Beam Guard Fence
Item 544	Guardrail End Treatments
Item 610	Roadway Illumination Assemblies
Item 618	Conduit
Item 620	Electrical Conductors
Item 621	Tray Cable
Item 624	Ground Boxes
Item 628	Electrical Services
Item 644	Small Roadside Sign Assemblies
Item 666	Retroreflectorized Pavement Markings
Item 672	Raised Pavement Markers
Item 677	Eliminating Existing Pavement Markings and Markers
Item 680	Highway Traffic Signals
Item 682	Vehicle and Pedestrian Signal Heads
Item 684	Traffic Signal Cables
Item 686	Traffic Signal Poll Assemblies (Steel)
Item 687	Pedestrian Pole Assemblies
Item 688	Pedestrian Detectors and Vehicle Loop Detectors
Item 690	Maintenance of Traffic Signals

TxDOT Special Specifications

TxDOT Special Specifications are included in the contract by reference and are available as a separate document from TxDOT at the following link:

<http://www.dot.state.tx.us/apps-cg/specs/toc.asp?year=4&type=SS&list=all>

SS6001	Portable Changeable Message Sign
SS6010	Closed Circuit Television (CCTV) Field Equipment
SS6027	Preparation of Existing Conduits, Ground Boxes or Manholes
SS6052	Video Imaging Vehicle Detection System Camera Assemblies and Communication Cable
SS6058	Battery Back-Up System for Signal Cabinet
SS6155	Radar Detector and Communication Cable
SS6292	Radar Vehicle Detection System for Signalized Intersection Control

A. PRODUCT INFORMATION

*Integrated Solar
Street Light*

**SMARTLIGHT SINGLE
ROADFOCUS RFS**



Project: G5007 - Trail Senter Park

Notes: Runs at 32W for 6 hours post-dusk and 1 hour pre-dawn. Dims to 30% for the rest of the night.

[RFS-35W16LED]	- 4K	- R2M	- BK	-	-	[P140F-T1]	-	- 2P	- 10	-	[RTA-20E-8B4-1S2C]	- BK
Fixture	Temp	Type	Color (Fixture)	HS	Solar-Mount	Option	Power Center	Tilt	Pole	Color (Pole)		

zero
Trenching and
Wiring Expense

zero
Emissions and
Electric Bills

zero
Maintenance for a
Minimum of 10 Years

The SmartLight solar powered street lighting system rivals traditional grid-tied light poles with infrastructure grade lighting, low maintenance and avoided installation costs. The advanced 365 Power Center features advanced NiMH battery technology and anti-blackout controls. The result is a sleek profile, 10-year battery life and a great value proposition.



Solar Assembly

- Black Tie panel backing creates a finished appearance and disappears in the night sky
- Steel powder coated and galvanized mounting
- 140W to 305W solar power



Power 365 Assembly

- Components are pre-wired inside of the sealed compartment
- Activated with two weather tight connections for true plug-and-play installation
- Extreme environment batteries deliver 365 nights of lighting for 10 or more years



RFS Luminaire

- Dark Sky Friendly Options
- 5 Distribution Types
- 35W or 72W Options
- Integrated Bubble Level

Note: Illustrated Arm Style by special order only

RFS SmartLight Single Specifications



LUMINAIRE PRODUCT CODE	COLOR TEMP	DISTRIBUTION	COLOR	HOUSE SIDE SHIELD OPTION	WEIGHT LBS	EPA Ft²
RFS-35W16LED	2.7K, 3K,4K	R2M,R2S,R3M,R3S,T4,T5	BK-Black	HS (16LED) / 2 HS (32LED)	9.4	0.52
RFS-72W32LED	2.7K, 3K,4K	R2M,R2S,R3M,R3S,T4,T5	BK-Black	2 HS (32LED)	9.4	0.52
Custom						

SOLAR MODULE ASSEMBLY PRODUCT CODE / DESCRIPTION	DIMENSIONS SOLAR MODULE	MODULE FRAME & BACK SHEET	PERFORMANCE WARRANTY
P140F 140W PolyCrystalline Solar Module with Steel Mount - Tilt Adjustment (0,10,20 or 45 Degree) Galvanized and Powder Coated	43.31 x 33.46 x 1.57	Black	25 Years
P260F 260W PolyCrystalline Solar Module with Steel Mount - Tilt Adjustment (0,10,20 or 45 Degree) Galvanized and Powder Coated	66.93 x 40.55 x 1.81	Black	25 Years
P305F 305W PolyCrystalline Solar Module with Steel Mount - Tilt Adjustment (0,10,20 or 45 Degree) Galvanized and Powder Coated	66.93 x 42.13 x 1.57	Black	25 Years

Heavy Duty Mount Adder (Required with 45 degree tilt)	
HW-MC	Heavy Duty Mount Galvanized with Marine Powder Coat Upgrade

POWER 365 ASSEMBLY PRODUCT CODE / DESCRIPTION	
1P Power 365 Power Center with 312Wh NiMH Battery Capacity-IP65	
2P Power 365 Power Center with 624 Wh NiMH Battery Capacity-IP65	
3P Power 365 Power Center with 936 Wh NiMH Battery Capacity-IP65	
4P Power 365 Power Center with 1248 Wh NiMH Battery Capacity-IP65	
CONTROLLER	

BATTERIES	
Chemistry	Nickel Metal Hydride
Operating Temperature	-40°C to +70°C
Warranty	5 Year Full Replacement
Certifications	EN 550 14-1 ; EN 55014-2 ; EN 61000-6-2 ; EN 61000-6-3

Battery Management System (BMS)
 Anti-Black Out Control
 Real Time Scheduling Option
 3-Level Programmable Lighting Profiles
 LoRa Enabled for Wireless Network*

* Requires Fonroche Connect Gateway-See SolarOne for Details

Solar Assembly	TOTAL TOP OF POLE ASSEMBLY -PANEL, MOUNTING, 365 POWER CENTER				Weight - (Pounds)			EPA (Sq.Ft.)		
	1P	2P	3P	4P	10° Tilt	20° Tilt	45° Tilt			
P140F-HW-MC	102.73	113.31	123.89	134.48	2.67	3.89	7.45			
P260F-HW-MC	120.37	130.95	141.53	152.12	4.48	7.24	13.93			
P305F-HW-MC	120.37	130.95	141.53	152.12	4.48	7.38	14.36			

POLE ASSEMBLIES	RATED FOR MINIMUM 100MPH (DEPENDING ON TILT AND POWER CENTER SPECIFICATION)
RTA-14D-7B4-1S2C	Round tapered aluminum 14' x 7" x .188 wall, tenon top, with 2' Slipfit arm assembly and solar mounting provisions (15'-3" MH)
RTA-20E-8B4-1S2C	Round tapered aluminum 20' x 8" x .219 wall, tenon top, with 2' Slipfit arm assembly and solar mounting provisions (21'-3" MH)
RTA-25F-9B4-1S2C	Round tapered aluminum 25' x 9" x .250 wall, tenon top, with 2' Slipfit arm assembly and solar mounting provisions (26'-3" MH)
RTA-25F-9B4-1S6A	Round tapered aluminum 25' x 9" x .250 wall, tenon top, with 6' Slipfit arm assembly and solar mounting provisions (26'-8" MH)
Custom	

System	
System Warranty	5 Years
System Certification	CE



Ordering Selections

RFS-35W16LED	4K	R2M	BK	-	-	P140F-T1	-	2P	10	RTA-20E-8B4-1S2C	BK
Fixture	Temp	Type	Color (Fixture)		HS	Solar-Mount	Option	Power Center	Tilt	Pole	Color (Pole)



Road Focus Small

The versatile Road Focus has a sleek, unobtrusive design that is at home in all types of environments. With three color temperature choices, six light distribution patterns, zero uplight and optional shielding, it is a great solution for pathways, bike paths, streets, general area lighting and parking lots. The luminaire's superior optics allow you to get the most out of your solar lighting systems by using your lumens exactly where you need them. Optional house side shields protect neighboring properties.

Project:

Notes:

Lumen Values

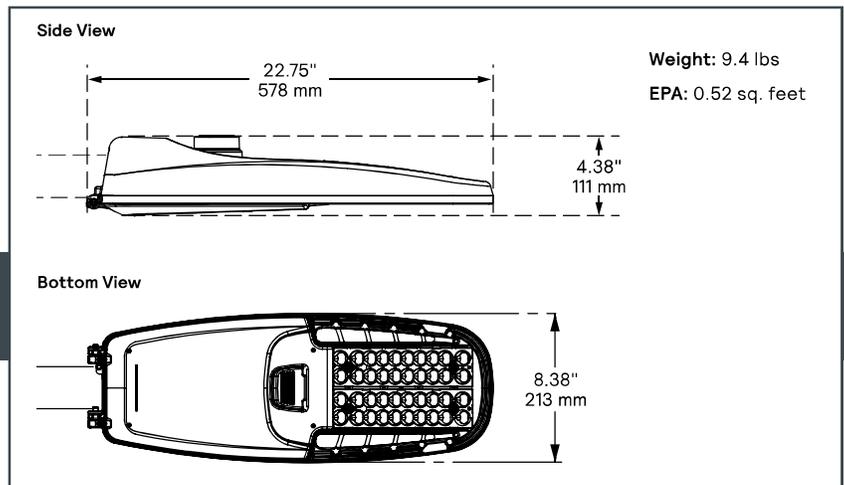
Ordering Code	Color Temp.	Type R2M			Type R2S			Type R3M			Type R2S			Type 4			Type 5		
		Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
RFS-35W16LED	4000	4,810	127	B1- U0-G1	5,007	132	B1- U0-G1	4,795	126	B1- U0-G1	4,859	128	B1- U0-G1	4,772	126	B1- U0-G1	4,964	131	B1- U0-G1
RFS-72W32LED	4000	9,408	129	B2- U0-G2	9,794	134	B2- U0-G2	9,379	128	B2- U0-G2	9,505	130	B2- U0-G2	9,336	128	B2- U0-G2	9,711	133	B2- U0-G2
RFS-35W16LED	3000	4,512	119	B1- U0-G1	4,697	124	B1- U0-G1	4,498	118	B1- U0-G1	4,558	120	B1- U0-G1	4,477	118	B1- U0-G1	4,657	123	B3- U0-G1
RFS-72W32LED	3000	8,826	121	B2- U0-G2	9,188	126	B2- U0-G1	8,799	121	B2- U0-G2	8,917	122	B1- U0-G2	8,758	120	B2- U0-G2	9,110	125	B3- U0-G2
RFS-35W16LED	2700	4,138	109	B1- U0-G1	4,307	113	B1- U0-G1	4,125	109	B1- U0-G1	4,180	110	B1- U0-G1	4,105	108	B1- U0-G1	4,271	112	B3- U0-G1
RFS-72W32LED	2700	8,094	111	B2- U0-G2	8,426	115	B2- U0-G1	8,069	111	B2- U0-G2	8,177	112	B1- U0-G2	8,031	110	B2- U0-G2	8,354	114	B3- U0-G2

Ordering Guide

Model	CCT	Distribution	Finish	Options
RFS-35W16LED	4K	R2M	BK	-
RFS-35W16LED	4K	TR2S Type 2 Short	BK Black	HS House Side Shield (16LED)
RFS-72W32LED	3K	TR2M Type 2 Medium	DBZ Bronze	2HS House Side Shield (32LED)
	2.7K	TR3S Type 3 Short	WH White	
		TR3M Type 3 Medium		
		T4 Type 4		
		T5 Type 5		

Roadfocus Small

Specifications



Housing

Made of a low copper die cast Aluminum alloy(A360), 0.100" (2.5mm) minimum thickness. Fits on a 1.66" (42mm) O.D. (1.25" NPS), 1.9"(48mm) O.D. (1.5" NPS) or 2 3/8" (60mm) O.D. (2" NPS) by 5 1/2" (140mm) minimum long tenon. Comes with a zinc plated clamp fixed by 2 zinc plated hexagonal bolts 3/8 16 UNC for ease of installation. Provides an easy step adjustment of +/- 5° tilt in 2.5° increments. Includes integral bubble level standard (always included). A quick release, tool-less entry, single latch, hinged, removable door opens downward to provide access to electronic components and to a terminal block. Door is secured to prevent accidental dropping or disengagement. Clearance of 13" (330mm) at the rear is required to remove the door. Complete with a bird guard protecting against birds and similar intruders. Housing (including electrical compartment) rated IP54 per ANSI C136.37.

Light Engine

Composed of 4 main components: LED Module /Optical System / Heat Sink / Driver. IP66 sealed light engine equipped LEDs tested by ISO17025-2005 accredited lab in accordance with IESNA LM-80 guidelines in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM-21. Metal core board ensures greater heat transfer and longer lifespan.

LED Module: Composed of high-performance white LEDs. Color temperature as per ANSI/NEMA bin 2700 Kelvin nominal (2725 ±145K), 3000Kelvin nominal (3045K +/- 175K) or 4000 Kelvin nominal (3985K +/- 275K), CRI 70 Min. 75 Typical. Other CCT/CRI also available, consult factory.

Optical System: Composed of high performance stabilized optical grade polymer refractor lenses to achieve desired distribution optimized to get maximum spacing, target lumens and a superior lighting uniformity. System is rated IP66. Performance shall be tested per LM-63, LM-79, and TM-15 (IESNA) certifying its photometric performance. 0% uplight and U0 per IESNA TM-15.

Heat Sink: Built in the housing, designed to ensure high efficacy and superior cooling by natural vertical convection air flow pattern always close to LEDs and driver optimizing their efficiency and life. Product does not use any cooling device with moving parts (only passive cooling). Wide openings enable natural cleaning and removal of dirt and debris. Entire luminaire is rated for operation in ambient temperature of -40°C / -40°F up to +50°C / +122°F.

Driver: Constant Current, Dimmable driver is integrated the SmartLight Controller. High power factor of 90% min. Voltage input 24VDC. Operating temperature of -40°C /-40°F - +70°C/+158°F. MTBF – 1170.3Khrs min. MIL-HDBK-217F. EMC Compliance – EN55015 Emissions and EN61547, EN61000-4-2,3,4,6,8 Immunity.

Luminaire Useful Life

Refer to IES files for energy consumption and delivered lumens for each option. Based on ISTMT in situ thermal testing in accordance with UL1598 and UL8750, System Reliability Tool, Advance data and LED manufacturer LM-80/TM-21 data, expected to reach 100,000 + hours with >L70 lumen maintenance @ 25°C. Luminaire Useful Life accounts for LED lumen maintenance AND all of these additional factors including: LED life, driver life, PCB substrate, solder joints, on/off cycles, burning hours and corrosion.

Hardware

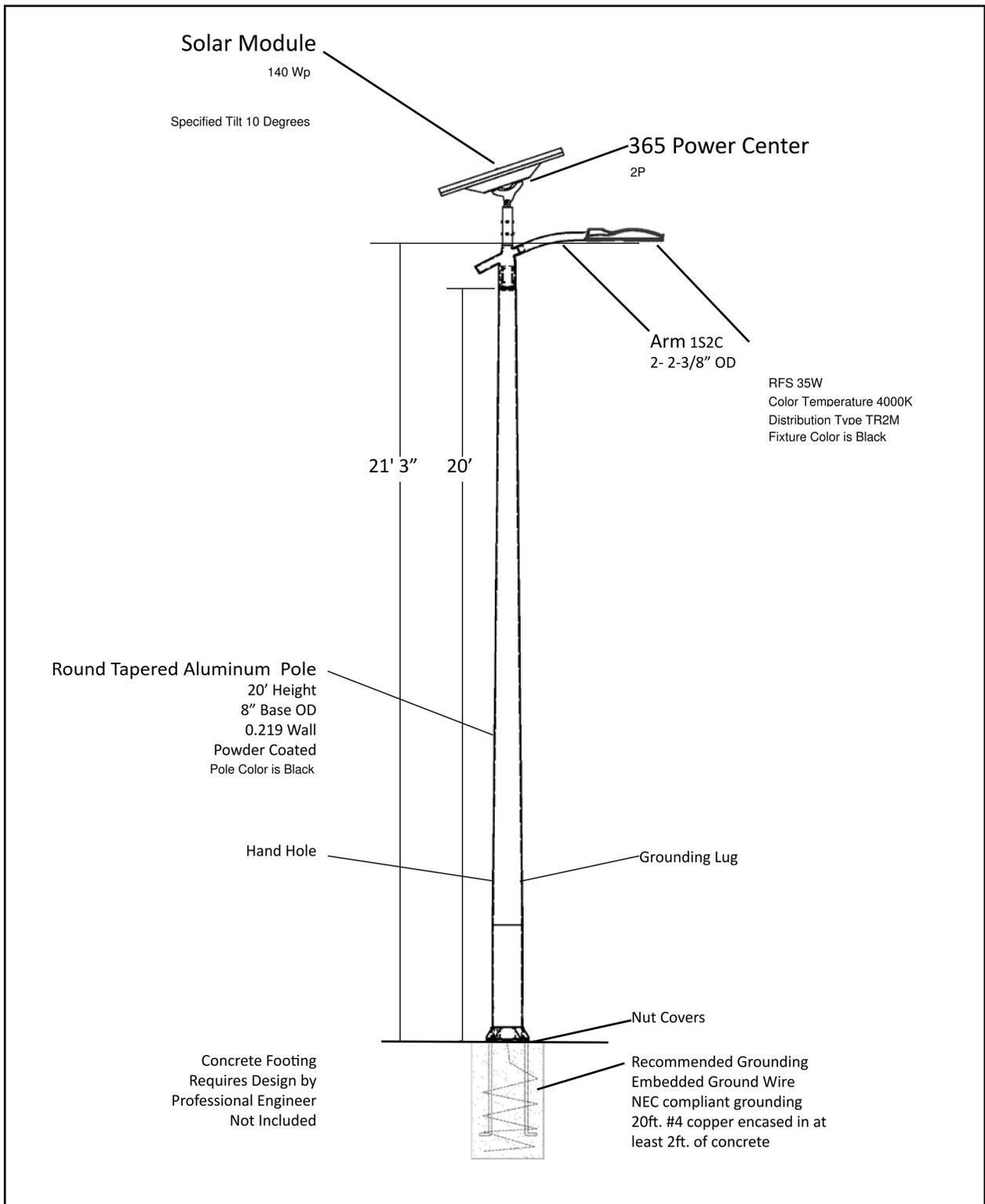
All exposed screws shall be complete with Ceramic primer seal to reduce seizing of the parts, also offers a high resistance to corrosion. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.

Finish

Color in accordance with the AAMA 2603 standard. Application of polyester powder coat paint (4 mils/100 microns) with ± 1 mils/24microns of tolerance. The Thermosetting resins provides a discoloration resistant finish in accordance with the ASTM D2244 standard, as well as luster retention in keeping with the ASTM D523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment achieves a minimum of 5000 hours for salt spray resistant finish in accordance with testing performed and per ASTM B117 standard. LED products manufacturing standard Light emitting diodes (LEDs) are assembled in compliance with IEC61340-5-1 and ANSI/ESDS20.20 standards to eliminate ESD events that could decrease the useful life of the product.

Vibration Resistance

The RFS meets the ANSI C136.31-2018, American National Standard for Roadway Luminaire Vibration specifications for Bridge/over pass applications. (Tested for 3G over 100,000 cycles by independent lab).



TOTAL TOP OF POLE ASSEMBLY - PANEL, MOUNTING, 365 POWER CENTER

Solar Assembly	Weight - (Pounds)				EPA (Sq.Ft.)		
	1P	2P	3P	4P	10° Tilt	20° Tilt	45° Tilt
P140F-HW-MC	102.73	113.31	123.89	134.48	2.67	3.89	7.45
P260F-HW-MC	120.37	130.95	141.53	152.12	4.48	7.24	13.93
P305F-HW-MC	120.37	130.95	141.53	152.12	4.48	7.38	14.36



20' Pole

Ordering Selections

[RFS-35W16LED]	-	[4K]	-	[R2M]	-	[BK]	-	[-]	-	[P140F-T1]	-	[-]	-	[2P]	-	[10]	-	[RTA-20E-8B4-1S2C]	-	[BK]
Fixture		Temp		Type		Color (fixture)		HS		Solar-Mount		Option		Power Center		Tilt		Pole		Color (Pole)

General

- Low profile design
- Photocell sensor
- Deep cycle battery will charge and discharge over 2000 times
- Up to 177lm/w
- 8 Hour charge time from fully depleted battery
- 3000K-6500K CCT
- Wildlife/Turtle friendly amber CCT available



Exclusive Free
Battery Recycling
Program



Certifications

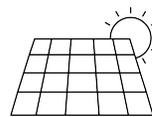


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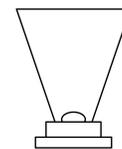


5G Remote Access

- Monitor
- Set Timing
- Get Alerts
- Dimming



Monocrystalline
Solar Module



Philips Lumileds
Luxeon 5050 Chips



IP65



Bluetooth
Programming
(optional)



AMERICAN COMBAT VETERAN OWNED COMPANY



405-673-8684
www.gridshiftsolar.lighting

Corporate: 2803 Broadway Ct. Edmond, OK 73013
 California: 1341 Distribution Way, Suite 20, Vista, CA 92081

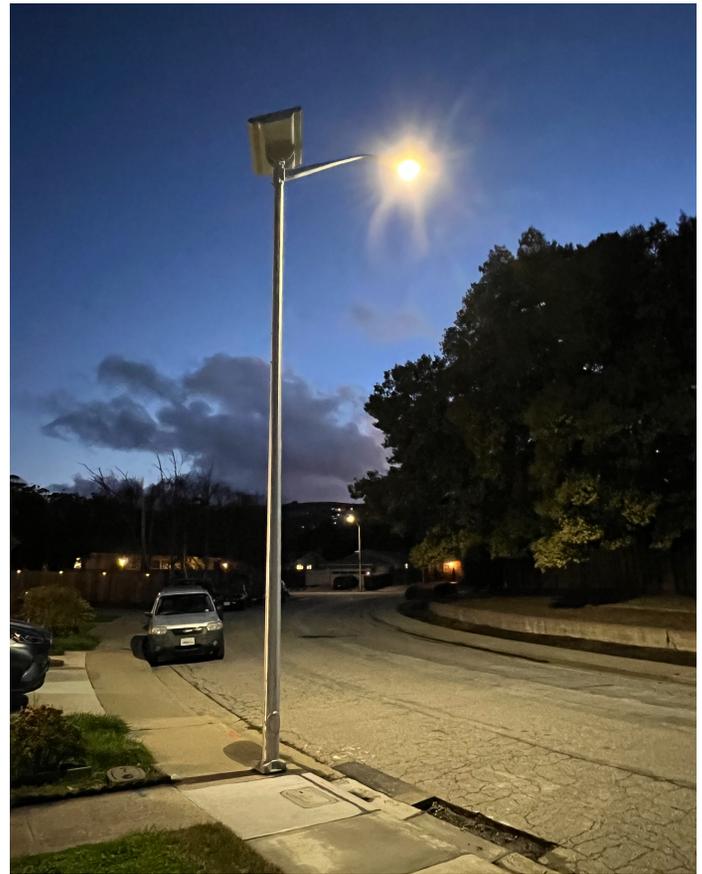
Cuesta Sol is a trademark of GridShift Solutions, LLP



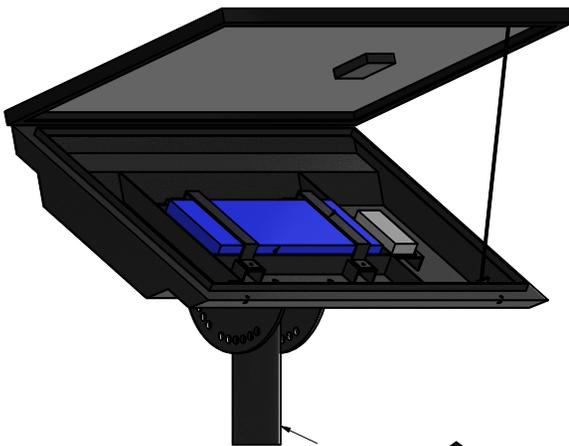
Wounded Warrior Project

Construction

- Solar assembly construction marine grade aluminum and stainless steel
- UV stabilized polyester powder coat finish over primer for durability and corrosion resistance
- Streamlined design to reduce wind resistance
- All key components located beneath solar panel. Providing protection and easy access for maintenance
- Assembly comes pre-drilled and tapped for ease of installation
- Integral monocrystalline silicon solar panel
- 25 Year Lifespan
- Conversion rate up to 30%

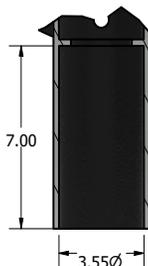


Solar Panel



3.5" X 6" Pole top tenon required for solar panel installation

*Custom Slip fitters available upon request



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GRIDSHIFT™
 SOLAR LIGHTING

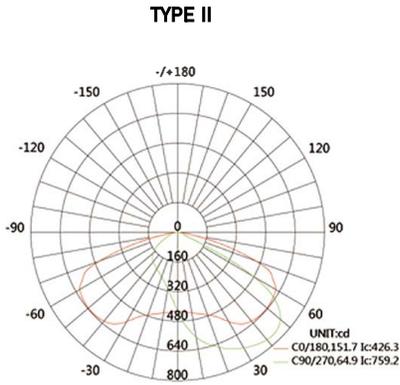
Corporate: 2803 Broadway Ct. Edmond, OK 73013
 California: 1341 Distribution Way, Suite 20, Vista, CA 92081

Cuesta Sol is a trademark of GridShift Solutions, LLP

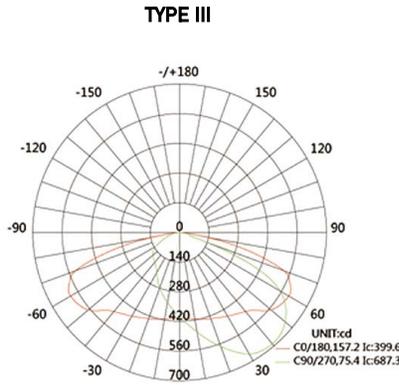


Wounded Warrior Project

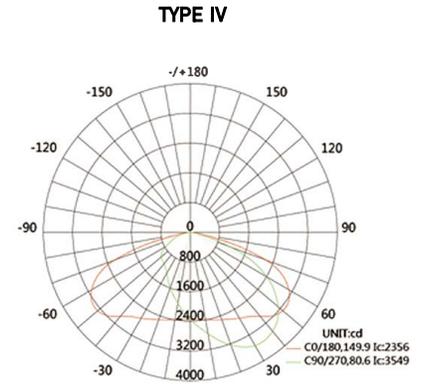
Photometry



Average Beam Angle (50%): 108.3° Unit:cd



Average Beam Angle (50%): 116.3° Unit:cd



Average Beam Angle (50%): 115.3° Unit:cd

	CS-PRE-20W	CS-PRE-40W	CS-PRE-60W	CS-PRE-100W
Wattage	20W	40W	60W	100W
LED Chip	5050	5050	5050	5050
Lumen Output	3540lm	6680lm	10080lm	16800lm
Efficacy	177lm/w	167lm/w	168lm/w	168lm/w
Weight	42lbs	45lbs	45lbs	101lbs
EPA	4.2	5.5	9	12.5
BUG Rating	B2-U0-G1	B2-U0-G1	B2-U0-G1	3-U0-G2
Optional Beam Angle	T2/T3/T4			
Input Voltage	12-24V DC			
Photovoltaic Panel	Double Crystal Photovoltaic Panel			
Solar Panel	18V/70W	18V/130W	36V/200W	36V/280W
Lithium-Ion Battery	691.2WH 12.8V 54AH	1382.4WH 12.8V 102AH	2150.4WH 25.6V 84AH	2611.2WH 25.6V 102AH
Discharge Time (Full Charge)	30 Hours			
Installation Height	10-13ft	16-19ft	22-26ft	36-39ft
Working Temperature	14°F to 122°F			
Charging Temperature	32°F to 113°F			
Control System	MPPT Intelligent Controller			
Autonomy	30%-100% 102hrs (Max) 20%-80% 155hrs (Max)			
Constant Mode (Full Charge)	100% 30hrs 40% 78hrs			
Wildlife & Turtle Friendly CCT	5050 LED Chips, 1900K CCT, 1.8% blue light content, 400-500 nanometer range of the visible light spectrum			



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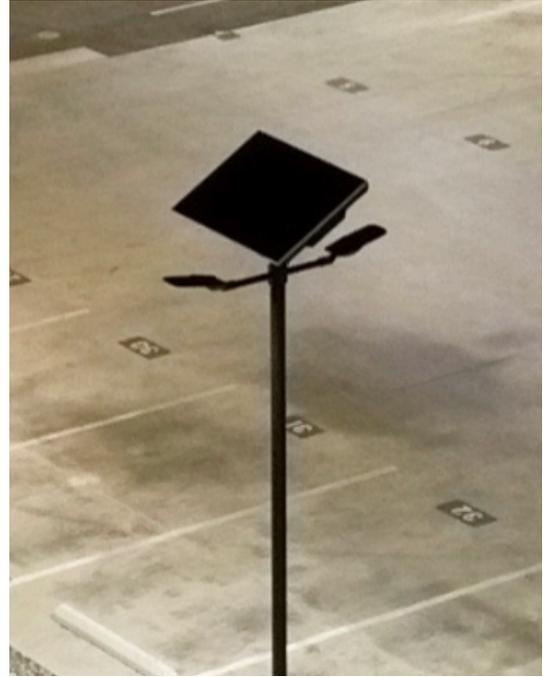


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CS-PRE-(20W-40W-60W-100W)-S



CS-PRE-(20W-40W-60W-100W)-D

Model #	Watts	Voltage	00-No Motion SN-Motion Sensor	Color Temp in 100K	CRI	Available Optic Types	Optional 5G Remote Access (Yes/No)	S - Single D - Double
Cuesta Sol CS-PRE	20	NV-12 DC	00 / SN	19K / 30K / 40K / 50K / 57K / 65K	70 CRI / 80 CRI	II / III / IV	Y / N	S / D
Cuesta Sol CS-PRE	40	NV-12 DC	00 / SN	19K / 30K / 40K / 50K / 57K / 65K	70 CRI / 80 CRI	II / III / IV	Y / N	S / D
Cuesta Sol CS-PRE	60	NV-24V DC	00 / SN	19K / 30K / 40K / 50K / 57K / 65K	70 CRI / 80 CRI	II / III / IV	Y / N	S / D
Cuesta Sol CS-PRE	100	NV-24V DC	00 / SN	19K / 30K / 40K / 50K / 57K / 65K	70 CRI / 80 CRI	II / III / IV	Y / N	S / D

Ordering Description Example								
Cuesta Sol CS-PRE	60	NV-24V DC	SN	50	80	IV	Y	S

Ordering Description								
Cuesta Sol CS-PRE	20	NV-12 DC						
Cuesta Sol CS-PRE	40	NV-12 DC	SN	40	70	II	Y	S
Cuesta Sol CS-PRE	60	NV-24V DC						
Cuesta Sol CS-PRE	100	NV-24V DC						



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Gardco OptiForm solar powered system is an off-grid smart solar powered system that includes a luminaire featuring the latest in LED technology, post-top PV panel, batteries and charge controller. The solution offers multiple lumen packages with industry leading efficacy, a complete array of optical distributions, ensuring the right fit for any type of site and area applications. The solar subsystem comes with a pre-tilted bracket for optimum energy collection based on the system configuration, location and wind speed. The system can be tailored to the expected night activities, number of cloudy days and solar irradiance available at the location.

Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lamps: _____ Qty: _____
 Notes: _____

Part I Ordering guide: Luminaire ^{1, 2, 3}

example: OPFS-SOL-80L-730-T5W-AR1S-MR-PDD01-GBK

Luminaire	Lumen Output	Color Temp.	Distribution	Mounting ⁵	Options	Operating Profiles ⁶	Finish
OPFS-SOL							
OPFS-SOL	50L 5000 lm	740 4000K	T2M Type 2 medium	AR1S Arm mount 5"	MR Motion response	Luminaire without Motion Response (FD - Fixed Dimming)	GBK Black
OptiForm	60L 6000 lm	730 3000K	T3M Type 3 medium	AR2S Arm mount 5 5/16"	EHS External Shield	FDD01 Fixed dimming #1	GWH White
Small Solar	70L 7000 lm	727 ⁴ 2700K	T4M Type 4 medium			FDD02 Fixed dimming #2	GBZ Bronze
	80L 8000 lm		T4W Type 4 wide			FD530 100% for 5 hrs, then 30% till sunrise	GDG Dark Gray
	90L 9000 lm		T5M Type 5 medium			FD550 100% for 5 hrs, then 50% till sunrise	GMG Medium Gray
	100L 10,000 lm		T5N Type 5 narrow				
	110L 11,000 lm		T5W Type 5 wide				
	120L 12,000 lm						
						Luminaire with Motion Response (MR) ⁷ (PD - Profile Dimming)	
						PDD01 Profile dimming #1	
						PDD02 Profile dimming #2	
						PD30 100% with motion override and 30% without	
						PD50 100% with motion override and 50% without	

Part II Ordering guide: Pole and Solar Subassembly

example: SPR5V-20-P200-30-CB2-VDS-GBK

Pole ⁸	Pole Height ⁹	Solar Panel Power	Solar Panel Tilt Angle	Battery Type/Capacity	Vibration Dampener	Finish
					VDS	
ATR85N 0.188"	18 23	P200 200Wp	10	CB1 Crystal battery 960Wh	VDS Vibration dampening solar	GBK Black
SPR5J 0.180"	19 24	P325 325Wp	20	CB2 Crystal battery 1,680Wh		GWH White
SPR5V 0.250"	20 25		30	CB3 Crystal battery 2,400Wh		GBZ Bronze
SSM8V 0.250"	21 26		40			GDG Dark Gray
	22 27		50			GMG Medium Gray

Default anchor bolts and circles for solar poles

(optional, to be ordered separately) example: 1x36-12 1/2-DEC

Anchor Bolts Ordering Code	Pole Family	Bolt Circle Diameter
1x36-11-DEC	ATR85N	11
1x36-12 1/2-DEC	SPR5J	12 1/2
1x36-12 1/2-DEC	SPR5V	12 1/2
1x36-12 1/2-DEC	SSM8V	12 1/2

1. Please use our online Outdoor 3D configurator for faster ordering guide (recommended): [Click here](#)
2. All system parts I and II must be ordered together and cannot be ordered separately
3. Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.
4. Extended lead-time may apply (consult factory).
5. AR1S to be used with ATR85N, SPR5J and SPR5V poles and AR2S is to only be used with SSM8V pole.
6. Operating profiles can be changed in the site via a mobile device using a dedicated app, standard ones are in pages 5 & 6. Factory pre-programmed custom profiles are available upon request.
7. Profile Dimming (PD) is only available for luminaires equipped with Motion Response (MR).
8. Pole selection is based on height, wind speed, solar system size and tilting angle, please check pages 7 and 8 for poles selection table.
9. Luminaire mounting height is 2 ft below the pole height.
10. VDS (Vibration Dampening Solar) is only supplied with steel poles (SPR5J, SPR5V, and SSM8V).

OPFS-SOL OptiForm

Solar powered system



OPFS-SOL OptiForm

Solar powered system

Predicted Lumen Depreciation Data

Derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output. Calculated per IESNA TM21-21.

Ambient Temp°C	L70 per TM-21	Lumen Maintenance % at 100,000 hrs
25°C	>100,000 hours	See table below

Shielding Accessory Kits (order separately)

One shield kit per luminaire

- OPF-S-EHS-1*** External house side shield (field installed)
- OPF-S-HIS-1**** Internal house side shields. For Area optic types T2M, T3M, and T5N.
- OPF-S-HIS-T4-1**** Internal house side shield for Area optic types T4M and T4W. qty 1.
- OPF-S-HIS-5M/5W-1**** Internal house side shield for Area optic types T5M and T5W. qty 1

*Must select EHS option on luminaire options section

Ordering Code	Total LEDs	Light Engine Config.	Average System Wattage (W)	Lumen Maintenance at:			
				25K hrs	50K hrs	75K hrs	100K hrs
OPFS-SOL-50L	40	1x40LED	25.6	99%	97%	95%	93%
OPFS-SOL-60L	40	1x40LED	27.2	99%	97%	95%	93%
OPFS-SOL-70L	40	1x40LED	37.4	99%	97%	95%	93%
OPFS-SOL-80L	40	1x40LED	43.3	99%	97%	95%	93%
OPFS-SOL-90L	40	1x40LED	49.5	99%	97%	95%	93%
OPFS-SOL-100L	40	1x40LED	54.8	99%	97%	95%	93%
OPFS-SOL-110L	40	1x40LED	62.3	99%	97%	95%	93%
OPFS-SOL-120L	40	1x40LED	69	99%	97%	95%	93%

4000K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-740	4958	193.8	B1-U0-G1	4888	191.1	B1-U0-G1	4908	191.9	B1-U0-G1
OPFS-SOL-60L-740	5886	216.3	B2-U0-G2	5803	213.2	B1-U0-G1	5827	214.1	B1-U0-G2
OPFS-SOL-70L-740	7052	188.4	B2-U0-G2	6952	185.7	B2-U0-G2	6981	186.5	B1-U0-G2
OPFS-SOL-80L-740	8043	185.6	B2-U0-G2	7929	183	B2-U0-G2	7962	183.7	B1-U0-G2
OPFS-SOL-90L-740	9067	183.1	B2-U0-G2	8939	180.5	B2-U0-G2	8976	181.3	B1-U0-G2
OPFS-SOL-100L-740	9919	180.9	B2-U0-G2	9779	178.3	B2-U0-G2	9820	179.1	B2-U0-G2
OPFS-SOL-110L-740	10889	174.7	B2-U0-G2	10736	172.2	B2-U0-G2	10780	172.9	B2-U0-G2
OPFS-SOL-120L-740	12006	174.1	B3-U0-G3	11837	171.7	B2-U0-G2	11886	172.4	B2-U0-G2

4000K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-740	4456	174.2	B1-U0-G2	5062	197.9	B2-U0-G1	5090	199	B3-U0-G1	4981	194.7	B3-U0-G2
OPFS-SOL-60L-740	5291	194.4	B1-U0-G2	6010	220.8	B3-U0-G1	6043	222	B3-U0-G1	5914	217.3	B3-U0-G2
OPFS-SOL-70L-740	6338	169.3	B1-U0-G2	7200	192.3	B3-U0-G1	7239	193.4	B3-U0-G1	7084	189.2	B3-U0-G2
OPFS-SOL-80L-740	7229	166.8	B1-U0-G2	8212	189.5	B3-U0-G1	8257	190.5	B3-U0-G2	8080	186.5	B3-U0-G2
OPFS-SOL-90L-740	8150	164.6	B2-U0-G2	9258	187	B3-U0-G1	9309	188	B3-U0-G2	9109	184	B3-U0-G3
OPFS-SOL-100L-740	8915	162.6	B2-U0-G3	10128	184.7	B3-U0-G2	10183	185.7	B3-U0-G2	9965	181.7	B4-U0-G3
OPFS-SOL-110L-740	9787	157	B2-U0-G3	11118	178.3	B3-U0-G2	11179	179.3	B4-U0-G2	10940	175.5	B4-U0-G3
OPFS-SOL-120L-740	10791	156.5	B2-U0-G3	12259	177.8	B3-U0-G2	12326	178.8	B4-U0-G2	12062	174.9	B4-U0-G3

OPFS-SOL OptiForm

Solar powered system

3000K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-730	4735	185.1	B1-U0-G1	4668	182.5	B1-U0-G1	4688	183.3	B1-U0-G1
OPFS-SOL-60L-730	5621	206.5	B2-U0-G2	5542	203.6	B1-U0-G1	5565	204.5	B1-U0-G2
OPFS-SOL-70L-730	6734	179.9	B2-U0-G2	6639	177.3	B2-U0-G2	6667	178.1	B1-U0-G2
OPFS-SOL-80L-730	7681	177.2	B2-U0-G2	7573	174.8	B2-U0-G2	7604	175.5	B1-U0-G2
OPFS-SOL-90L-730	8659	174.9	B2-U0-G2	8537	172.4	B2-U0-G2	8572	173.1	B1-U0-G2
OPFS-SOL-100L-730	9472	172.7	B2-U0-G2	9339	170.3	B2-U0-G2	9378	171	B1-U0-G2
OPFS-SOL-110L-730	10399	166.8	B2-U0-G2	10253	164.5	B2-U0-G2	10295	165.1	B2-U0-G2
OPFS-SOL-120L-730	11466	166.3	B3-U0-G3	11304	164	B2-U0-G2	11351	164.6	B2-U0-G2

3000K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-730	4256	166.4	B1-U0-G2	4835	189	B2-U0-G1	4861	190	B3-U0-G2	4757	186	B3-U0-G2
OPFS-SOL-60L-730	5053	185.7	B1-U0-G2	5740	210.9	B3-U0-G1	5771	212	B3-U0-G2	5647	207.5	B3-U0-G2
OPFS-SOL-70L-730	6053	161.7	B1-U0-G2	6876	183.7	B3-U0-G1	6914	184.7	B4-U0-G2	6766	180.7	B3-U0-G2
OPFS-SOL-80L-730	6904	159.3	B1-U0-G2	7842	181	B3-U0-G1	7885	182	B3-U0-G1	7717	178.1	B3-U0-G2
OPFS-SOL-90L-730	7783	157.2	B2-U0-G2	8841	178.6	B3-U0-G1	8890	179.6	B3-U0-G1	8699	175.7	B3-U0-G2
OPFS-SOL-100L-730	8514	155.3	B2-U0-G3	9672	176.4	B3-U0-G2	9725	177.3	B3-U0-G1	9517	173.5	B4-U0-G3
OPFS-SOL-110L-730	9347	149.9	B2-U0-G3	10618	170.3	B3-U0-G2	10676	171.3	B3-U0-G1	10448	167.6	B4-U0-G3
OPFS-SOL-120L-730	10306	149.5	B2-U0-G3	11707	169.8	B3-U0-G2	11771	170.7	B3-U0-G2	11519	167.1	B4-U0-G3

2700K, 70CRI LED Lumen Values

Ordering Code	Type 2M			Type 3M			Type 4M		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-727	4294	168	B1-U0-G1	4233	166	B1-U0-G1	4251	166	B1-U0-G1
OPFS-SOL-60L-727	5097	187	B1-U0-G1	5026	185	B1-U0-G1	5046	185	B1-U0-G1
OPFS-SOL-70L-727	6107	163	B2-U0-G2	6021	161	B2-U0-G2	6046	162	B1-U0-G2
OPFS-SOL-80L-727	6965	161	B2-U0-G2	6867	159	B2-U0-G2	6895	159	B1-U0-G2
OPFS-SOL-90L-727	7852	159	B2-U0-G2	7741	156	B2-U0-G2	7774	157	B1-U0-G2
OPFS-SOL-100L-727	8590	157	B2-U0-G2	8469	154	B2-U0-G2	8504	155	B1-U0-G2
OPFS-SOL-110L-727	9430	151	B2-U0-G2	9297	149	B2-U0-G2	9336	150	B1-U0-G2
OPFS-SOL-120L-727	10397	151	B2-U0-G2	10251	149	B2-U0-G2	10293	149	B2-U0-G2

2700K, 70CRI (cont'd)

Ordering Code	Type 4W			Type 5N			Type 5M			Type 5W		
	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating	Lumen Output	Efficacy (LPW)	BUG Rating
OPFS-SOL-50L-727	3859	151	B1-U0-G2	4384	171	B2-U0-G1	4408	172	B3-U0-G1	4314	169	B3-U0-G2
OPFS-SOL-60L-727	4582	168	B1-U0-G2	5205	191	B2-U0-G1	5233	192	B3-U0-G1	5121	188	B3-U0-G2
OPFS-SOL-70L-727	5489	147	B1-U0-G2	6235	167	B3-U0-G1	6269	168	B3-U0-G1	6135	164	B3-U0-G2
OPFS-SOL-80L-727	6260	145	B1-U0-G2	7112	164	B3-U0-G1	7151	165	B3-U0-G1	6997	162	B3-U0-G2
OPFS-SOL-90L-727	7058	143	B1-U0-G2	8017	162	B3-U0-G1	8061	163	B3-U0-G2	7889	159	B3-U0-G2
OPFS-SOL-100L-727	7721	141	B2-U0-G2	8770	160	B3-U0-G1	8819	161	B3-U0-G2	8630	157	B3-U0-G2
OPFS-SOL-110L-727	8476	136	B2-U0-G3	9628	154	B3-U0-G2	9681	155	B3-U0-G2	9474	152	B4-U0-G3
OPFS-SOL-120L-727	9345	136	B2-U0-G3	10616	154	B3-U0-G2	10674	155	B3-U0-G2	10446	152	B4-U0-G3

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Solar powered system

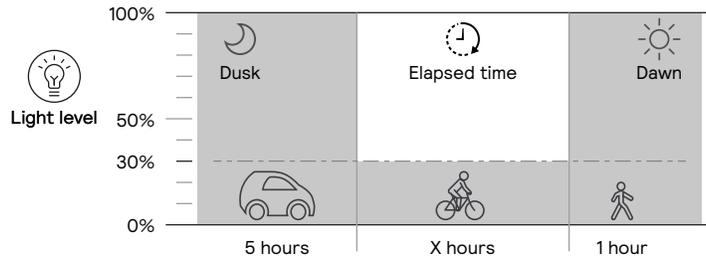
Optical Distributions



FD - Fixed Dimming

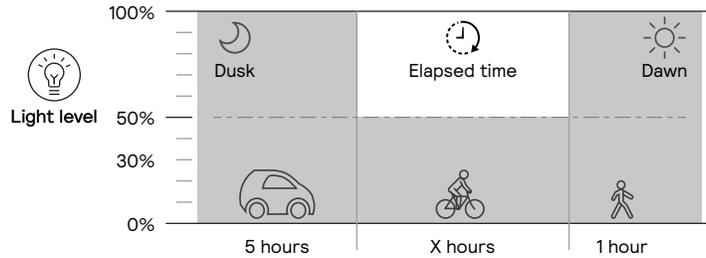
FDD01

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn minus 1-hour, light level fixed at 30% (dynamic duration based on night length)
- Last 1-hour before dawn, light level fixed at 100%.



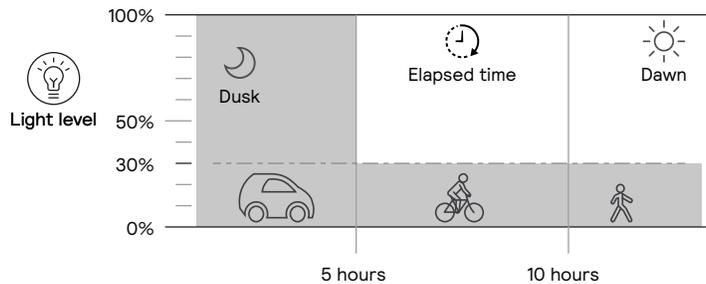
FDD02

- First 5 hours from dusk, light level fixed at 100%.
- Remaining hours to dawn minus 1-hour, light level fixed at 50% (dynamic duration based on the length).
- One hour before dawn, light level fixed at 100%.



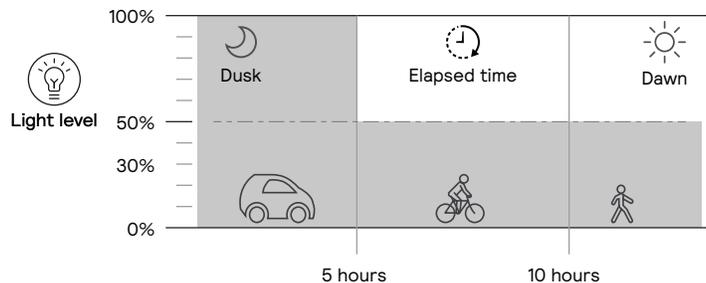
FD530

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn, light level fixed at 30%.



FD550

- First 5 hours from dusk light level fixed at 100%.
- Remaining hours to dawn, light level fixed at 50%.



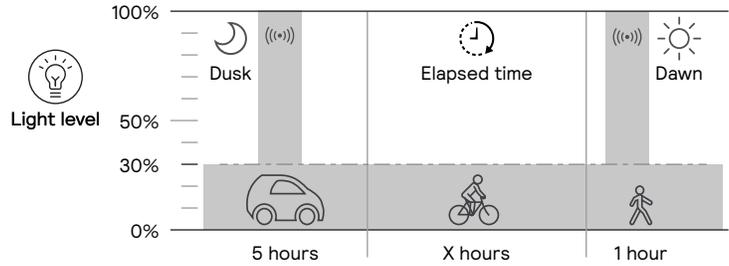
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Solar powered system

PD - Profile Dimming

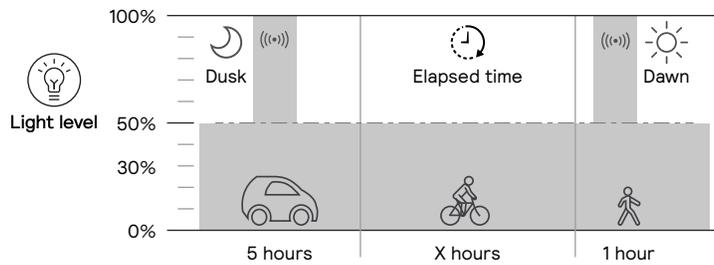
PDD01

- First 5 hours from dusk light level 100% when motion is detected and 30% when no motion is detected.
- Remaining hours to dawn **minus 1-hour**, motion sensor disabled, and light level fixed at 30% (dynamic duration based on night length).
- One hour before dawn, light level at 100% when motion is detected and 30% without motion.



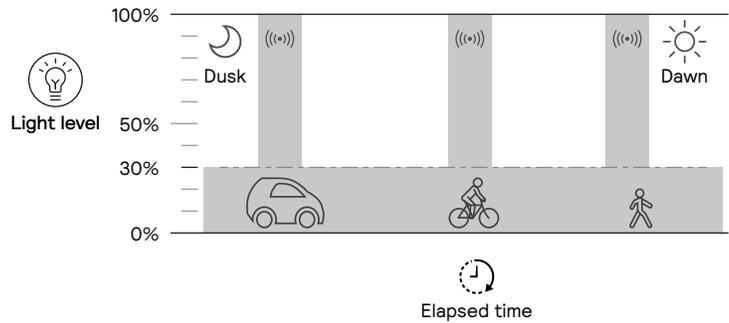
PDD02

- First 5 hours from dusk, light level 100% when motion is detected and 50% when no motion is detected.
- Remaining hours to dawn minus 1-hour, motion sensor disabled, and light level fixed at 50% (dynamic duration based on night length).
- One hour before dawn, light level at 100% when motion is detected and 50% without motion.



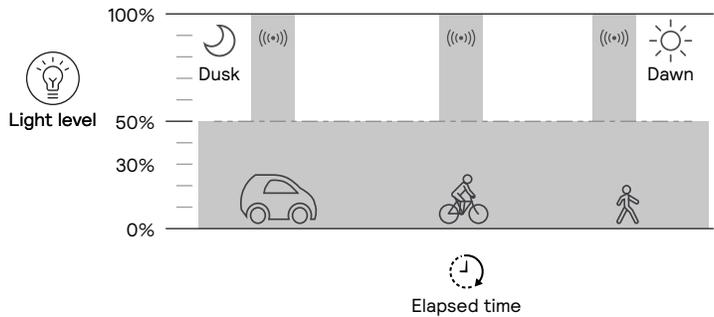
PD30

- Dusk to dawn, light level is at 100% with motion and at 30% without motion.



PD50

- Dusk to dawn, light level is at 100% with motion and at 50% without motion.



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Solar powered system

AASHTO Compliant Poles Selection Tables

Luminaire mounting height is 2 ft less than the total pole height

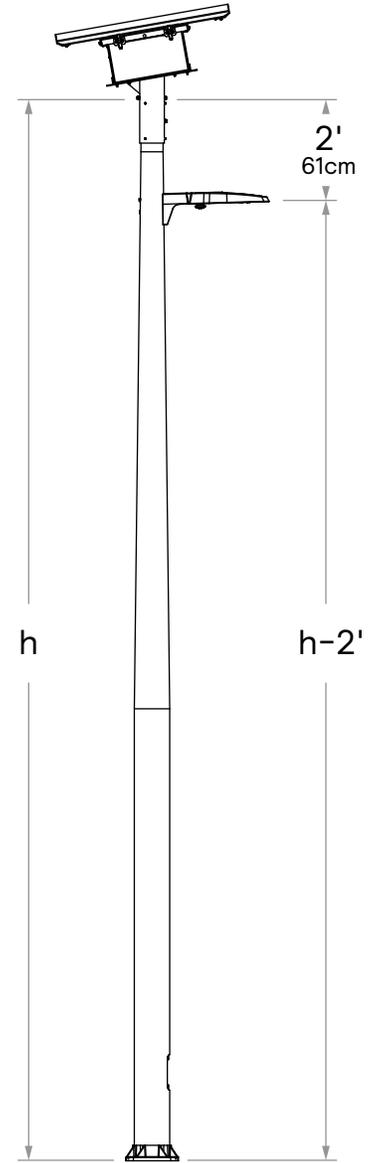
PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 10° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SPR5V
	140	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V
	130	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V
	120	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J
	110	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J
	100	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 20° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5J	SPR5V	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	140	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V
	130	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V
	120	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5J	SPR5V
	110	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	100	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 30° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	140	SPR5J	SPR5J	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	130	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V
	120	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SSM8V
	110	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V
	100	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 40° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	140	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	130	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-
	120	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-
	110	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V
	100	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V
	90	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 50° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SSM8V	-	SSM8V	-	SSM8V	-	-	-	-	-
	140	SPR5V	SSM8V	SSM8V	-	SSM8V	-	SSM8V	-	-	-
	130	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-	SSM8V	-	-	-
	120	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-
	110	SPR5J	SPR5V	SPR5J	SSM8V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	-
	100	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V
	90	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V
	80	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5V
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J



ATR85B_18FT_OPFS-S_CB12-70GS_200W_10deg

Note: Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.

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Solar powered system

CSA Compliant Poles Selection Tables

Luminaire mounting height is 2 ft less than the total pole height

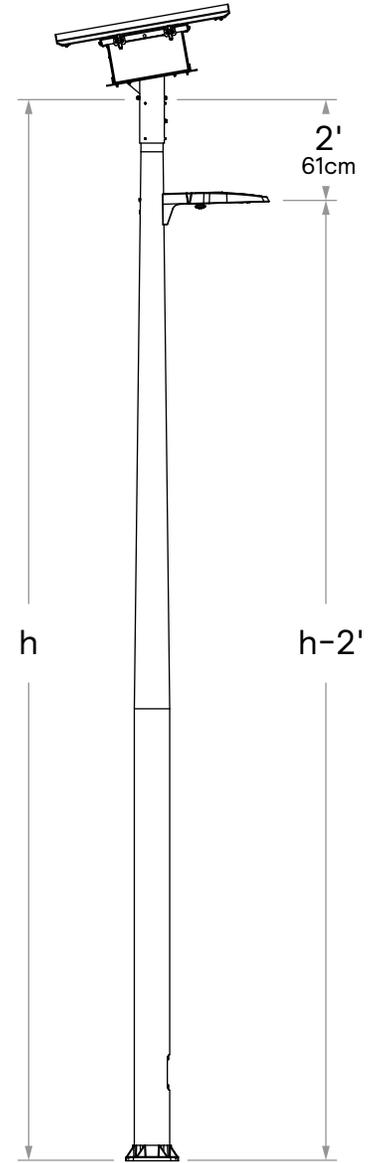
PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 10° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	140	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	130	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	120	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SSM8V	SSM8V
	110	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V
	100	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	90	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 20° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-
	140	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	130	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	120	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	110	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	100	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V
	90	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	80	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 30° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-	-	-
	140	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	130	SPR5V	SSM8V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	120	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V
	110	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	100	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	90	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5V	SSM8V
	80	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V
	70	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	ATR85N	SPR5J	SPR5J	SPR5J

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 40° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	-	-	-	-
	140	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	130	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	120	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-
	110	SPR5J	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	100	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	90	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SSM8V	SSM8V
	80	ATR85N	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V
	70	ATR85N	ATR85N	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V

PV Panels		(h) Total Pole Height (ft) – Aluminum & Steel Poles									
with 50° tilt		18		19-20		21-22		23-24		25-27	
		200w	325w	200w	325w	200w	325w	200w	325w	200w	325w
Wind Speed (MPH)	150	SSM8V	-	SSM8V	-	-	-	-	-	-	-
	140	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-	-	-
	130	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	120	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-	SSM8V	-	-	-
	110	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	SSM8V	-
	100	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V	SSM8V	-
	90	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V	SSM8V	SPR5V	SSM8V	SSM8V	SSM8V
	80	SPR5J	SPR5J	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SSM8V	SSM8V	SSM8V
	70	ATR85N	SPR5J	ATR85N	SPR5J	SPR5J	SPR5J	SPR5V	SPR5J	SPR5V	SPR5V



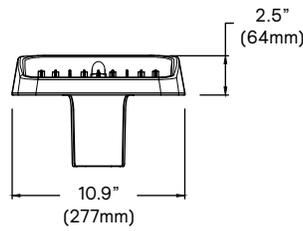
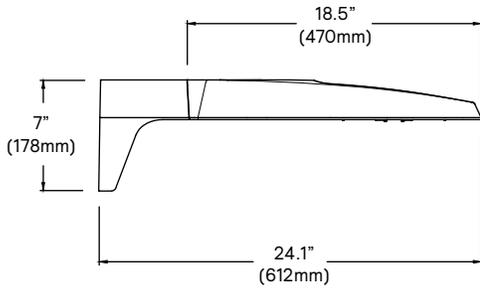
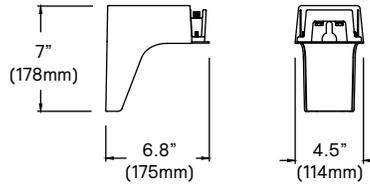
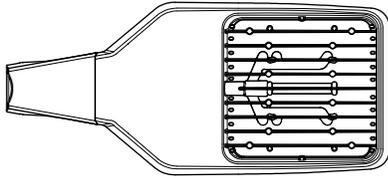
ATR85B_18FT_OPFS-S_CB12-70GS_200W_10deg

Note: Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency.

OPFS-SOL OptiForm

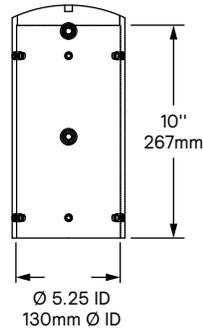
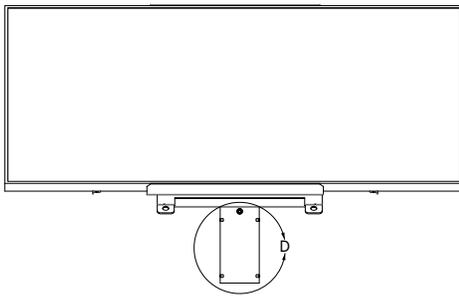
Solar powered system

Dimensions



OptiForm Standard Arm

- EPA: 0.2 sq. feet
- Weight: 9 lbs

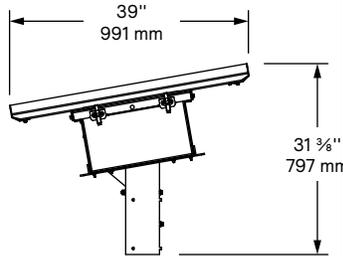
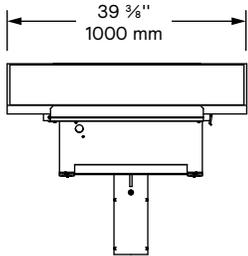


Post-Top Solar Subassembly Tenon (for all versions)

OPFS-SOL OptiForm

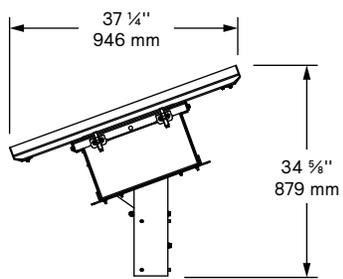
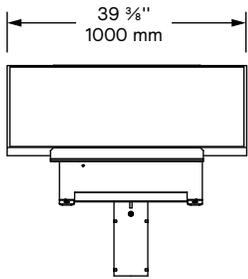
Solar powered system

Dimensions (2.1 with 200Wp PV Panel)



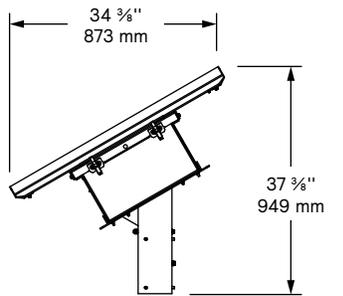
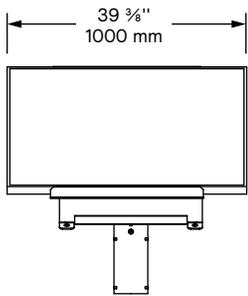
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 10°
- Drag EPA: 2.65 ft²
- Lift EPA: 1.61 ft²
- Max Weight: 256.3 lbs



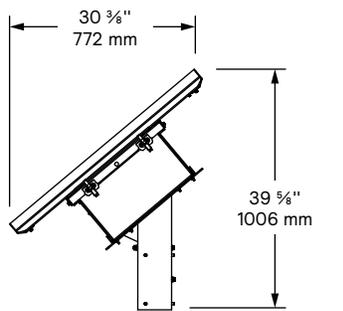
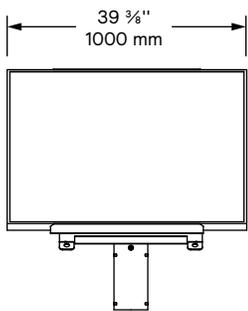
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 20°
- Drag EPA: 3.79 ft²
- Lift EPA: 3.00 ft²
- Max Weight: 256.3 lbs



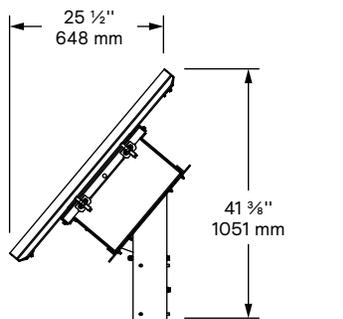
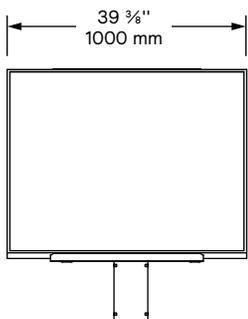
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 30°
- Drag EPA: 5.50 ft²
- Lift EPA: 7.08 ft²
- Max Weight: 256.3 lbs



Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 40°
- Drag EPA: 8.00 ft²
- Lift EPA: 8.48 ft²
- Max Weight: 256.3 lbs



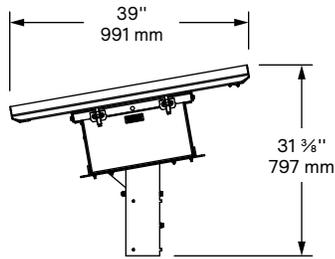
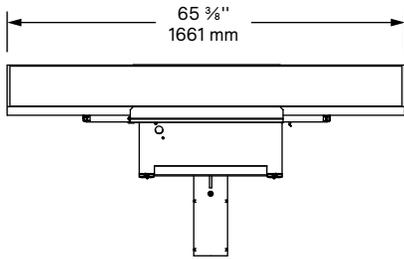
Post-Top Solar Subassembly With 200Wp PV Panel

- Tilt: 50°
- Drag EPA: 9.73 ft²
- Lift EPA: 9.29 ft²
- Max Weight: 256.3 lbs

OPFS-SOL OptiForm

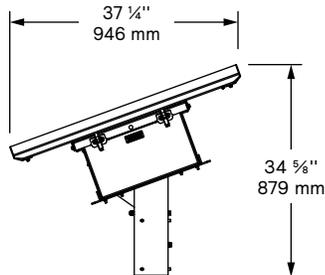
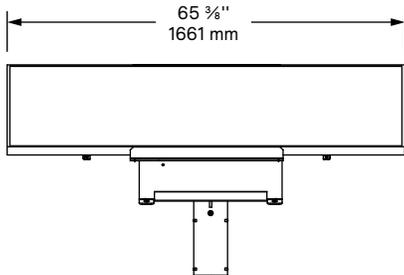
Solar powered system

Dimensions (2.2 with 325Wp PV Panel)



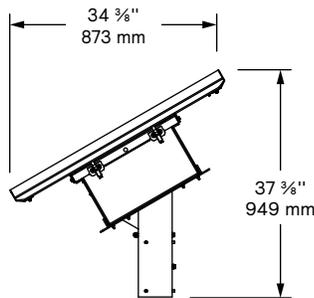
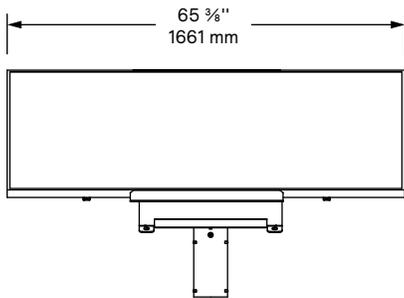
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 10°
- Drag EPA: 3.57 ft²
- Lift EPA: 1.18 ft²
- Max Weight: 273 lbs



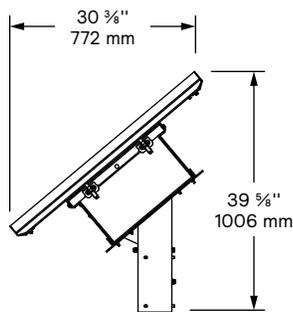
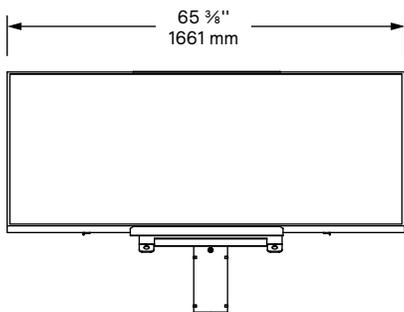
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 20°
- Drag EPA: 5.7 ft²
- Lift EPA: 4.58 ft²
- Max Weight: 273 lbs



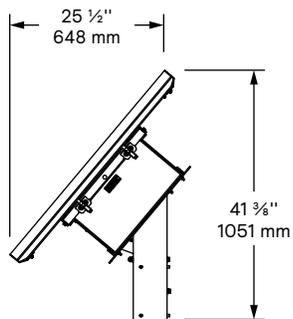
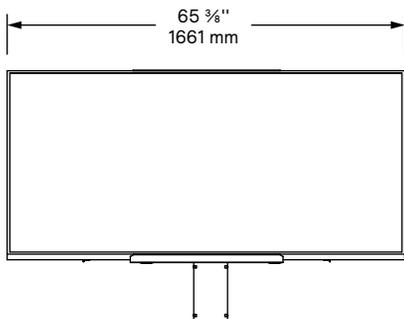
Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 30°
- Drag EPA: 7.90 ft²
- Lift EPA: 7.58 ft²
- Max Weight: 273 lbs



Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 40°
- Drag EPA: 11.93 ft²
- Lift EPA: 9.55 ft²
- Max Weight: 273 lbs



Post-Top Solar Subassembly With 325Wp PV Panel

- Tilt: 50°
- Drag EPA: 14.84 ft²
- Lift EPA: 11.85 ft²
- Max Weight: 273 lbs

OPFS-SOL OptiForm

Solar powered system

Technical Specifications

Luminaire Subassembly

Product Family	OptiForm Small
Lumen Output Range	5,000 up to 12,000
CCT	2700K, 3000K, 4000K
Distribution	T2M, T3M, T4M, T4W, T5M, T5N, T5W
Motion Sensor	Optional (MR)
Weight (lbs)	9
Operating Temperature	-40 to +122°F / -40 to +50°C
IP Rating	Housing: IP65 / Light Engine: IP66

Solar Module Subassembly

PV Panels Nomenclature	P200	P325
Total Power	200Wp	325Wp
Dimensions (in)	39.41 x 39.41 x 1.38	65.4 x 39.41 x 1.38
Weight (lbs)	28.32	40.78
Module Type	Monocrystalline Silicon Solar Cells	
Panel Mount	Anodized aluminum extrusion	
Tilting Angles	Factory pre-tilted: 10, 20, 30, 40 or 50°	
Operating Temperature	-40 to 185°F / -40 to +85°C	

Battery / Controller Subassembly

Battery Chemistry	Silicon Dioxide (SiO ₂)		
Battery Nomenclature	CB1	CB3	CB3
Capacity (AH)	40AH	70AH	100AH
Capacity (WH)	960Wh	1,680Wh	2,400Wh
Total Subassembly Weight (lbs)	175	216	273
Total Subassembly Dimensions (in)	26.9 x 19.5 x 10.2		
Battery Voltage	24V (2x12V)		
Battery Charge Temperature	-30 to +149°F / -35 to +65°C		
Battery Discharge Temperature	-30 to +149°F / -35 to +65°C		
Enclosure Material	Aluminum & Steel base		
Mounting	Post-Top		
Post-Top Tenon Inner Diameter	5 1/8"		

Charge Controller / LED Driver

Charging Type	MPPT	
LED Driver Type	High-efficiency integrated LED driver	
LED Wattage Range	2.5W to 100W	
Configurable	Yes	
Operating Profiles	Programmable up to 5 steps	
	Dusk to dawn	
Run Time Extension	Enabled	
Interface	Enabled	
Operating Temperature	-30 to +122°F / -35 to +50°C	
Mobile App Data Monitoring	LED voltage, current	Battery voltage, current
	PV voltage, current	Battery temperature
Mobile App Fault Status Monitoring	Load short circuit	Board overtemperature
	Load disconnected	PV overvoltage
	Battery undervoltage, overvoltage, overtemperature	

Poles (see poles selection charts in pages 7 & 8)

Pole Material	Aluminum	Steel
Product Families	ATR85N	SSM8V / SPR5V / SPR5J
Luminaire Mounting Height	16' up to 25'	
Total Pole Height	18' up to 27'	
Max Wind Speed	Up to 150 MPH (check page 7 and 8)	

Certification and Compliance

Luminaire	cULus listed for USA and Canada
	DLC QPL approved
	CCTs 2700K & 3000K are Dark Sky approved
PV Panels	UL 61730 / IEC 61215:2016 / IEC 61730-1 & 2:2016
Battery	UL 1989 / IEC 60896-21 / IEC 60896-22
Charge Controller	UL 1741 / UL 8750 / IEC 62109-1 / IEC 61547 / IEC 61347 / CISPR 15
Poles	Compliant with AASHTO 2001 and CSA AAMA 2603 / ASTM D2244 / ASTM D523 / ASTM D2247
Whole System	UL 8801

Limited Warranty

Luminaire	OptiForm Solar	5 years
PV Panel		5 years
Battery		5 years
Charge Controller		5 years
Poles	Aluminum	5 years
	Steel	3 years

OPFS-SOL OptiForm

Solar powered system

Specifications

Housing

Housing and door constructed of low copper die cast Aluminum alloy (A360) with detachable arms for quick mounting. Heatsink is integral to the housing providing passive cooling of LEDs to maintain long LED life. Luminaire housing rated to IP65, LED Modules rated IP66 tested in accordance to Section 9 of IEC 60598-1.

Vibration resistance

Luminaire is tested and rated to standards set forth in ANSI C136.31-2018 Level 2 for Bridge and Overpass applications.

Light engine

Light engine comprises of a module of 40-LED aluminum metal clad board fully sealed with optics. Module is RoHS compliant. Color temperature as per ANSI/NEMA bin 2700 Kelvin nominal (2725 ±145K), 3000 Kelvin nominal (3045K +/- 175K) or 4000 Kelvin nominal (3985K +/- 275K), CRI 70 Min. 75 Typical. Other CCT/CRI also available, consult factory. LED light engine is rated IP66 in accordance to Section 9 of IEC 60598-1.

Energy saving benefits

System efficacy up to 224 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional motion sensor provides added energy savings during unoccupied periods.

Optical systems

Site and Area optical distributions include Types 2 Medium, 3 Medium, 4 Medium, 4 Wide, 5 Narrow, 5 Medium, 5 Wide, and Auto Front Row. LEED Corner Left, LEED Corner Right, and Backlight Control distributions also available to provide excellent cutoff to meet the most stringent requirements at property lines. Optional internal shields mount to LED optics and are available with Type 2M, 3M, and 4M distributions. Types 2M and 3M can be rotated at 90° or 270° when specified, and are factory set only. Site and Area optics shall be performance tested per LM-79 and TM-15 (IESNA) certifying their photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Precision Plus optical distributions include Types 2, 3, 4 and 5 and are designed to illuminate pedestrian scale applications by providing lower glare, while still achieving desired distribution, optimized spacing, and excellent uniformity. Optics are made of optical grade polymer refractor lenses and

shall be performance tested per LM-63, LM-79 and TM-15 (IESNA) certifying their photometric performance. Luminaire designed with 0% uplight (U0 per IESNA TM-15).

Mounting

Standard luminaire arm mounts to 5" (with ATR85N, SPR5J and SPR5V) poles or 5 9/16" with SSM8V poles. Poles selection is based on the PV panel size, EPA and wind speed.

Control options

Motion Response (MR): Motion Response module is mounted integral to luminaire and system is factory pre-programmed and can be updated at the site.

Luminaire Useful Life

Refer to IES files for energy consumption and delivered lumens for each option. Based on ISTMT in situ thermal testing in accordance with UL1598 and UL8750, System Reliability Tool. Advance data and LED manufacturer LM 80/TM 21 data, expected to reach 100,000 + hours with >L70 lumen maintenance @ 25°C. Luminaire Useful Life accounts for LED lumen maintenance AND all of these additional factors including: LED life, driver life, PCB substrate, solder joints, on/off cycles, burning hours and corrosion.

Solar Panel

200W or 325W Solar panels with fixed tilt angle 10 , 20 , 30 , 40 or 50 mounted on a steel frame mechanically assembled on an aluminum box c/w door with hinge and latch giving a tool free access to the Crystal battery, charge controller and wiring. Enclosure is rated IP54.

Pole Shaft

Shall be made from a 5" (127mm) round high tensile carbon steel tubing, having a 0.250" (6.4mm) wall thickness, welded to both the bottom and top of the anchor plate.

Maintenance Opening

The pole shall have a 2" x 4 1/2" (51mm x 114mm) maintenance opening centered 20" (508mm) from the bottom of the anchor plate, complete with a weatherproof aluminum cover and a copper ground lug.

Base Cover

Two piece square base cover made from formed aluminum, mechanically fastened with stainless steel screws.

Important

Gardco strongly recommends the installation of the complete lighting assembly with all its accessories upon the anchoring of the pole. This will ensure that the structural integrity of the product is maintained throughout its lifetime.

Wiring

The connection of the luminaire is done using a terminal block connector 600V, 85A for use with #2 14 AWG. wires from the primary circuit, located inside the housing.

Hardware

All exposed screws shall be complete with Ceramic primer seal basecoat to reduce seizing of the parts and offers a high resistance to corrosion. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.

Anchor Bolts

Anchor bolts made of ASTM F1554 grade 55 steel with a minimum yield strength of 55,000 psi. Nuts made of ASTM F1554 99 grade A steel or better. The thread adjustment is ANSI class 2B regardless of the diameter of the bolts. Washers made of ASTM grade F 844 steel or better. All galvanized parts are hot dip galvanized with minimum requirement the ACNOR G 164 standard. **Note:** Ground rod must be provided and installed by contractor as per National Electrical code (NEC) article 250.52 (A)(5) or the local application regulation agency

Vibration Resistance

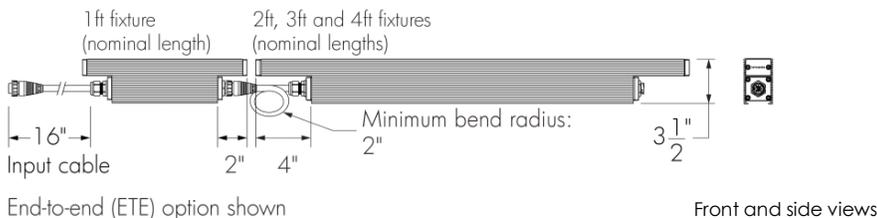
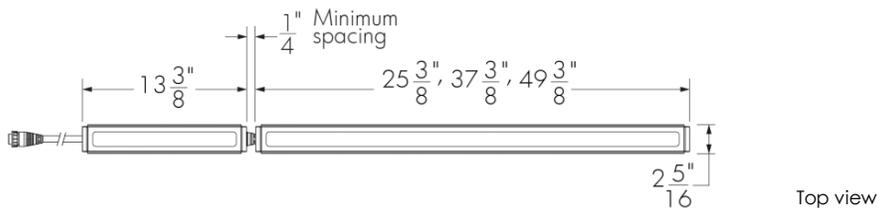
The OPFS SOL meets the ANSI C136.31 2018, American National Standard for Roadway Luminaire Vibration specifications for normal applications.

Mechanical Resistance

This design information is intended as a general guideline only. The customer is solely responsible for proper selection of pole, luminaire, accessories and foundation under the given site conditions and intended usage. The addition of any other item to the pole may dramatically impact the wind load on that pole. It is strongly recommended that a qualified professional be consulted to analyze the loads given the user's specific needs to ensure proper selection of the pole, luminaire, accessories, and foundation. Lumec assumes no responsibility for such complete analysis or product selection. Failure to ensure proper site analysis, pole selection, loads and installation can result in pole failure, leading to serious injury or property damage.

Project Name FARMERS BRANCH WESTSIDE ART TRAIL Qty

Type Catalog / Part Number

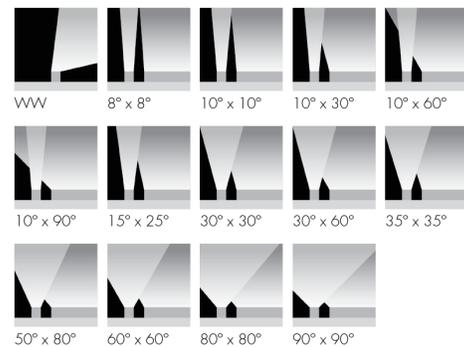


Photometric Summary

	Delivered output (lm)	Intensity (peak cd)
WW	2681	3856
8°x8°	3054	58,209
10°x10°	2862	28,655
10°x30°	2903	22,459
10°x60°	2980	13,266
10°x90°	2690	5902
15°x25°	2948	18,480
30°x30°	2865	11,004
30°x60°	2878	3819
35°x35°	2929	7473
50°x80°	2811	2577
60°x60°	2569	2250
80°x80°	2900	1890
90°x90°	2681	1409

Based on RGBW40K full output, 4ft [1219mm] DMX/RDM configuration.
Photometric performance is measured in compliance with IESNA LM-79-08.

Optics



Description

The Lumenfacade Colour Changing is a high-performance linear LED luminaire designed for grazing or floodlighting exterior facades with colour. This luminaire is available in 12 in, 24 in, 36 in or 48 in sections, and offers a wide number of options, including: a choice of optics for grazing or floodlighting; RGB, RGBW, or RGBA colour mixing; various mounting options, finishes, accessories and controls; as well as Legacy or Custom output modes.

Features

Color and Color Temperature	RGB, RGB + white 3000K, RGB + white 4000K, RGB + amber
Length (nominal)	12 in, 24 in, 36 in, 48 in
Optics	Asymmetric Wallwash, 8° x 8°, 10° x 10°, 10° x 30°, 10° x 60°, 10° x 90°, 15° x 25°, 30° x 30°, 30° x 60°, 35° x 35°, 50° x 80°, 60° x 60°, 80° x 80°, 90° x 90°
Options	End-to-end configuration (factory installed 16 in black input cable included), Corrosion-resistant coating for hostile environments, 3G ANSI C136.31-2010 Vibration Rating for bridge applications, CE (certification covers European Economic Area)
Power Consumption	17.25 W/ft, Typically 20% higher for 12 in fixture lengths
Warranty	5-year limited warranty

Performance

Maximum Delivered Output	2,828 lm (48 in fixture, RGB full output, 8° x 8°, DMX/RDM), 2,993 lm (48 in fixture, RGBW30K full output, 8° x 8°, DMX/RDM), 3,054 lm (48 in fixture, RGBW40K full output, 8° x 8°, DMX/RDM), 2,510 lm (48 in fixture, RGBA full output, 8° x 8°, DMX/RDM)
Maximum Delivered Intensity	53,888 cd at nadir (48 in fixture, RGB full output, 8° x 8°, DMX/RDM), 57,045 cd at nadir (48 in fixture, RGBW30K full output, 8° x 8°, DMX/RDM), 58,209 cd at nadir (48 in fixture, RGBW40K full output, 8° x 8°, DMX/RDM), 47,819 cd at nadir (48 in fixture, RGBA full output, 8° x 8°, DMX/RDM)

Colors and Color Temperatures



Controls



Ratings

IP66 IK07*
*asymmetric wallwash lens is IK06 rated

Certifications



Illuminance at Distance

Minimum 1 fc at 232 ft (48 in fixture, RGB full output, 8° x 8°, DMX/RDM), Minimum 1 fc at 239 ft (48 in fixture, RGBW30K full output, 8° x 8°, DMX/RDM), Minimum 1 fc at 241 ft (48 in fixture, RGBW40K full output, 8° x 8°, DMX/RDM), Minimum 1 fc at 219 ft (48 in fixture, RGBA full output, 8° x 8°, DMX/RDM)

Lumen Maintenance

L70 280,000 hrs, L95 35,000 hrs

Physical

Housing Material Low copper content extruded aluminum

Lens Material Clear tempered glass

Hardware Material Stainless steel

End Cap Material Machined aluminum

Gasket Material Silicone

Surface Finish Electrostatically applied polyester powder coat

Weight 12 in: 4.5 lbs, 24 in: 7 lbs, 36 in: 10.5 lbs, 48 in: 14 lbs

Electrical and control

Voltage 100 to 277 volts, 347 volts available (consult factory for details)

Fixture Cable Power and data in one cable, End-to-end option (ETE): 16 in black input cable (no jumper cable needed for minimum spacing between two fixtures)

Leader Cable Conductor 5C #16-5

Control Lumentalk, DMX/RDM enabled

Resolution (DMX/RDM) Per foot or per fixture (configured with LumenID V3 software), 8-bit or 16-bit, 3 channels (RGB) or 4 channels (RGBW30K, RGBW40K and RGBA)

RGB Color Mixing 12 LEDs per 12 in (4x Red, 4x Green, 4x Blue)

RGBW30K Color Mixing 12 LEDs per 12 in (3x Red, 3x Green, 3x Blue, 3x White 3000K)

RGBW40K Color Mixing 12 LEDs per 12 in (3x Red, 3x Green, 3x Blue, 3x White 4000K)

RGBA Color Mixing 12 LEDs per 12 in (3x Red, 3x Green, 3x Blue, 3x Amber)

Environmental

Storage Temperature -40 °F to 185 °F (device must reach start-up temperature value before operating)

Start-up Temperature -13 °F to 122 °F

Operating Temperature -40 °F to 122 °F

Ingress Protection Rating IP66, Wet location rated

Impact Resistance Rating IK07 (asymmetric wallwash lens is IK06 rated)

Accessories (order separately)

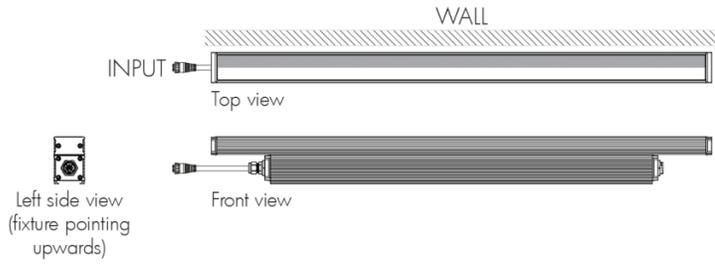
Cables Leader cable (standard), Jumper cable (standard), Leader cable (ETE), Jumper cable (ETE)

Control Boxes DMX/RDM enabled (daisy chain or star configuration), Ethernet enabled (daisy chain or star configuration), Lumentalk Data Bridge

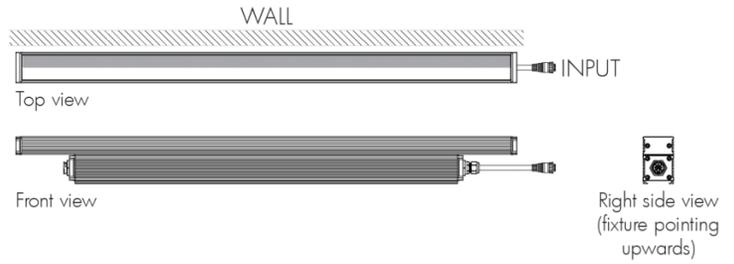
Control Systems	Lumentone™ 2 (LTN2), Pharos® kit (PHAROS)
Diagnostic and Addressing Tools	LumenID (LID), LumentalkID

Asymmetric wallwash optic details

WWLF - Asymmetric wallwash optic, left feed



WWRF - Asymmetric wallwash optic, right feed

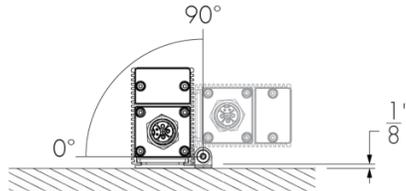


- Always position frosted side toward the wall.
- Fixture's feeding side is based on uplight installations. Feeding sides are reversed when fixture is used in a downlight application.
- Recommended setback from wall is 1/10 of the wall height. Example: 2 ft setback for a 20 ft wall.

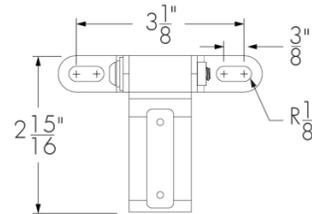
Mounting options

Surface Mount

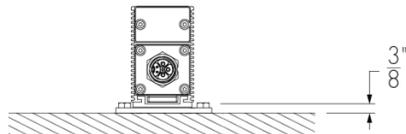
SAM - Slim Adjustable Mounting



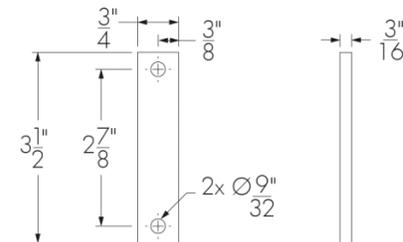
SAM - Mounting hole pattern



UMP - Fixed Mounting

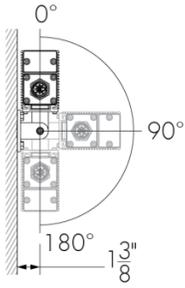


UMP - Mounting hole pattern

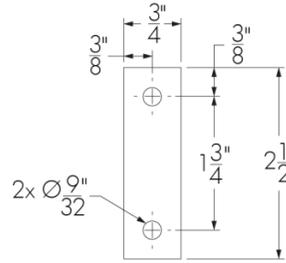


Wall Mount

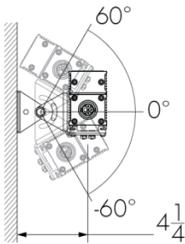
UMAS - Universal Adjustable Mounting



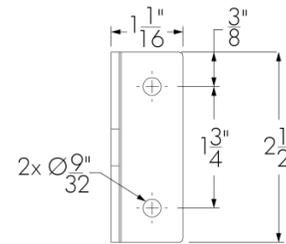
UMAS - Mounting hole pattern



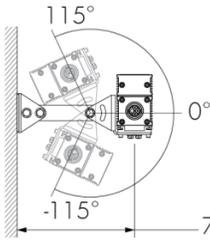
WAM2 - Adjustable Wall Mounting 2 in



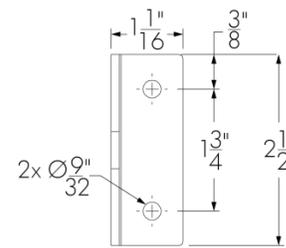
WAM2 - Mounting hole pattern



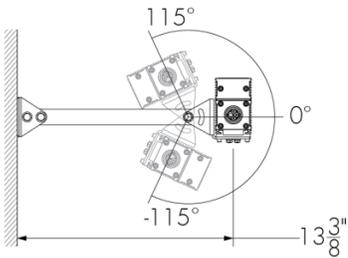
WAM6 - Adjustable Extended Arm Mounting 6 in



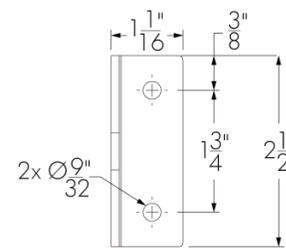
WAM6 - Mounting hole pattern



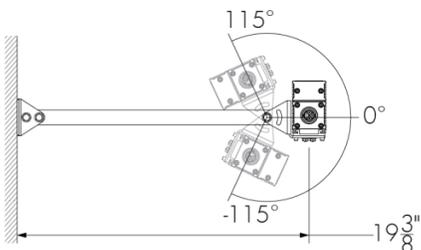
WAM12 - Adjustable Extended Arm Mounting 12 in



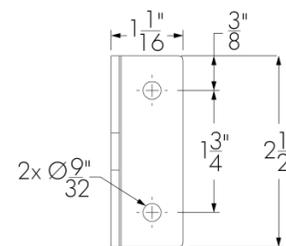
WAM12 - Mounting hole pattern



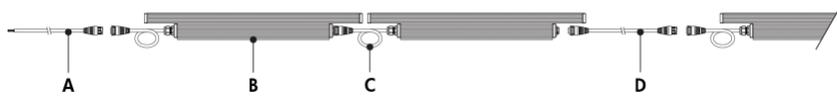
WAM18 - Adjustable Extended Arm Mounting 18 in



WAM18 - Mounting hole pattern



End-to-end configuration option (ETE)

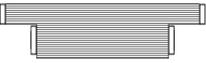


- A** - ETE leader cable (order separately)
- B** - Lumenfacade with ETE option
- C** - ETE 1/6 in black input cable (minimum bend radius: 2 in)
- D** - ETE jumper cable (order separately)

Includes a factory installed 1/6 in black input cable. A jumper cable is not required for minimum spacing between two end-to-end (ETE) fixtures. An ETE jumper cable is required only if a longer distance between two adjacent ETE fixtures is needed, or to connect two continuous runs of ETE fixtures together.

EPA Guide

Fixture

	LOG 12 in	LOG 24 in	LOG 36 in	LOG 48 in
EPA front (sq ft) 	0.274	0.579	0.980	1.386
EPA side (sq ft) 	0.040	0.040	0.044	0.047

Cables (order separately)

LOGLC - Leader cable for Lumenfacade



Standard construction

LOGLC-CERTIFICATION-STD-LENGTH-CABLE COLOR



End-to-end (ETE) option

LOGLC-CERTIFICATION-ETE-LENGTH-CABLE COLOR

Please specify:

CERTIFICATION: UL or CE; **LENGTH:** 10 ft, 25 ft, 50 ft, 100 ft, 150 ft or 200 ft; **CABLE COLOR:** black or white (connectors are black as standard; ETE fixture input cables are black as standard)

- Suitable for dimming/data and non-dimming applications.
- Sealing end cap is mandatory for any unused connector. One (1) included with every leader cable.
- Consult Lumenfacade leader cable specification sheet for details.

LOGJC - Jumper cable for Lumenfacade



Standard construction

LOGJC-CERTIFICATION-STD-LENGTH-CABLE COLOR



End-to-end (ETE) option

LOGJC-CERTIFICATION-ETE-LENGTH-CABLE COLOR

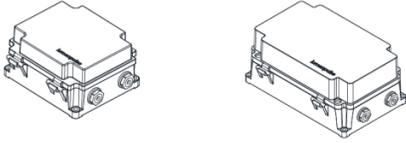
Please specify:

CERTIFICATION: UL or CE; **LENGTH:** 1 ft (available for ETE option only), 2 ft to 30 ft (available in 1 ft increments) or 50 ft; **CABLE COLOR:** black or white (connectors are black as standard; ETE fixture input cables are black as standard)

- Suitable for dimming/data and non-dimming applications.
- Consult Lumenfacade jumper cable specification sheet for details.

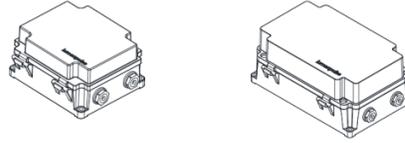
Control boxes (order separately)

CBX-DMX/RDM - DMX/RDM enabled (daisy chain or star configuration)



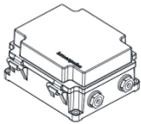
DMX/RDM control box. Up to six power and data outputs to fixtures or fixture runs. Consult CBX specification sheet and installation instructions for details. Lumenterminators provided with CBX (2x for daisy chain configuration, 6x for star configuration), consult factory to order spares.

CBX-ENET - Ethernet enabled (daisy chain or star configuration)



Ethernet control box. Up to four power and data outputs to fixture or fixture runs. Consult Ethernet CBX specification sheet and installation instructions for details.

LDB - Lumentalk Data Bridge



Lumentalk Data Bridge, 0-10V or DMX output. Consult LDB specification sheet for details.

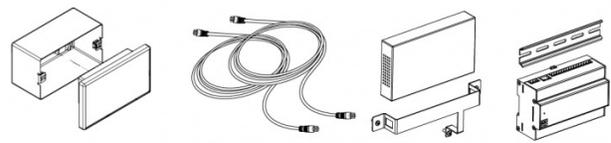
Control systems (order separately)

LTN2 - Lumentone™ 2



Lumentone 2 is a simple pre-programmed DMX 512 controller with a push button rotary dial and live feedback.

PHAROS - Pharos® kit



The Pharos kit, available for 1 or 2 DMX universes, allows for complete control of large lighting installations. 2 DMX universes kit shown.

Diagnostic and addressing tools (order separately)

LID - LumenID



LumenID is a diagnostic and addressing DMX/RDM tool. It must be specified on all DMX applications. Consult LID specification sheet for details.

LID-LT - LumentalkID

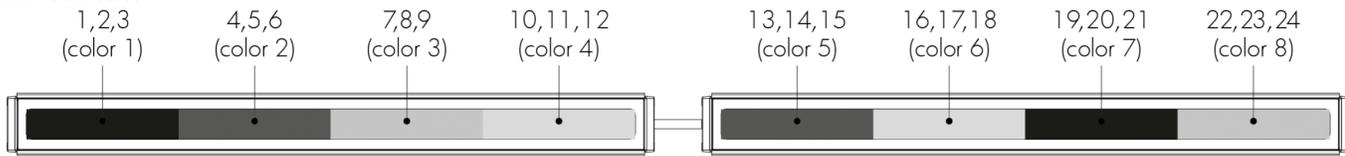


LumentalkID is a diagnostic and addressing tool. It must be specified for all Lumentalk (LT) applications. Consult LID-LT specification sheet for details.

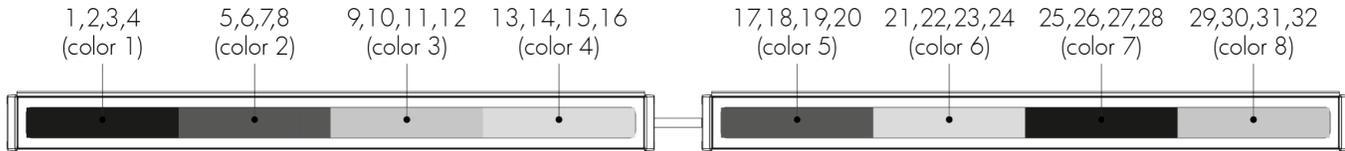
Resolution details

DMX/RDM control, resolution per foot: each 12 in section is addressed independently

DMX addresses:



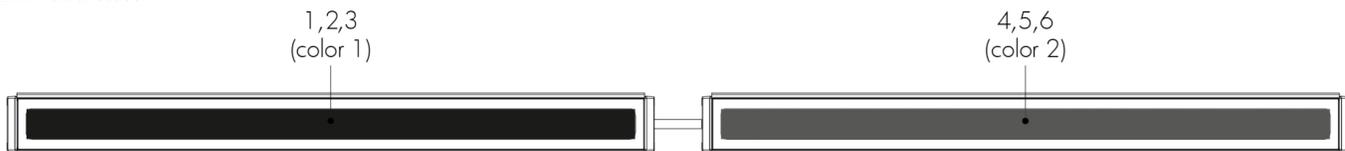
RGB color mixing option



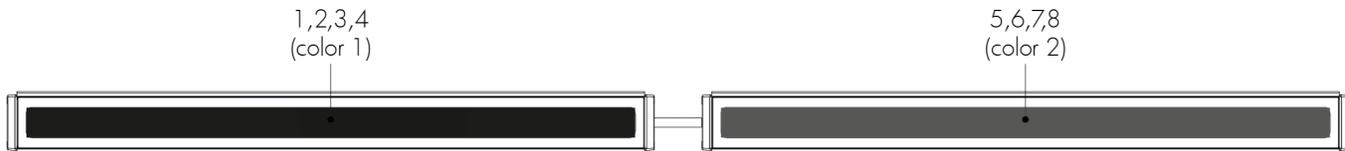
RGBW30K, RGBW40K and RGBA color mixing options

DMX/RDM control, resolution per fixture: each fixture is addressed independently

DMX addresses:



RGB color mixing option



RGBW30K, RGBW40K and RGBA color mixing options

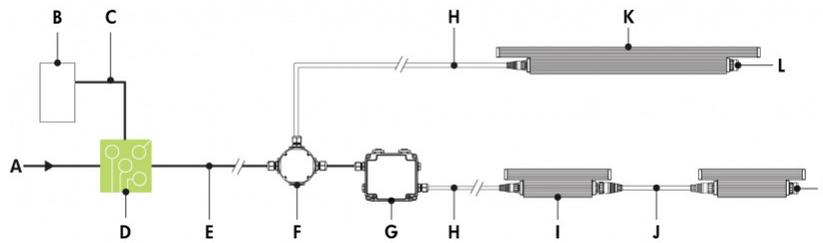
- 48 in fixtures shown.
- Applicable for DMX/RDM control option only. Fixture resolution can be configured on-site within the LumenID V3 software. A DMX/RDM enabled CBX is required.

Typical wiring diagrams

Wiring color code

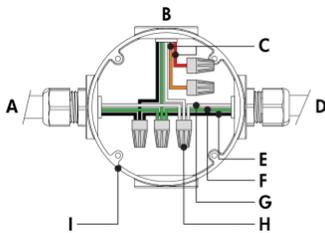
UL Color Code	USE
Green	Ground
Black	Line
White	Line/Neutral
Red or Purple	0-10V / Data +
Orange	0-10V / Data -

Lumentalk (LT)



- A** - Power input (100-277V AC, wiring by others)
- B** - DMX/RDM controller (order separately from Lumenpulse, or by others)
- C** - Data wiring (by others)
- D** - Lumentranslator 2 (LTL2-DMX)
- E** - Power wiring (by others)
- F** - Junction box (by others)
- G** - Lumentalk Data Bridge (LDB-DMX)
- H** - Leader cable (LOGLC)
- I** - Lumenfacade 12 in
- J** - Jumper cable (LOGJC)
- K** - Lumenfacade (24 in, 36 in or 48 in fixture lengths)
- L** - Sealing end cap

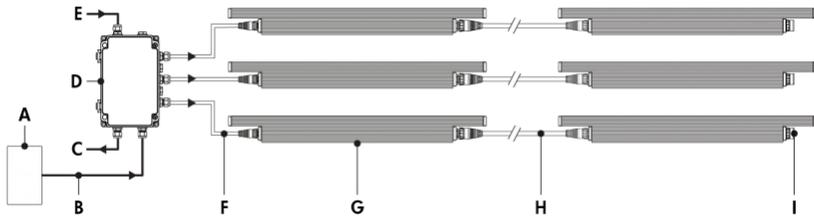
Lumentalk (LT) - wiring detail



- A** - Power input (control over power line via Lumentalk system)
- B** - To fixture
- C** - Not required
- D** - To Lumentalk Data Bridge (for run lengths with 12 in fixtures)
- E** - Line
- F** - Ground
- G** - Line/Neutral
- H** - Wire-nuts (by others)
- I** - Junction box (by others)

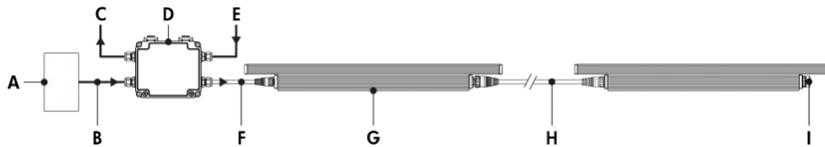
- Consult factory for specific applications and maximum fixture count/cable length recommendations.
- Lumentalk Data Bridge required for 12 in fixture lengths, see LDB installation instructions for details. Fixtures must be specified as DMX/RDM and the Lumentalk Data Bridge must be specified as DMX. 2-step commissioning process: 1 - DMX/RDM system using LumenID software and a LID, 2 - Lumentalk system using LumentalkID software and a LID-LT. Consult factory for details.
- Maximum of 32 fixtures per LDB-DMX. Consult factory for details.
- 1 DMX controller per Lumentalk network, maximum of 48 DMX channels per Lumentalk network (minimum step transition update rate is 1 second, minimum fade time between two colors is 1 minute). Consult factory for applications that require additional capabilities.
- Maximum of 1 transmitter (Lumentranslator or Lumenlink) per system.
- No third party fixtures allowed on the same circuit.
- 17.25 W/ft.

Star Layout (DMX/RDM)



- A** - DMX/RDM controller (order separately from Lumenpulse, or by others)
- B** - Data input (Belden 9841 or equivalent, by others)
- C** - Data output to next CBX (optional, not isolated/not boosted)
- D** - CBX-ST
- E** - Power input (100-277V, wiring by others)
- F** - Leader cable (LOGLC)
- G** - Lumenfacade
- H** - Jumper cable (LOGJC)
- I** - Sealing end cap

Daisy Chain Layout (DMX/RDM)



- A** - DMX/RDM controller (order separately from Lumenpulse, or by others)
- B** - Data input (Belden 9841 or equivalent, by others)
- C** - Data output to next CBX (optional, not isolated/not boosted)
- D** - CBX-DS
- E** - Power input (100-277V, wiring by others)
- F** - Leader cable (LOGLC)
- G** - Lumenfacade
- H** - Jumper cable (LOGJC)
- I** - Sealing end cap

Maximum Run of Fixtures, Lumenfacade® LOG Color Changing 17.25 W/ft

Voltage	120V	240V	277V
Maximum Run of Fixtures*	68ft	80ft	88ft

Based on 15A maximum, 50ft leader cable.

*Example: 120V = 68ft maximum run of end to end fixtures (17 fixtures maximum for 4ft LOG).

Based on 15A maximum, 50 ft leader cable.

- Consult CBX installation instructions for additional wiring details.
- Consult factory for specific applications and maximum fixture count/cable length recommendations. Maximum run length calculations are typically based on 48 in fixtures.
- The DMX/RDM protocol states a maximum of 32 DMX/RDM enabled fixtures on any single run.
- Maximum of 4 DMX/RDM repeaters/CBX cascading in line.
- Maximum of 6 outputs per CBX-ST; maximum of 1 output per CBX-DS.
- RGB color mixture option requires 3 DMX addresses. RGBW30K and RGBW40K color mixture options require 4 DMX addresses. RGBA color mixture option requires 4 DMX addresses.
- 17.25 W/ft.

How to order

LOG	240	12	RGB	10x30	UMP			ETE, 3GV	
Housing ⁽¹⁾	Voltage ⁽²⁾	Length	Color and Color Temperature	Optics	Mounting Options	Finish	Control	Options	Buy American Act
LOG Lumenfacade™	100 100 volts 120 120 volts 208 208 volts 220 220 volts 240 240 volts 277 277 volts	12 13 3/8 in (4.5 lbs) ⁽¹⁾ 24 25 3/8 in (7 lbs) 36 37 3/8 in (10.5 lbs) 48 49 3/8 in (14 lbs)	RGB RGB RGBW30K RGB + white 3000K ⁽⁴⁾ RGBW40K RGB + white 4000K ⁽⁴⁾ RGBA RGB + amber	WWLF Asymmetric Wallwash, left feed WWRP Asymmetric Wallwash, right feed 8x8 8° x 8° ⁽⁵⁾ 10x10 10° x 10° ⁽⁵⁾ 10x30 10° x 30° 10x60 10° x 60° 10x90 10° x 90° 15x25 15° x 25° 30x30 30° x 30° 30x60 30° x 60° 35x35 35° x 35° 50x80 50° x 80° 60x60 60° x 60° 80x80 80° x 80° 90x90 90° x 90°	SAM Slim Adjustable Mounting UMP Fixed Mounting ⁽⁶⁾ UMAS Universal Adjustable Mounting ⁽⁶⁾ WAM2 Adjustable Wall Mounting 2 in WAM6 Adjustable Extended Arm Mounting 6 in WAM12 Adjustable Extended Arm Mounting 12 in WAM18 Adjustable Extended Arm Mounting 18 in	BK Black Sandtex® BRZ Bronze Sandtex® SI Silver Sandtex® WH Smooth white CC Custom color and finish (please specify RAL color) ⁽⁷⁾ ⁽⁸⁾ ⁽⁹⁾	LT Lumentalk ⁽³⁾ ⁽¹⁰⁾ ⁽¹¹⁾ DMX/RDM DMX/RDM enabled ⁽¹²⁾	ETE End-to-end configuration (factory installed 16 in black input cable included) CRC Corrosion-resistant coating for hostile environments ⁽¹³⁾ ⁽¹⁴⁾ 3GV 3G ANSI C136.31-2010 Vibration Rating for bridge applications ⁽¹⁵⁾ CE CE (certification covers European Economic Area) ⁽¹⁶⁾	BAA Buy American ⁽¹⁷⁾ ⁽¹⁸⁾

Notes:

- Power consumption is typically 20% higher for 12 in fixture lengths.
- 347 volts available, consult factory for details.
- To connect 12 in fixture lengths to the Lumentalk system, DMX/RDM must be specified as the control option, and a Lumentalk Data Bridge (LDB-DMX) is required. See the typical wiring diagrams in the specification sheet for details.
- 2700K, 3500K and Royal Blue available, consult factory. Longer lead times apply.
- For best results, we recommend a 6 in setback from surface. Contact factory for application support.
- Suitable to use when 3GV option is specified.
- Lumenpulse offers a wide selection of RAL CLASSIC (K7) colors with a smooth texture and high-gloss finish. Please consult factory for a list of available K7 colors, other RAL textures and glosses, or to match alternate color charts. Final color matching results may vary.
- Setup charges apply for RAL colors. Consult factory for details.
- Longer lead times can be expected for custom RAL color finishes.
- Available for 24 in, 36 in and 48 in fixture lengths only.
- A Lumentranslator 2 (LTL2) and LumentalkID (LIDL) must be specified for Lumentalk applications. Consult Lumentranslator 2 and Lumentalk pages and specification sheets for details.
- A control box (CBX) and LumenID (LID) must be specified.
- Use only when exposed to salt spray. This option is not required for normal outdoor exposure.
- Setup charges apply. Consult factory for details.
- Available with UMP and UMAS mounting options only.
- Consult European specification sheet and installation instructions for CE wiring information.
- Not available with CE certification option.
- Contact your Lumenpulse Sales Representative for more information on order volume details.

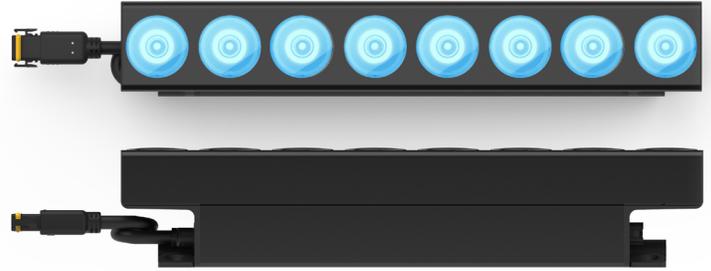
L60 RGBW LINEAR PROJECTOR | INTERIOR + EXTERIOR

DATE	PROJECT	FIRM	TYPE
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TROV L60 RGBW delivers 10 beams for grazing, asymmetric, and washing in a slim form factor for color changing facade lighting application. With VividSync™ and color mixing optics, L60 Linear provides uniform color mixing with minimal mixing distance and setbacks.

Features:

- RGBW quad chips and color mixing optics provide uniform color mixing with minimal setbacks
- Channel Max™ directs all driver output to the LEDs in use.
- VividSync™ ensures consistent output for every 12in section.
- 5 power levels
- Friction hinge allows infinite aiming from 0°-180°
- Aiming indicators for precise aiming
- IP66 exterior rated
- Two standard finishes: Black & White



Model Size	Interior/Exterior	Length	Power	Spectra	Voltage	Optics	Finish
L60	E - Exterior I - Interior	12 - 12IN 48 - 48IN	10 - 10W/FT 12 - 12W/FT 14 - 14W/FT 16 - 16W/FT 18 - 18W/FT	RGB3 - 3000K, 80CRI White RGB4 - 4000K, 80CRI White Red 625nm Green 527nm Royal Blue 453nm	MULT (100-277VAC)	15x15 30x45 20x20 30x75 20x40 55x55 20x70 55x60 30x30 55x90	K - Black W - White

Build to Order Shipping

- S - Silver
- Z - Bronze
- C - Custom

EXAMPLE: L60-E-12-18-RGB4-MULT-15X15

Performance

Watts/ft	Channel	Optic	Lumen Output		Efficacy	Optic	Lumen Output		Efficacy
18W	Red	15°x15°	286 lm/ft	938 lm/m	22 lm/W	55° x 90°	235 lm/ft	771 lm/m	18 lm/W
	Green	15°x15°	870 lm/ft	2854 lm/m	59 lm/W	55° x 90°	712 lm/ft	2335 lm/m	48 lm/W
	Blue	15°x15°	158 lm/ft	518 lm/m	11 lm/W	55° x 90°	112 lm/ft	367 lm/m	8 lm/W
	4000K	15°x15°	934 lm/ft	3064 lm/m	64 lm/W	55° x 90°	806 lm/ft	2644 lm/m	55 lm/W
	Full Output	15°x15°	909 lm/ft	2982 lm/m	48 lm/W	55° x 90°	778 lm/ft	2552 lm/m	41 lm/W
10W	Red	15°x15°	198 lm/ft	649 lm/m	26 lm/W	55° x 90°	153 lm/ft	502 lm/m	20 lm/W
	Green	15°x15°	513 lm/ft	1683 lm/m	62 lm/W	55° x 90°	420 lm/ft	1378 lm/m	50 lm/W
	Blue	15°x15°	91 lm/ft	298 lm/m	11 lm/W	55° x 90°	57 lm/ft	186 lm/m	7 lm/W
	4000K	15°x15°	489 lm/ft	1604 lm/m	60 lm/W	55° x 90°	411 lm/ft	1348 lm/m	50 lm/W
	Full Output	15°x15°	499 lm/ft	1637 lm/m	49 lm/W	55° x 90°	390 lm/ft	1279 lm/m	38 lm/W

Color Rendering Index Color Consistency

White LED 80+ CRI
White LED 3-Step Macadam Ellipse

Lumen Maintenance

	Reported*						Calculated**					
	25° C			50° C			25° C			50° C		
	L90	L80	L70	L90	L80	L70	L90	L80	L70	L90	L80	L70
L60 RGBW All Optics - 10W/ft	>90,000	>90,000	>90,000	30,684	62,992	>90,000	133,965	282,258	450,368	30,684	62,992	99,618
L60 RGBW All Optics - 18W/ft	30,684	62,992	>90,000	31,173	64,471	>90,000	30,684	62,992	99,618	33,173	64,471	102,233

*REPORTED HOURS COMPLY WITH TM-21 GUIDELINES THAT EXTRAPOLATIONS CANNOT EXCEED SIX TIMES LM-80 TESTED LED HOURS.

**CALCULATIONS FOR LED FIXTURES ARE BASED ON MEASUREMENTS THAT COMPLY WITH IES LM-80 TESTING PROCEDURES AND IES TM-21 CALCULATOR.

Max Run Length

Maximum run length is determined by input voltage and wattage of the fixture, or a 30 fixture count set by the DMX-RDM standard ANSI E1.11 2008. Run lengths should be the shortest of the two. 48in fixtures count as 1 fixture.

TROV Max Run Length (ft)			
VAC (V)	10W	18W	
120	97	54	
220	120	99	
277	120	120	

TROV Max Run Length (m)			
VAC (V)	10W	18W	
120	29.6	16.5	
220	36.5	30.2	
277	36.5	36.5	

Protocol	Limitations
DMX	30 Fixtures

L60 RGBW LINEAR PROJECTOR | INTERIOR + EXTERIOR

DATE	PROJECT	FIRM	TYPE	
Electrical	Driver Power Consumption Power Factor THD Operating Voltage Startup Temperature Operating Temperature Storage Temperature	Proprietary integral driver, one driver per fixture (see driver spec sheet for more details) 10W/FT (33W/M); 12W/FT (39W/M); 14W/FT (46W/M); 16W/FT (52W/M); 18W/FT (59W/M) 10-18W/ft @120V PF>0.90 (See DRIVER SPEC SHEET FOR MORE DETAILS) <10% @120V MULTI-VOLT: 100-277VAC, 50/60Hz -40°F TO 122°F (-40°C TO 50°C) -40°F TO 122°F (-40°C TO 50°C) -40°F TO 176°F (-40°C TO 80°C)		
Control	Dimming Protocol Dimming Range	DMX/RDM: 8-BIT and 16-BIT; Factory settings = ch.1 8-BIT 48in Resolution: 12in, 24in, and 48in; Factory setting = 48in Dimming Curve: Log or Linear; Factory settings = Log 100%-2%		
Physical	Dimensions Housing/Lens Weight Connectors Environment Finish Mounting Options	H 2.47" x W 1.86" x L 12"/48"; (62.7mm x 47.3mm x 305mm/1220mm) Extruded aluminum housing; UV stabilized polycarbonate optic; stainless steel fasteners; rubber overmolded cable assembly 2.0lbs / 0.91KG (1ft), 6.6LBS / 3.0KG (4ft) Integral male / female connectors Outdoor • UL CERTIFIED for wet locations IP66 Interior • UL certified for damp locations IP54 Impact rated to IK07 MEETS 5G ANSI C136.31 VIBRATION STANDARD FOR BRIDGE APPLICATIONS Not intended to be used in water features such as waterfalls, fountains, etc. Corrosion-resistant finish using high durability triglycidyl isocyanurate (TGIC) powder coatings specifically designed for exterior weather exposure. Integral mounting and adjustable lockable aiming from 0°-180° increments		
Fixture Rating & Certifications	UL LISTED, CE RCM, NOM, & PSE RoHS COMPLIANT	     		

Limited Warranty 5 Years

Wiring Options 100-277VAC (One Leader Cable or Wire Box Needed Per Run)

TROV L45 L60, 6-pin, Black, Leader with Terminator Caps, Universal Voltage, 10ft	CBL-6P-LBK-LDR-UNV-10
TROV L45 L60, 6-pin, Black, Leader with Terminator Caps, Universal Voltage, 50ft	CBL-6P-LBK-LDR-UNV-50
TROV L45 L60, 6-pin, Black, Leader with Terminator Caps, Universal Voltage, 25ft.....	CBL-6P-LBK-LDR-UNV-25
TROV L45 L60, 6-pin, Black, Jumper, Universal Voltage, 5ft	CBL-6P-LBK-JMP-UNV-5
TROV L45 L60, 6-pin, Black, Jumper, Universal Voltage, 1ft	CBL-6P-LBK-JMP-UNV-1
TROV L45 L60, Interior Wire Box, White	L45 L60-A-I-WIREBOX
TROV L45 L60, 6-pin, Black, DMX 120-Ohm Terminator Cap Set, Male and Female, Universal Voltage.....	CBL-6P-LBK-DMX-CAP-UNV

*DMX Terminator caps MUST be ordered separately from the leader cable or wire box. Order one set for every leader cable or wire box. Leader cables and jumper cables come with connectors on both ends. Jumpers can be used as leader cables.

Optional Accessories

Mounting Track

TROV L45 L60, Mounting Track, 12in, White	L45L60-A-MNT-TRACK-12-W
TROV L45 L60, Mounting Track, 48in, White	L45L60-A-MNT-TRACK-48-W
TROV L45 L60, Mounting Track, 12in, Black.....	L45L60-A-MNT-TRACK-12-K
TROV L45 L60, Mounting Track, 48in, Black.....	L45L60-A-MNT-TRACK-48-K
TROV L45 L60, Mounting L-Track, 12in, White.....	L45L60-A-LTRACK-12-W
TROV L45 L60, Mounting L-Track, 48in, White.....	L45L60-A-LTRACK-48-W
TROV L45 L60, Mounting L-Track, 12in, Black.....	L45L60-A-LTRACK-12-K
TROV L45 L60, Mounting L-Track, 48in, Black.....	L45L60-A-LTRACK-48-K
TROV L45 L60, Track, KEC, and Masking Plate Mounting Clip, Set of 2, (1 Set per Fixture)	L45L60-A-MNT-CLIP

*One set of clips are required per fixture. See Mounting Track spec sheet for more information.

Snap on Lenses

TROV L60, Snap on Frosted Lens, 12in	L60-A-FRLS-12
TROV L60, Snap on Frosted Lens, 48in	L60-A-FRLS-48
TROV L60, Snap on Clear Lens, 12in	L60-A-CLLS-12
TROV L60, Snap on Clear Lens, 48in.....	L60-A-CLLS-48

*48in SKUs consist of four 12in louvers. See Louver spec sheet for more information.

L60 RGBW LINEAR PROJECTOR | INTERIOR + EXTERIOR

DATE	PROJECT	FIRM	TYPE
------	---------	------	------

Louvers

TROV L45 L60, Half Louver, Black, 12in	L45L60-A-LV-HL-12
TROV L45 L60, Half Louver, Black, 4x12in.....	L45L60-A-LV-HL-48
TROV L45 L60, Full Louver, Black, 12in.....	L45L60-A-LV-FL-12
TROV L45 L60, Full Louver, Black, 4x12in.....	L45L60-A-LV-FL-48
TROV L45 L60, Honeycomb Louver, Black, 12in.....	L45L60-A-LV-HCOMB-12
TROV L45 L60, Honeycomb Louver, Black, 4x12in	L45L60-A-LV-HCOMB-48

*48in SKUs consist of four 12in louvers. See Louver spec sheet for more information.

Masking Plates (Silver, bronze, and custom finishes have longer lead-times and increased pricing)

TROV L45 L60, Masking Plate, 5in Tall, 12in Long, (Black, White, Silver, Bronze, Custom)	L45L60-A-MP5-12-(K,W,S,Z,C)
TROV L45 L60, Masking Plate, 5in Tall, 48in Long, (Black, White, Silver, Bronze, Custom)	L45L60-A-MP5-48-(K,W,S,Z,C)
TROV L45 L60, Masking Plate, 5in Tall, 90-Deg Coffe Corner, (Black, White, Silver, Bronze, Custom).....	L45L60-A-MP5-C90-(K,W,S,Z,C)
TROV L45 L60, Masking Plate, 5in Tall, 90-Deg Raft Corner, (Black, White, Silver, Bronze, Custom)	L45L60-A-MP5-R90-(K,W,S,Z,C)
TROV L45 L60, Track, KEC, and Masking Plate Mounting Clip, Set of 2, (1 Set per Fixture).....	L45L60-A-MNT-CLIP

*One set of clips are required per fixture. See Masking Plate spec sheet for more information.

Wall Mount Arm System (Silver, bronze, and custom finishes have longer lead-times and increased pricing)

TROV L45 L60, Wall Mount Assm, 6in Arm, (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-CA-06-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, 12in Arm, (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-CA-12-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, 18in Arm, (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-CA-18-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, 24in Arm, (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-CA-24-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, 12in Tray (1 per 12in Fixture), (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-TRAY-12-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, 48in Tray (1 per 48in Fixture), (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-TRAY-48-(K,W,S,Z,C)
TROV L45 L60, Wall Mount Assm, End Cap Set (1 Per Run), (Black, White, Silver, Bronze, Custom).....	L45L60-A-WMA-ENDCAPS-(K,W,S,Z,C)

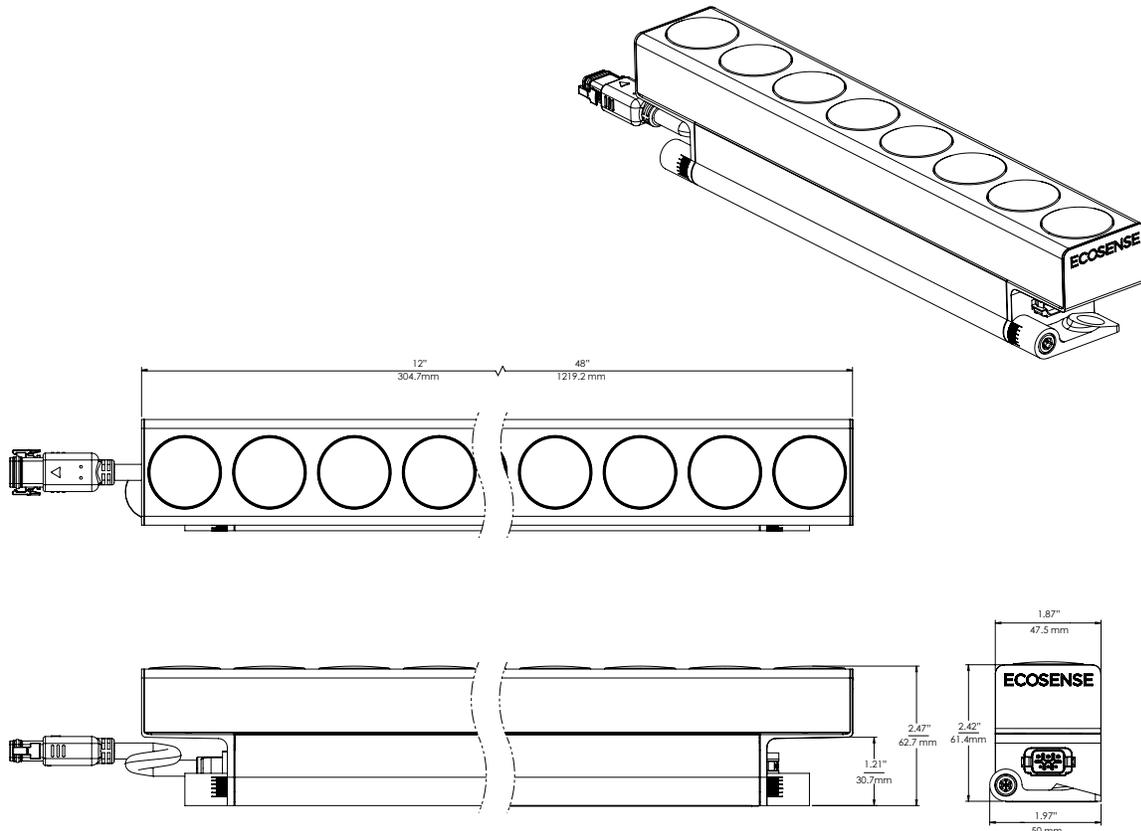
*See Wall Mount Arm System spec sheet for more information.

Landscape Stakes (Anodized aluminum finish only. Not finished to match fixtures)

TROV Landscape Stake, 6inch, Anodized Aluminum Finish, Set of 2.....	LS-L-STK-06
TROV Landscape Stake, 12inch, Anodized Aluminum Finish, Set of 2.....	LS-L-STK-12
TROV Landscape Stake, 18inch, Anodized Aluminum Finish, Set of 2.....	LS-L-STK-18

*See TROV L50 Landscape stake spec sheet for more information.

Dimensions



PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

PROFILE

OUTPUT	LO (5 W/FT), MO (10 W/FT), HO (15 W/FT), VO (20 W/FT)
OPTICAL DISTRIBUTIONS	10°, 20°, 30°, 40°, 60°, 80°, 90° - SEE PAGE 2 FOR DETAILS
LED CONFIGURATIONS	PATENTED QUAD PERECT™ TECHNOLOGY POWERED BY NITRO COLOR TECHNOLOGY RGB-AMBER, RGB22K, RGB27, RGB30K, RGB35K, RGB40K RG-ROYAL BLUE30K, RG-ROYAL BLUE-40K , TUNABLE WHITE (2200K-6500K)
PERFORMANCE	UP TO: 4,276 LUMENS, 47,764 PEAK CANDELA
VOLTAGE	120VAC, 277VAC 380VDC - REMOTE DRIVER, POWERED BY MARATHON TECHNOLOGY
CONTROL	DMX/RDM
FIXTURE LENGTHS	12", 24", 36", 48", 60" (NOMINAL LENGTHS)
WEIGHT	2.41 LB/FT
HOUSING	PRECISION EXTRUDED ALUMINUM
LENS	HIGH DENSITY TEMPERED GLASS
FINISH	HIGH DURABILITY POWDER COATING
OPERATING TEMP.	-20° C TO 50° C
WARRANTY	5-YEAR LIMITED
LUMEN MAINTENANCE	75,000 HOURS
CERTIFICATION	ETL AND CETL FOR IP67, IK07, 3G, COMPLIES WITH BUY AMERICAN ACT



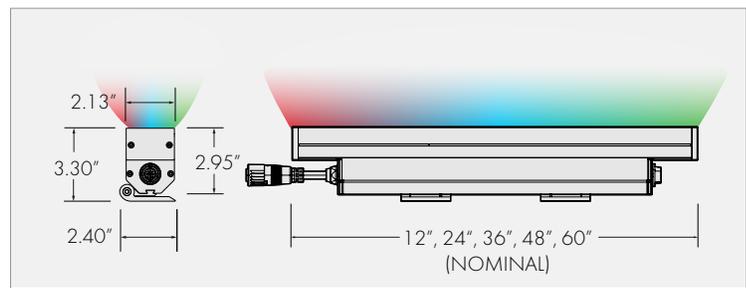
STANDARD FINISHES



OPTIONS



PROFILE



PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

FIXTURE SPECIFICATION

Separate options with dashes

AP									
1	2	3	4	5	6	7	8	9	

1 FIXTURE

ARGO PRO **AP**

2 WATTAGE

LOW OUTPUT **LO**
5 W/FT

MEDIUM OUTPUT **MO**
10 W/FT

HIGH OUTPUT **HO**
15 W/FT

MAXIMUM OUTPUT **VO**
20 W/FT

3 CCT

RED, GREEN, BLUE, AMBER **RGBAM**

RED, GREEN, BLUE, 22K **RGB22**

RED, GREEN, BLUE, 27K **RGB27**

RED, GREEN, BLUE, 30K **RGB30**

RED, GREEN, BLUE, 35K **RGB35**

RED, GREEN, BLUE, 40K **RGB40**

RED, GREEN, ROYAL BLUE, 30K **RGY30**

RED, GREEN, ROYAL BLUE, 40K **RGY40**

TUNABLE WHITE **2265K**
Kelvin tunable 2200K-6500K

Contact factory for additional CCT combinations

4 OPTICAL DISTRIBUTION

10° X 10° **1010**

10° X 30° **1030**

10° X 60° **1060**

10° X 90° **1090**

20° X 20° **2020**

20° X 30° **2030**

20° X 60° **2060**

20° X 90° **2090**

30° X 30° **3030**

30° X 60° **3060**

30° X 90° **3090**

40° X 40° **4040**

40° X 60° **4060**

40° X 90° **4090**

60° X 60° **6060**

80° X 80° **8080**

90° X 90° **9090**

ASYM GRAZE UPLIGHT,
LEFT POWER FEED ¹ **ASUL**

ASYM GRAZE UPLIGHT,
RIGHT POWER FEED ¹ **ASUR**

ASYM GRAZE DOWNLIGHT, LEFT
POWER FEED ¹ **ASDL**

ASYM GRAZE DOWNLIGHT,
RIGHT POWER FEED ¹ **ASDR**

¹ Asym Graze: See page 5 for details.

5 FIXTURE LENGTH

12" **12**

24" **24**

36" **36**

48" **48**

60" **60**

6 VOLTAGE

INTEGRAL

120VAC **120**

277VAC **277**

Contact factory for additional voltages

MARATHON REMOTE

380VDC **MAR**

380VDC requires a remote power supply[s]
Must be ordered separately. See page 4 for details.

7 CONTROL OPTIONS

DMX SYSTEM RESOLUTION **DMXSY**

DMX FIXTURE RESOLUTION **DMXFX**

DMX FT BY FT RESOLUTION **DMXFT**

Default factory setting is DMX System Resolution
Fixtures are not pre-addressed/labeled at the factory. A DMXCAT Tool is required for on-site fixture resolution/addressing. See page 4 for details.

A CDS/RDM Distribution Kit is required. Must be ordered separately. See page 4 for details.
DMX controls are required. Order separately.

8 FIXTURE FINISH

TEXTURED WHITE **TWH**

TEXTURED BLACK **TBL**

TEXTURED BRONZE **TBR**

TEXTURED LIGHT BRONZE **TLB**

TEXTURED GRAY **TGR**

TEXTURED NATURAL **TNA**

TEXTURED SANDSTONE **TSA**

ANODIZED ALUMINUM **ANA**

Includes corrosion resistant finish.

CUSTOM COLOR **CUS**

Contact factory for custom color. Additional charges will apply.

9 OPTIONS

WHITE CABLE **WCA**

White fixtures are provided with white cables and connectors. All other fixture finishes are provided with black cabling unless WC option is specified.

CORROSION RESISTANT
FINISH **CRF**

CRF complies with ASTM B117. CRF is recommended for coastal or extreme exterior environments

BUILD AMERICA
BUY AMERICA ACT **BAB**

Complies with BAA
Contact factory for current offering.

PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

ORDERING LOGIC: MOUNTING OPTIONS (ORDER SEPARATELY)

SA - -

1 2

1 MOUNTING OPTION SEE PAGES	PART NUMBERS	
	12" FIXTURE	24" - 60" FIXTURE
FIXED MOUNT	SA28170-1	SA28170
HINGE MOUNT	SA28104-1	SA28104
WALL MOUNT	SA28105-1	SA28105
GROUND MOUNT	SA28106-1	SA28106
EXTENDED ARM, WALL		
6" ARM	SA28107-1-6	SA28107-6
12" ARM	SA28107-1-12	SA28107-12
18" ARM	SA28107-1-18	SA28107-18
24" ARM	SA28107-1-24	SA28107-24
EXTENDED ARM, GROUND		
6" ARM	SA28108-1-6	SA28108-6
12" ARM	SA28108-1-12	SA28108-12
18" ARM	SA28108-1-18	SA28108-18
24" ARM	SA28108-1-24	SA28108-24
PENDANT, CEILING		
6" PENDANT	SA28108-1-6	SA28108-6
12" PENDANT	SA28108-1-12	SA28108-12
18" PENDANT	SA28108-1-18	SA28108-18
24" PENDANT	SA28108-1-24	SA28108-24
<small>Contact factory for additional pendant lengths</small>		
STAKE MOUNT	SA28110-1	SA28110

2 MOUNTING FINISH	
TEXTURED WHITE	TWH
TEXTURED BLACK	TBL
TEXTURED BRONZE	TBR
TEXTURED LIGHT BRONZE	TLB
TEXTURED GRAY	TGR
TEXTURED NATURAL	TNA
TEXTURED SANDSTONE	TSA
ANODIZED ALUMINUM	ANA
<small>Includes corrosion resistant finish.</small>	
CUSTOM COLOR	CUS
<small>Contact factory for custom color. Additional charges will apply.</small>	

ORDERING LOGIC: ACCESSORIES AND OPTIONS (ORDER SEPARATELY)

SHIELDING ACCESSORY

SA - -

1 2

1 SHIELDING ACCESSORIES	PART NUMBER				
	12" FIXTURE	24" FIXTURE	36" FIXTURE	48" FIXTURE	60" FIXTURE
LOUVER	SA28111-1	SA28111-2	SA28111-3	SA28111-4	SA28111-5
VISOR	SA28112-1	SA28112-2	SA28112-3	SA28112-4	SA28112-5
SHIELD/MASKING PLATE	SA28113-1	SA28113-2	SA28113-3	SA28113-4	SA28113-5
PROLINK CONDUIT J-BOX					
PROLINK CONDUIT J-BOX	PART NUMBER SA28177				
PROLINK CONNECT ACCESSORIES (NOT AVAILABLE WITH 12" FIXTURES)					
PROLINK CONNECT START	PART NUMBER SA28178				
<small>Not available with Extended Arm Wall. See SA28179 below.</small>					
PROLINK CONNECT START FOR EXTENDED ARM WALL	PART NUMBER SA28179				
<small>Intended for Extended Arm, Wall only (SA28107-X)</small>					
PROLINK CONNECT MID FOR PLUG AND PLAY SYSTEM	PART NUMBER SA28180				
<small>ProLink Mid is intended for straight runs only</small>					
PROLINK CONNECT END	PART NUMBER SA28181				
<small>ProLink Connect End for end of continuous run.</small>					

PROLINK TECHNOLOGY - SEE PAGE 12

SA - -

1 2

2 ACCESSORY FINISH	
TEXTURED WHITE	TWH
TEXTURED BLACK	TBL
TEXTURED BRONZE	TBR
TEXTURED LIGHT BRONZE	TLB
TEXTURED GRAY	TGR
TEXTURED NATURAL	TNA
TEXTURED SANDSTONE	TSA
ANODIZED ALUMINUM	ANA
<small>Includes corrosion resistant finish.</small>	
CUSTOM COLOR	CUS
<small>Contact factory for custom color. Additional charges will apply.</small>	

PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

ORDERING LOGIC: CABLES - SEE PAGE 14

EL - _____

1

EL - _____

2

EL - _____

3

1 LEADER CABLES	PART NUMBER	
	BLACK	WHITE
5.0 FT LEADER CABLE	EL12430-5-B	EL12430-5-W
10.0 FT LEADER CABLE	EL12430-10-B	EL12430-10-W

A leader cables is required for standard J-box installations

3 DMX TERMINATOR	PART NUMBER	
	BLACK	WHITE
DMX TERMINATOR	EL12291-B	EL12291-W

One required per DMX run

2 JUMPER CABLES	PART NUMBER	
	BLACK	WHITE
1.0 FT JUMPER CABLE	EL12288-1-B	EL12288-1-W
2.0 FT JUMPER CABLE	EL12288-2-B	EL12288-2-W
5.0 FT JUMPER CABLE	EL12288-5-B	EL12288-5-W
10.0 FT JUMPER CABLE	EL12288-10-B	EL12288-10-W
25.0 FT JUMPER CABLE	EL12288-25-B	EL12288-25-W

A jumper cable is required for ProStart Plug & Play Starter with Surge Protection (see below for details)

ORDERING LOGIC: PROSURGE POWER & DATA BOX WITH SURGE PROTECTION (OPTIONAL)

1

1 PROSURGE POWER & DATA BOX	PART NUMBER
PROSURGE POWER & DATA BOX - FOR MARATHON DMX	SA28173
PROSURGE POWER & DATA BOX - FOR 120-277V DMX	SA28176

Transitions Data and Power, with 10 kVA surge protection for Insight's Plug and Play cable system. One required per continuous run.
A jumper cable is required.
Not available with ProLink Conduit Box

ORDERING LOGIC: MARATHON REMOTE 380VDC TECHNOLOGY

1

1 MARATHON REMOTE POWER SUPPLY - REQUIRED FOR MARATHON REMOTE	PART NUMBER
MARATHON REMOTE POWER SUPPLY, 380VDC, 2300W, 277V INPUT, IP67	EL12419

ORDERING LOGIC: DMX TOOLS - REQUIRED

1

1 DMX/RDM DISTRIBUTION KIT	PART NUMBER
CDS-RDM - DMX/RDM DISTRIBUTION KIT - IP67	SA27411

Consists of 4 output
Each output is limited to (1) run per output - up to 96 fixtures max

1

1 REMOTE DMX/RDM MONITORING TOOL	PART NUMBER
DMX/RDM ADDRESSING & MONITORING TOOL	SA27636

Uses Bluetooth LE technology for communication with the smartphone and the DMXcat app (up to a 50' range). Allows for on-site fixture resolution and addressing.

PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

MAXIMUM RUN LENGTH IN FEET AND MAXIMUM FIXTURES PER RUN

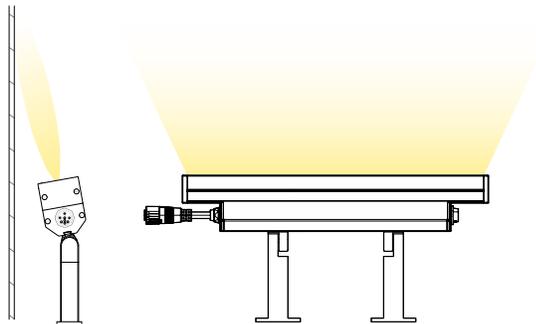
MAXIMUM POSSIBLE RUN LENGTHS IN FEET (FIXTURES & JUMPERS AS STATED)
ALL DISTANCES ARE CALCULATED AS CONTINUOUS RUNS

MAXIMUM RUN LENGTH IN FEET						
	120VAC		277VAC		380VDC @ 277V	
	FIXTURE RUN LENGTH	JUMPER LENGTH	FIXTURE RUN LENGTH	JUMPER LENGTH	FIXTURE RUN LENGTH	JUMPER LENGTH
DMX						
LO OUTPUT 5W/FT	96 FIXTURES MAX NOT TO EXCEED 268'	0'	96 FIXTURES NOT TO EXCEED 480'	0'	96 FIXTURES NOT TO EXCEED 460'	540'
MO OUTPUT 10W/FT	96 FIXTURES NOT TO EXCEED 156'	0'	96 FIXTURES NOT TO EXCEED 360'	0'	96 FIXTURES NOT TO EXCEED 230'	770'
HO OUTPUT 15W/FT	96 FIXTURES NOT TO EXCEED 104'	0'	96 FIXTURES NOT TO EXCEED 240'	0'	96 FIXTURES NOT TO EXCEED 153'	847'
VO OUTPUT 20W/FT	78'	0'	180'	0'	96 FIXTURES NOT TO EXCEED 115'	885'

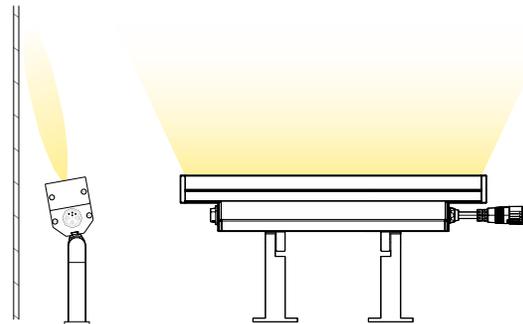
ALL CALCULATIONS ARE BASED ON 16AWG CABLE

ASYMMETRIC DISTRIBUTIONS/LIGHT DIRECTION /FEED LOCATIONS

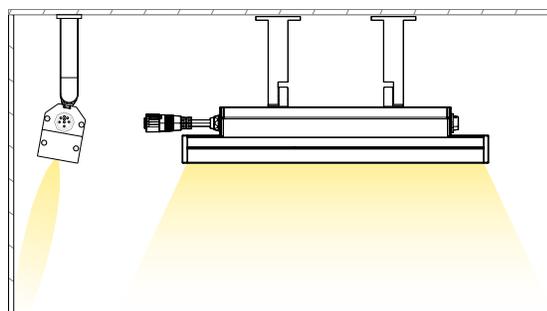
ASYMMETRIC GRAZE UPLIGHT | LEFT POWER FEED



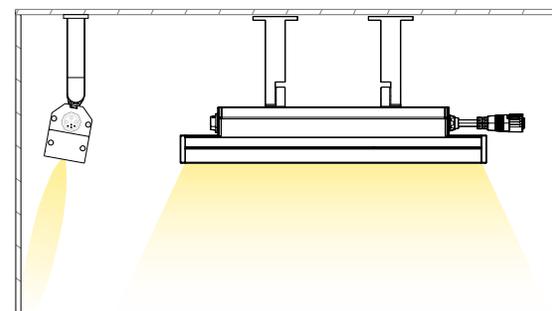
ASYMMETRIC GRAZE UPLIGHT | RIGHT POWER FEED



ASYMMETRIC GRAZE DOWNLIGHT | LEFT POWER FEED



ASYMMETRIC GRAZE DOWNLIGHT | RIGHT POWER FEED



PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

PERFORMANCE

BASED ON 48" FIXTURE

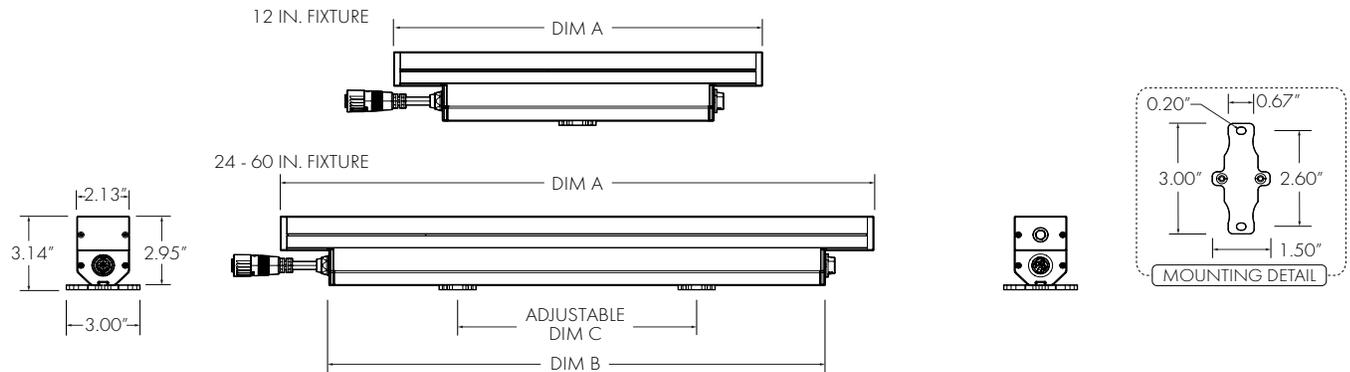
OPTIC	CCT'S	LOW OUTPUT				MEDIUM OUTPUT				HIGH OUTPUT				MAX OUTPUT			
		LUMENS	WATTS	LM/W	PEAK CANDELA CBCP	LUMENS	WATTS	LM/W	PEAK CANDELA CBCP	LUMENS	WATTS	LM/W	PEAK CANDELA CBCP	LUMENS	WATTS	LM/W	PEAK CANDELA CBCP
	RGB40	868	20	43.4	9738	1736	40	43.4	19476	2604	60	43.4	29214	3472	80	43.4	38952
	RED	241	16	15.4	2831	482	31	15.4	5662	723	47	15.4	8493	964	62	15.4	11324
	GREEN	1019	18	55.7	11167	2038	37	55.7	22334	3057	55	55.7	33501	4076	73	55.7	44668
	BLUE	350	19	18.0	3687	700	39	18.0	7374	1050	58	18.0	11061	1400	78	18.0	14748
	WHITE	1028	20	51.7	11941	2056	40	51.7	23882	3084	60	51.7	35823	4112	80	51.7	47764
	RGB40	781	20	39.1	3828	1562	40	39.1	7656	2343	60	39.1	11484	3124	80	39.1	15312
	RED	229	16	14.7	1153	458	31	14.7	2306	687	47	14.7	3459	916	62	14.7	4612
	GREEN	915	18	50.0	4380	1830	37	50.0	8760	2745	55	50.0	13140	3660	73	50.0	17520
	BLUE	319	19	16.4	1484	638	39	16.4	2968	957	58	16.4	4452	1276	78	16.4	5936
	WHITE	925	20	46.5	4706	1850	40	46.5	9412	2775	60	46.5	14118	3700	80	46.5	18824
	RGB40	765	20	38.3	2176	1530	40	38.3	4352	2295	60	38.3	6528	3060	80	38.3	8704
	RED	204	16	13.1	600	408	31	13.1	1200	612	47	13.1	1800	816	62	13.1	2400
	GREEN	898	18	49.1	2513	1796	37	49.1	5026	2694	55	49.1	7539	3592	73	49.1	10052
	BLUE	311	19	16.0	834	622	39	16.0	1668	933	58	16.0	2502	1244	78	16.0	3336
	WHITE	926	20	46.5	2692	1852	40	46.5	5384	2778	60	46.5	8076	3704	80	46.5	10768
	RGBW	750	20	37.5	1238	1500	40	37.5	2476	2250	60	37.5	3714	3000	80	37.5	4952
	RED	203	16	13.0	346	406	31	13.0	692	609	47	13.0	1038	812	62	13.0	1384
	GREEN	880	18	48.1	1434	406	31	13.0	692	2640	55	48.1	4302	3520	73	48.1	5736
	BLUE	304	19	15.7	482	608	39	15.7	964	912	58	15.7	1446	1216	78	15.7	1928
	WHITE	892	20	44.8	1507	1784	40	44.8	3014	2676	60	44.8	4521	3568	80	44.8	6028
	RGB40	818	20	40.9	5150	1636	40	40.9	10300	2454	60	40.9	15450	3272	80	40.9	20600
	RED	229	16	14.7	1376	458	31	14.7	2752	687	47	14.7	4128	916	62	14.7	5504
	GREEN	951	18	52.0	5846	1902	37	52.0	11692	2853	55	52.0	17538	3804	73	52.0	23384
	BLUE	333	19	17.2	2141	666	39	17.2	4282	999	58	17.2	6423	1332	78	17.2	8564
	WHITE	977	20	49.1	6300	1954	40	49.1	12600	2931	60	49.1	18900	3908	80	49.1	25200
	RGB40	741	20	37.1	2461	1482	40	37.1	4922	2223	60	37.1	7383	2964	80	37.1	9844
	RED	203	16	13.0	664	406	31	13.0	1328	609	47	13.0	1992	812	62	13.0	2656
	GREEN	864	18	47.2	2850	1728	37	47.2	5700	2592	55	47.2	8550	3456	73	47.2	11400
	BLUE	303	19	15.6	1002	606	39	15.6	2004	909	58	15.6	3006	1212	78	15.6	4008
	WHITE	894	20	44.9	3013	1788	40	44.9	6026	2682	60	44.9	9039	3576	80	44.9	12052
	RGB40	727	20	36.4	1530	1454	40	36.4	3060	2181	60	36.4	4590	2908	80	36.4	6120
	RED	199	16	12.8	413	398	31	12.8	826	597	47	12.8	1239	796	62	12.8	1652
	GREEN	864	18	47.2	1768	1728	37	47.2	3536	2592	55	47.2	5304	3456	73	47.2	7072
	BLUE	295	19	15.2	618	590	39	15.2	1236	885	58	15.2	1854	1180	78	15.2	2472
	WHITE	867	20	43.6	1844	1734	40	43.6	3688	2601	60	43.6	5532	3468	80	43.6	7376
	RGB40	707	20	35.4	955	1414	40	35.4	1910	2121	60	35.4	2865	2828	80	35.4	3820
	RED	195	16	12.5	264	390	31	12.5	528	585	47	12.5	792	780	62	12.5	1056
	GREEN	820	18	44.8	1101	1640	37	44.8	2202	2460	55	44.8	3303	3280	73	44.8	4404
	BLUE	284	19	14.6	386	568	39	14.6	772	852	58	14.6	1158	1136	78	14.6	1544
	WHITE	841	20	42.3	1161	1682	40	42.3	2322	2523	60	42.3	3483	3364	80	42.3	4644
	RGB40	907	20	45.4	1667	1814	40	45.4	3334	2721	60	45.4	5001	3628	80	45.4	6668
	RED	292	16	18.7	551	584	31	18.7	1102	876	47	18.7	1653	1168	62	18.7	2204
	GREEN	1052	18	57.5	1966	2104	37	57.5	3932	3156	55	57.5	5898	4208	73	57.5	7864
	BLUE	364	19	18.8	667	728	39	18.8	1334	1092	58	18.8	2001	1456	78	18.8	2668
	WHITE	1069	20	53.7	1918	2138	40	53.7	3836	3207	60	53.7	5754	4276	80	53.7	7672
	RGB40	785	20	39.3	790	1570	40	39.3	1580	2355	60	39.3	2370	3140	80	39.3	3160
	RED	246	16	15.8	251	492	31	15.8	502	738	47	15.8	753	984	62	15.8	1004
	GREEN	922	18	50.4	934	492	31	15.8	502	2766	55	50.4	2802	3688	73	50.4	3736
	BLUE	319	19	16.4	319	638	39	16.4	638	957	58	16.4	957	1276	78	16.4	1276
	WHITE	937	20	47.1	936	1874	40	47.1	1872	2811	60	47.1	2808	3748	80	47.1	3744
	RGB40	937	20	47.1	936	1504	40	37.6	1130	2256	60	37.6	1695	3008	80	37.6	2260
	RED	937	20	47.1	936	470	31	15.1	358	705	47	15.1	537	940	62	15.1	716
	GREEN	879	18	48.0	664	1758	37	48.0	1328	2637	55	48.0	1992	3516	73	48.0	2656
	BLUE	303	19	15.6	227	606	39	15.6	454	909	58	15.6	681	1212	78	15.6	908
	WHITE	892	20	44.8	667	1784	40	44.8	1334	2676	60	44.8	2001	3568	80	44.8	2668
	RGB40	826	20	41.3	950	1652	40	41.3	1900	2478	60	41.3	2850	3304	80	41.3	3800
	RED	259	16	16.6	303	518	31	16.6	606	777	47	16.6	909	1036	62	16.6	1212
	GREEN	972	18	53.1	1151	1944	37	53.1	2302	2916	55	53.1	3453	1356	78	17.5	1628
	BLUE	339	19	17.5	407	678	39	17.5	814	1017	58	17.5	1221	1356	78	17.5	1628
	WHITE	997	20	50.1	1105	1994	40	50.1	2210	2991	60	50.1	3315	3988	80	50.1	4420

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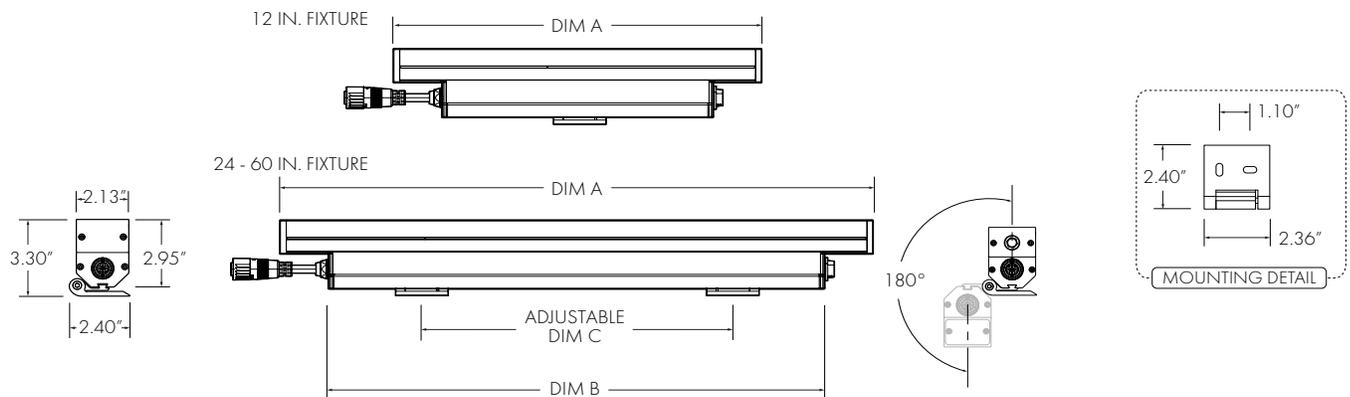
DIMENSIONS

DIMENSION	12.00"	24.00"	36.00"	48.00"	60.00"
DIM A	12.56"	24.37"	36.18"	48.00"	59.81"
DIM B	8.60"	20.24"	32.06"		55.68"
DIM C	NA	6.00" MIN 12.00" MAX	12.00" MIN 24.00" MAX	18.00" MIN 30.00" MAX	24.00" MIN 36.00" MAX

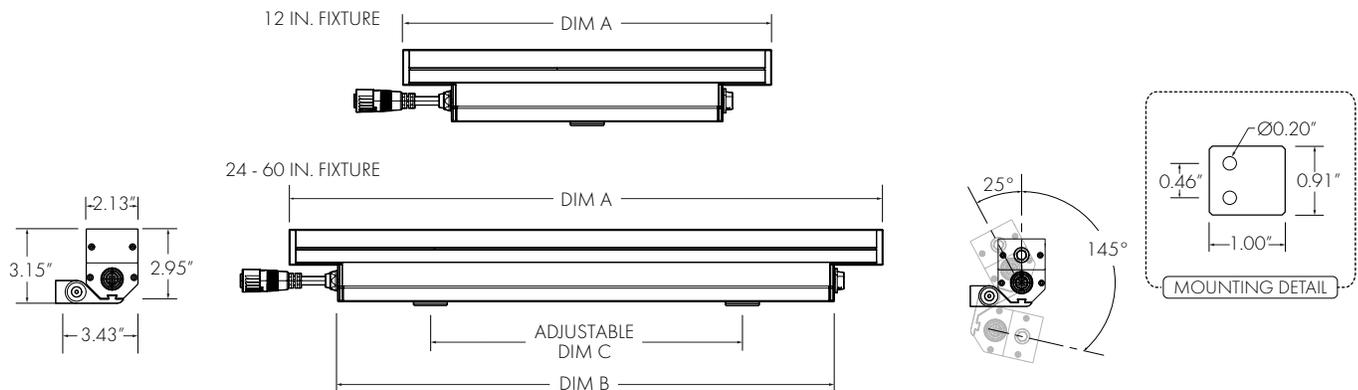
FIXED MOUNT (SA28170-1 / SA28170)



HINGE MOUNT (SA28104-1 / SA28104)



WALL MOUNT (SA28105-1 / SA28105)

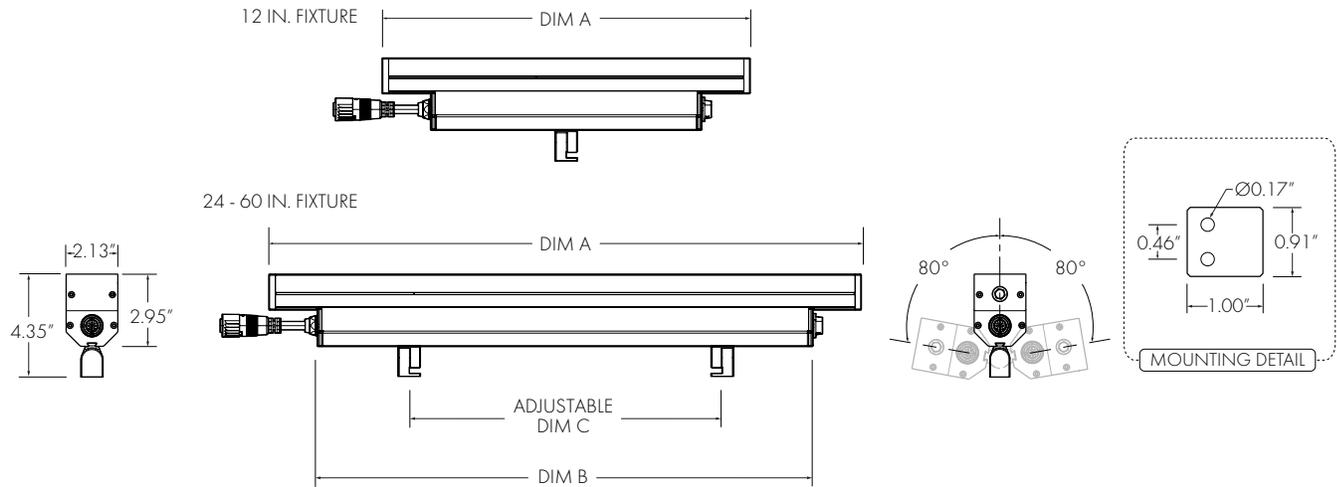


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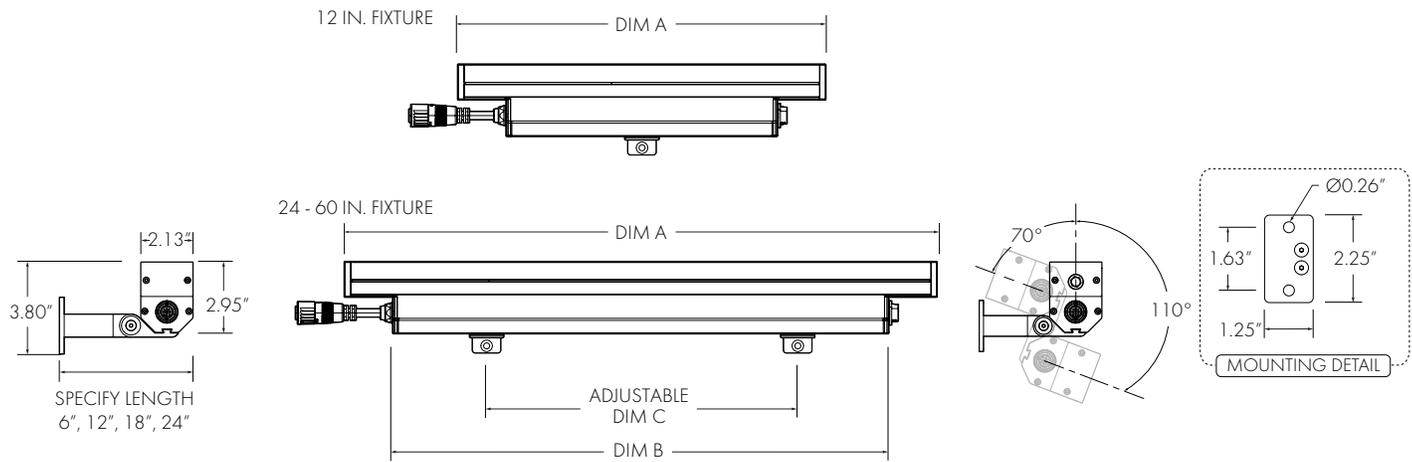
DIMENSIONS

DIMENSION	12.00"	24.00"	36.00"	48.00"	60.00"
DIM A	12.56"	24.37"	36.18"	48.00"	59.81"
DIM B	8.60"	20.24"	32.06"		55.68"
DIM C	NA	6.00" MIN 12.00" MAX	12.00" MIN 24.00" MAX	18.00" MIN 30.00" MAX	24.00" MIN 36.00" MAX

GROUND MOUNT (SA28106-1/ SA28106)



EXTENDED ARM, WALL MOUNT (SA28107-1-X/ SA28107-X)

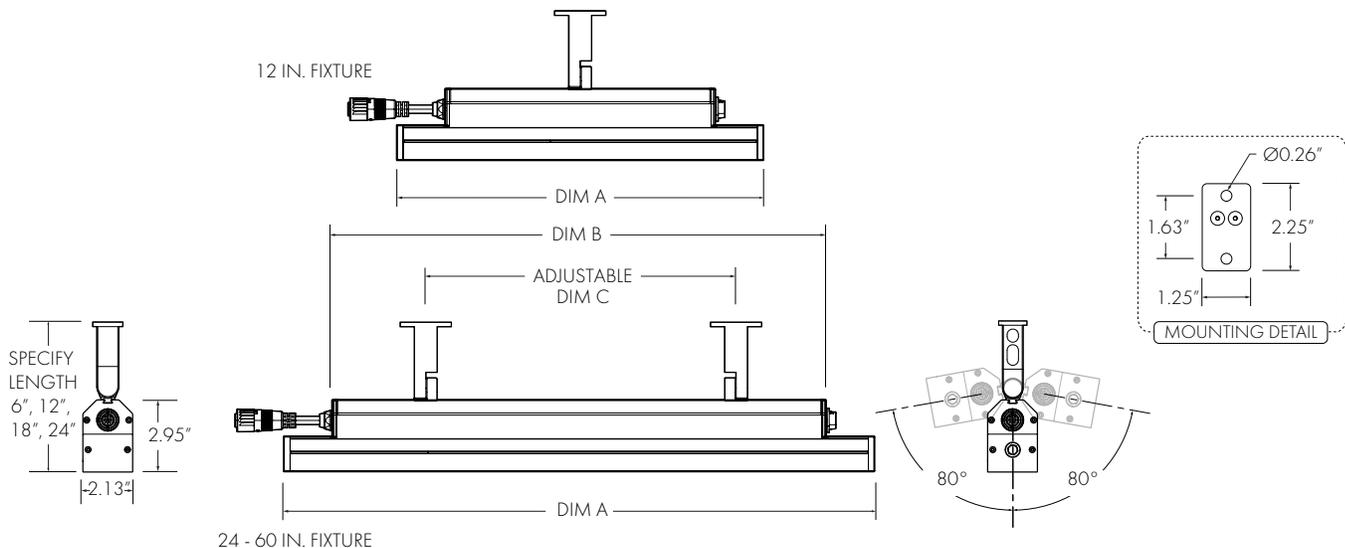


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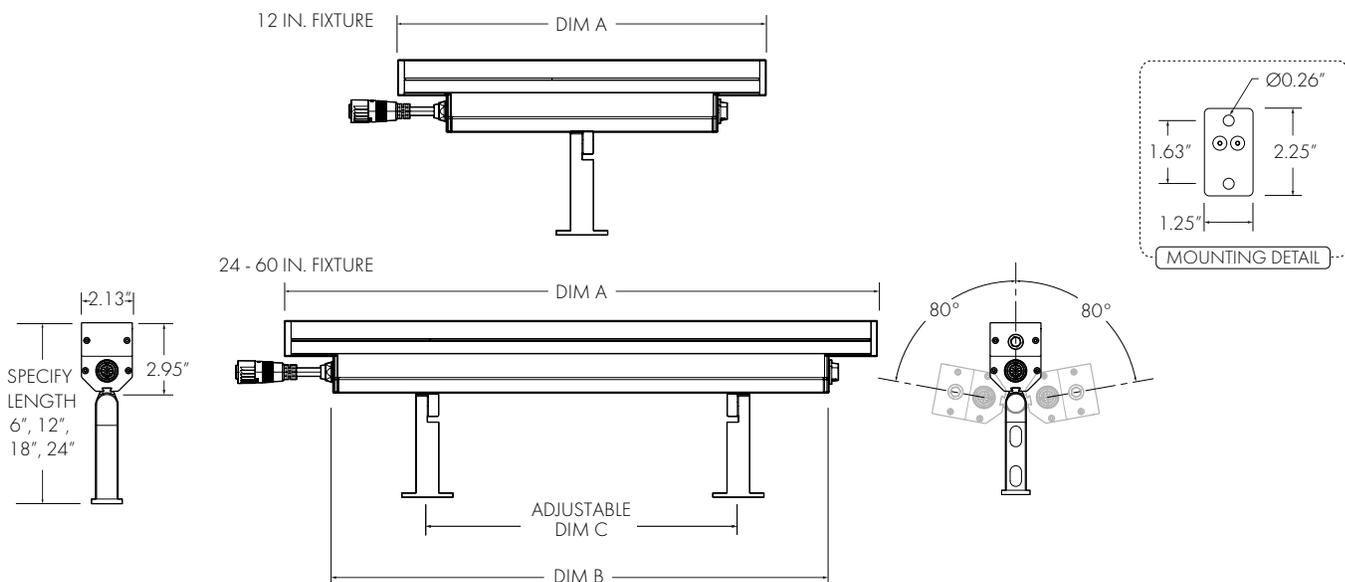
DIMENSIONS

DIMENSION	12.00"	24.00"	36.00"	48.00"	60.00"
DIM A	12.56"	24.37"	36.18"	48.00"	59.81"
DIM B	8.60"	20.24"	32.06"		55.68"
DIM C	NA	6.00" MIN 12.00" MAX	12.00" MIN 24.00" MAX	18.00" MIN 30.00" MAX	24.00" MIN 36.00" MAX

PENDANT MOUNT (SA28108-1-X/ SA28108-X)



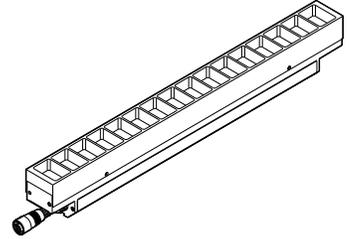
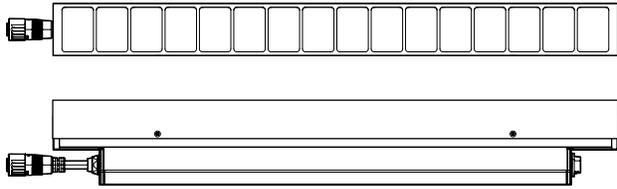
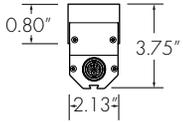
EXTENDED ARM, GROUND MOUNT (SA28108-1-X/ SA28108-X)



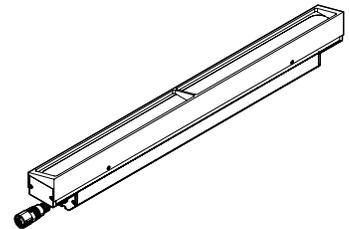
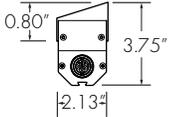
PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

SHIELDING ACCESSORIES

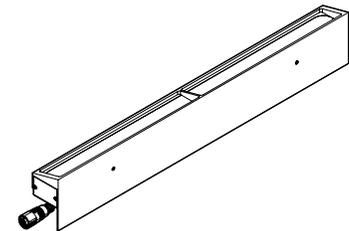
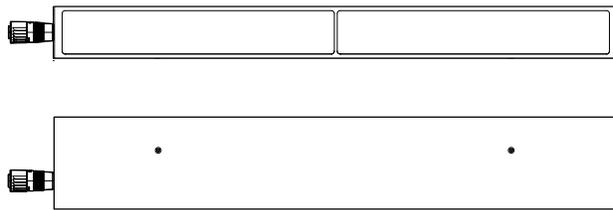
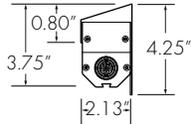
LOUVER (SA28111-X)



VISOR (SA28112-x)



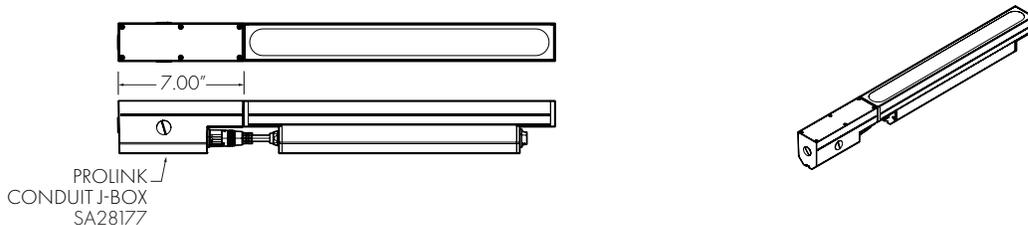
SHIELD (SA28113-x)



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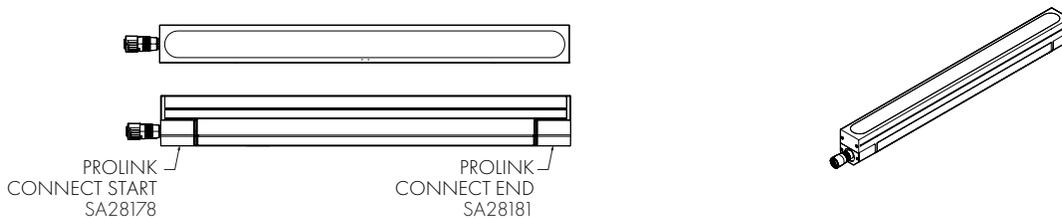
PROLINK TECHNOLOGY

PROLINK CONDUIT J-BOX

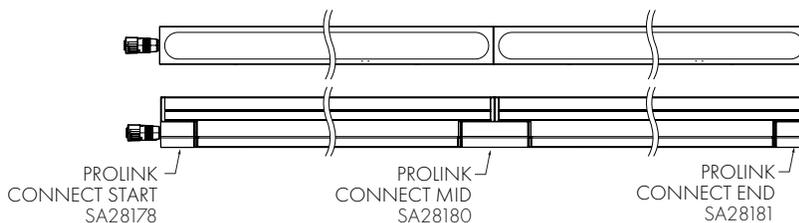


PROLINK CONNECT - WIRE COVER

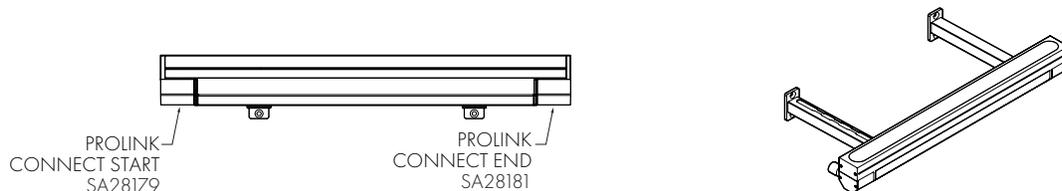
SINGLE FIXTURE



CONTINUOUS RUN

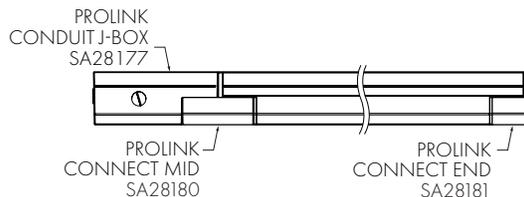


EXTENDED ARM WALL MOUNT



EXAMPLE OF PROLINK CONDUIT BOX AND CONNECT

SINGLE FIXTURE



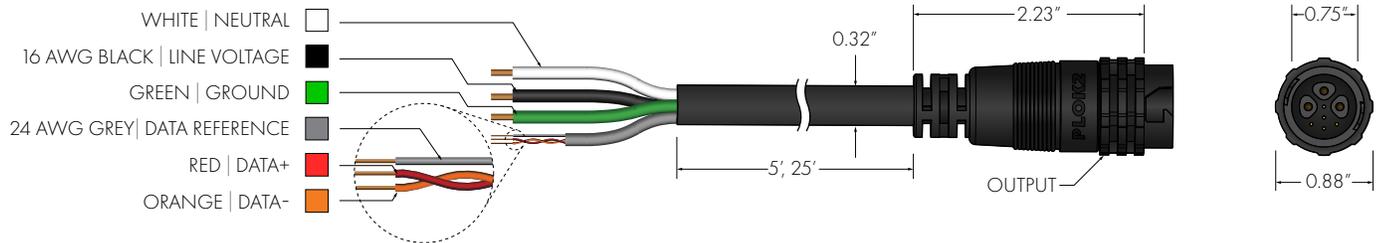
CONTINUOUS RUN



PROJECT: _____ TYPE: _____ FIXTURE CATALOG #: AP - - - - -

CABLES

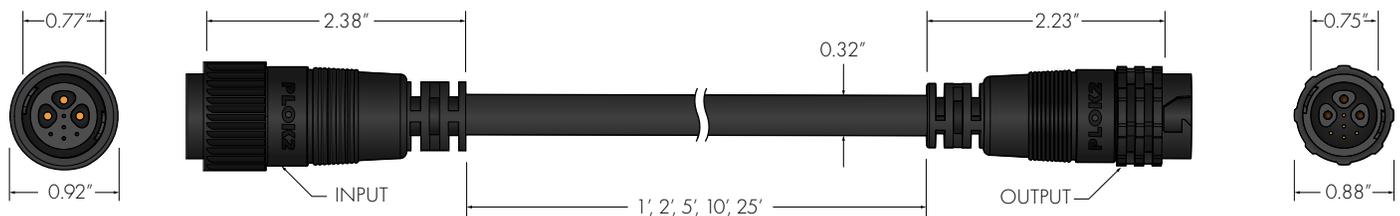
LEADER (EL12430-X-X) BLACK | 3x16AWG | 3x24AWG | 105°C | 600V | IP67



LEADER CABLES - REQUIRED	
5.0 FT LEADER CABLE, BLACK	EL12430-5-B
10.0 FT LEADER CABLE, BLACK	EL12430-10-B

LEADER CABLES - REQUIRED	
5.0 FT LEADER CABLE, WHITE	EL12430-5-W
10.0 FT LEADER CABLE, WHITE	EL12430-10-W

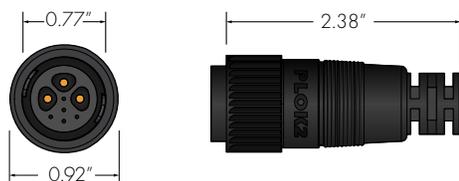
JUMPER (EL12288-X-X) BLACK | 3x16AWG | 3x24AWG | 105°C | 600V | IP67



EXTERIOR JUMPER CABLES FOR PLUG AND PLAY SYSTEMS - OPTIONAL	
1.0 FT JUMPER CABLE, BLACK	EL12288-1-B
2.0 FT JUMPER CABLE, BLACK	EL12288-2-B
5.0 FT JUMPER CABLE, BLACK	EL12288-5-B
10.0 FT JUMPER CABLE, BLACK	EL12288-10-B
25.0 FT JUMPER CABLE, BLACK	EL12288-25-B

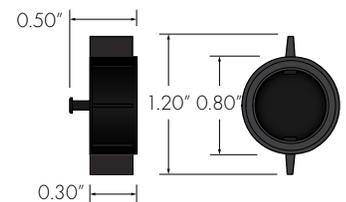
EXTERIOR JUMPER CABLES FOR PLUG AND PLAY SYSTEMS - OPTIONAL	
1.0 FT JUMPER CABLE, WHITE	EL12288-1-W
2.0 FT JUMPER CABLE, WHITE	EL12288-2-W
5.0 FT JUMPER CABLE, WHITE	EL12288-5-W
10.0 FT JUMPER CABLE, WHITE	EL12288-10-W
25.0 FT JUMPER CABLE, WHITE	EL12288-25-W

DMX TERMINATOR (EL12291-X) BLACK | 105°C | 600V



DMX TERMINATOR - ONE REQUIRED PER DMX RUN	
DMX TERMINATOR, BLACK	EL12291-B
DMX TERMINATOR, WHITE	EL12291-W

AC CAP (EL11900-X) BLACK | 105°C | 600V | IP67



AC CONNECTOR CAP - REQUIRED FOR NO DIMMING/0-10V DIMMING	
CONNECTOR CAP, BLACK	EL11900-B
CONNECTOR CAP, WHITE	EL11900-W

CONCEPT, TYPE 4X



INDUSTRY STANDARDS

Mounting brackets required to meet UL/CSA external mounting requirements.

UL 508A Listed; Type 3R, 4, 4X, 12; File No. E61997
 cUL Listed per CSA C22.2 No 94; Type 3R, 4, 4X, 12; File No. E61997

NEMA/EEMAC Type 3R, 4, 4X, 12, 13
 CSA File No. 42186: Type 4, 4X, 12
 VDE IP66
 IEC 60529, IP66
 Meets NEMA Type 3RX requirements

APPLICATION

For indoor or outdoor applications that require corrosion protection from chemicals and water. Concept Enclosures feature streamlined styling with an attractive stroked finish and flush quarter-turn latches for secure closure. Available in solid- and window-door models.

SPECIFICATIONS

- Manufactured from Type 304 or Type 316L stainless steel
- Minimum-width body flange provides maximum body opening
- External formed 90-degree body flange
- Panel mounting studs fit optional Concept panels and other accessories
- Mounting holes in back of body for direct mounting or for optional external mounting brackets
- Type 316 stainless steel hidden hinges promote clean aesthetic appearance
- Corner formed doors are interchangeable and easily removed by pulling clip-style hinge pins
- Provision on door (except window-door style and when B = 12 in.) for thermoplastic data pocket
- Provision on door (except window-door style and when B = 12 in.) for optional doorstop kit
- Quarter-turn latches furnished with flush slotted insert
- Seamless foam-in-place gasket
- Self-grounding latch system with double seal
- Bonding provision on door; grounding stud on body
- Furnished hardware kit consists of panel-mounting nuts, panel-grounding hardware and sealing washers for wall-mounting holes
- Installation instructions
- Window doors have a clear polycarbonate window

FINISH

Door and body have smooth #4 brushed finish.

ACCESSORIES

- Type 316 Stainless Steel Door Stop Kit
- Concept panels
- H2Omit Vent Drains, Type 4X
- H2Omit Thermoelectric Dehumidifier
- Handles
- Lock Inserts
- HF Side-Mount Filter Fans
- Steel, Stainless Steel and Non-Metallic Window Kits
- PaneLite Enclosure Lights
- Hol-Sealers Hole Seals

MODIFICATION AND CUSTOMIZATION

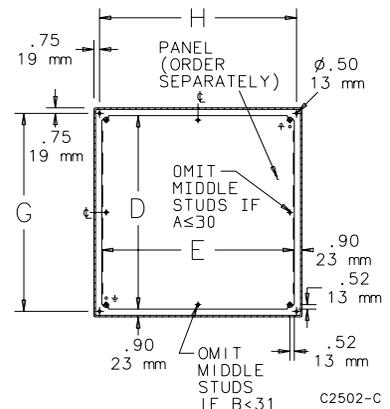
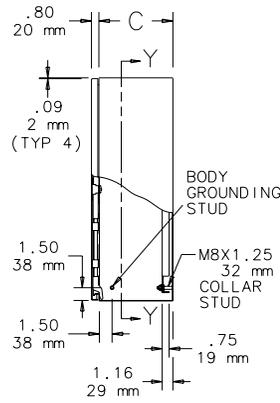
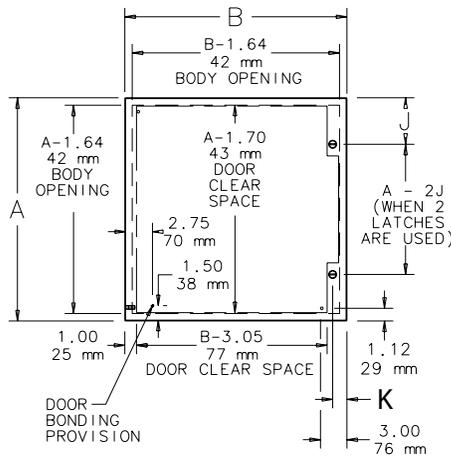
nVent HOFFMAN excels at modifying and customizing products to your specifications. Contact your local nVent HOFFMAN sales office or distributor for complete information.

BULLETIN: CWS

Standard Product **One-Door**

Catalog Number	AxBxC in.	AxBxC mm	Door Gauge	Body Gauge	Panel	Conductive Panel	Panel Size D x E (in.)	Panel Size G x H (mm)	Mounting G x H (in.)	Mounting G x H (mm)	Latches Qty.	Style	J (in.)	J (mm)
CSD12126SS	12.00 x 12.00 x 6.00	305 x 305 x 152	16	16	CP1212	CP1212G	10.20 x 10.20	259 x 259	10.50 x 10.50	267 x 267	1	Quarter-turn	6.00	152
CSD12126SS6	12.00 x 12.00 x 6.00	305 x 305 x 152	16	16	CP1212	CP1212G	10.20 x 10.20	259 x 259	10.50 x 10.50	267 x 267	1	Quarter-turn	6.00	152
CSD12246SS	12.00 x 24.00 x 6.00	305 x 610 x 152	16	16	CP2412	CP2412G	22.20 x 10.20	564 x 259	10.50 x 22.50	268 x 572	1	Quarter-turn	6.00	152
CSD12246SS6	12.00 x 24.00 x 6.00	305 x 610 x 152	16	16	CP2412	CP2412G	22.20 x 10.20	564 x 259	10.50 x 22.50	268 x 572	1	Quarter-turn	6.00	152
CSD16126SS	16.00 x 12.00 x 6.00	406 x 305 x 152	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD16126SS6	16.00 x 12.00 x 6.00	406 x 305 x 152	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD16166SS	16.00 x 16.00 x 6.00	406 x 406 x 152	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD16166SS6	16.00 x 16.00 x 6.00	406 x 406 x 152	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD20166SS	20.00 x 16.00 x 6.00	508 x 406 x 152	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD20166SS6	20.00 x 16.00 x 6.00	508 x 406 x 152	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD20206SS	20.00 x 20.00 x 6.00	508 x 508 x 152	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD20206SS6	20.00 x 20.00 x 6.00	508 x 508 x 152	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD24206SS	24.00 x 20.00 x 6.00	610 x 508 x 152	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD24206SS6	24.00 x 20.00 x 6.00	610 x 508 x 152	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD30166SS	30.00 x 16.00 x 6.00	762 x 406 x 152	16	16	CP3016	CP3016G	28.20 x 14.20	716 x 361	28.50 x 14.50	724 x 368	2	Quarter-turn	5.00	127
CSD30166SS6	30.00 x 16.00 x 6.00	762 x 406 x 152	16	16	CP3016	CP3016G	28.20 x 14.20	716 x 361	28.50 x 14.50	724 x 368	2	Quarter-turn	5.00	127
CSD16128SS	16.00 x 12.00 x 8.00	406 x 305 x 203	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD16128SS6	16.00 x 12.00 x 8.00	406 x 305 x 203	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD16168SS	16.00 x 16.00 x 8.00	406 x 406 x 203	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD16168SS6	16.00 x 16.00 x 8.00	406 x 406 x 203	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD16208SS	16.00 x 20.00 x 8.00	406 x 508 x 203	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 18.50	470 x 368	1	Quarter-turn	8.00	203
CSD16208SS6	16.00 x 20.00 x 8.00	406 x 508 x 203	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 18.50	470 x 368	1	Quarter-turn	8.00	203
CSD20168SS	20.00 x 16.00 x 8.00	508 x 406 x 203	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD20168SS6	20.00 x 16.00 x 8.00	508 x 406 x 203	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD20208SS	20.00 x 20.00 x 8.00	508 x 508 x 203	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD20208SS6	20.00 x 20.00 x 8.00	508 x 508 x 203	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD20248SS	20.00 x 24.00 x 8.00	508 x 610 x 203	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	18.50 x 22.50	470 x 572	1	Quarter-turn	10.00	254
CSD20248SS6	20.00 x 24.00 x 8.00	508 x 610 x 203	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	18.50 x 22.50	470 x 572	1	Quarter-turn	10.00	254
CSD24168SS	24.00 x 16.00 x 8.00	610 x 406 x 203	16	16	CP2416	CP2416G	22.20 x 14.20	564 x 361	22.50 x 14.50	572 x 368	1	Quarter-turn	12.00	305

Catalog Number	AxBxC in.	AxBxC mm	Door Gauge	Body Gauge	Panel	Conductive Panel	Panel Size D x E (in.)	Panel Size D x E (mm)	Mounting G x H (in.)	Mounting G x H (mm)	Latches Qty.	Style	J (in.)	J (mm)
CSD24168SS6	24.00 x 16.00 x 8.00	610 x 406 x 203	16	16	CP2416	CP2416G	22.20 x 14.20	564 x 361	22.50 x 14.50	572 x 368	1	Quarter-turn	12.00	305
CSD24208SS	24.00 x 20.00 x 8.00	610 x 508 x 203	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD24208SS6	24.00 x 20.00 x 8.00	610 x 508 x 203	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD24248SS	24.00 x 24.00 x 8.00	610 x 610 x 203	14	16	CP2424	CP2424	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD24248SS6	24.00 x 24.00 x 8.00	610 x 610 x 203	14	16	CP2424	CP2424G	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD24308SS	24.00 x 30.00 x 8.00	610 x 762 x 203	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD24308SS6	24.00 x 30.00 x 8.00	610 x 762 x 203	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD30208SS	30.00 x 20.00 x 8.00	762 x 508 x 203	14	16	CP3020	CP3020G	28.20 x 18.20	716 x 462	28.50 x 18.50	724 x 470	2	Quarter-turn	5.00	127
CSD30208SS6	30.00 x 20.00 x 8.00	762 x 508 x 203	14	16	CP3020	CP3020G	28.20 x 18.20	716 x 462	28.50 x 18.50	724 x 470	2	Quarter-turn	5.00	127
CSD30248SS	30.00 x 24.00 x 8.00	762 x 610 x 203	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD30248SS6	30.00 x 24.00 x 8.00	762 x 610 x 203	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD30308SS	30.00 x 30.00 x 8.00	762 x 762 x 203	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD30308SS6	30.00 x 30.00 x 8.00	762 x 762 x 203	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD36248SS	36.00 x 24.00 x 8.00	914 x 610 x 203	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD36248SS6	36.00 x 24.00 x 8.00	914 x 610 x 203	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD36308SS	36.00 x 30.00 x 8.00	914 x 762 x 203	14	16	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD36308SS6	36.00 x 30.00 x 8.00	914 x 762 x 203	14	16	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD161210SS	16.00 x 12.00 x 10.00	406 x 305 x 254	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD161210SS6	16.00 x 12.00 x 10.00	406 x 305 x 254	16	16	CP1612	CP1612G	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	1	Quarter-turn	8.00	203
CSD161610SS	16.00 x 16.00 x 10.00	406 x 406 x 254	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD161610SS6	16.00 x 16.00 x 10.00	406 x 406 x 254	16	16	CP1616	CP1616G	14.20 x 14.20	361 x 361	14.50 x 14.50	368 x 368	1	Quarter-turn	8.00	203
CSD162010SS	16.00 x 20.00 x 10.00	406 x 508 x 254	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	8.00	203
CSD162010SS6	16.00 x 20.00 x 10.00	406 x 508 x 254	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	8.00	203
CSD201610SS	20.00 x 16.00 x 10.00	508 x 406 x 254	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD201610SS6	20.00 x 16.00 x 10.00	508 x 406 x 254	16	16	CP2016	CP2016G	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	1	Quarter-turn	10.00	254
CSD202010SS	20.00 x 20.00 x 10.00	508 x 508 x 254	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD202010SS6	20.00 x 20.00 x 10.00	508 x 508 x 254	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD202410SS	20.00 x 24.00 x 10.00	508 x 610 x 254	16	16	CP2420	CP2420G	22.20 x 18.20	464 x 462	18.50 x 22.50	470 x 572	1	Quarter-turn	10.00	254
CSD202410SS6	20.00 x 24.00 x 10.00	508 x 610 x 254	16	16	CP2420	CP2420G	22.20 x 18.20	464 x 462	18.50 x 22.50	470 x 572	1	Quarter-turn	10.00	254
CSD241610SS	24.00 x 16.00 x 10.00	610 x 406 x 254	16	16	CP2416	CP2416G	22.20 x 14.20	564 x 361	22.50 x 14.50	572 x 368	1	Quarter-turn	12.00	305
CSD241610SS6	24.00 x 16.00 x 10.00	610 x 406 x 254	16	16	CP2416	CP2416G	22.20 x 14.20	564 x 361	22.50 x 14.50	572 x 368	1	Quarter-turn	12.00	305
CSD242010SS	24.00 x 20.00 x 10.00	610 x 508 x 254	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD242010SS6	24.00 x 20.00 x 10.00	610 x 508 x 254	16	16	CP2420	CP2420G	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	1	Quarter-turn	12.00	305
CSD242410SS	24.00 x 24.00 x 10.00	610 x 610 x 254	14	16	CP2424	CP2424G	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD242410SS6	24.00 x 24.00 x 10.00	610 x 610 x 254	14	16	CP2424	CP2424G	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD243010SS	24.00 x 30.00 x 10.00	610 x 762 x 254	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	22.50 x 28.50	572 x 724	2	Quarter-turn	5.00	127
CSD243010SS6	24.00 x 30.00 x 10.00	610 x 762 x 254	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	22.50 x 28.50	572 x 724	2	Quarter-turn	5.00	127
CSD302010SS	30.00 x 20.00 x 10.00	762 x 508 x 254	14	16	CP3020	CP3020G	28.20 x 18.20	716 x 462	28.50 x 18.50	724 x 470	2	Quarter-turn	5.00	127
CSD302010SS6	30.00 x 20.00 x 10.00	762 x 508 x 254	14	16	CP3020	CP3020G	28.20 x 18.20	716 x 462	28.50 x 18.50	724 x 470	2	Quarter-turn	5.00	127
CSD302410SS	30.00 x 24.00 x 10.00	762 x 610 x 254	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD302410SS6	30.00 x 24.00 x 10.00	762 x 610 x 254	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD303010SS	30.00 x 30.00 x 10.00	762 x 762 x 254	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD303010SS6	30.00 x 30.00 x 10.00	762 x 762 x 254	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD362410SS	36.00 x 24.00 x 10.00	914 x 610 x 254	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD362410SS6	36.00 x 24.00 x 10.00	914 x 610 x 254	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD363010SS	36.00 x 30.00 x 10.00	914 x 762 x 254	14	16	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD363010SS6	36.00 x 30.00 x 10.00	914 x 762 x 254	14	16	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD422410SS	42.00 x 24.00 x 10.00	1067 x 610 x 254	14	14	CP2442	CP2442G	22.20 x 40.20	564 x 1021	40.50 x 22.50	1029 x 572	1	3-point	21.00	533
CSD422410SS6	42.00 x 24.00 x 10.00	1067 x 610 x 254	14	14	CP2442	CP2442G	22.20 x 40.20	564 x 1021	40.50 x 22.50	1029 x 572	1	3-point	21.00	533
CSD423010SS	42.00 x 30.00 x 10.00	1067 x 762 x 254	14	14	CP4230	CP4230G	40.20 x 28.20	1021 x 716	40.50 x 28.50	1029 x 724	1	3-point	21.00	533
CSD423010SS6	42.00 x 30.00 x 10.00	1067 x 762 x 254	14	14	CP4230	CP4230G	40.20 x 28.20	1021 x 716	40.50 x 28.50	1029 x 724	1	3-point	21.00	533
CSD482410SS	48.00 x 24.00 x 10.00	1219 x 610 x 254	14	14	CP4824	CP4824G	46.20 x 22.20	1173 x 564	46.50 x 22.50	1181 x 572	1	3-point	24.00	610
CSD482410SS6	48.00 x 24.00 x 10.00	1219 x 610 x 254	14	14	CP4824	CP4824G	46.20 x 22.20	1173 x 564	46.50 x 22.50	1181 x 572	1	3-point	24.00	610
CSD202012SS	20.00 x 20.00 x 12.00	508 x 508 x 305	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD202012SS6	20.00 x 20.00 x 12.00	508 x 508 x 305	16	16	CP2020	CP2020G	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	1	Quarter-turn	10.00	254
CSD242412SS	24.00 x 24.00 x 12.00	610 x 610 x 305	14	16	CP2424	CP2424G	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD242412SS6	24.00 x 24.00 x 12.00	610 x 610 x 305	14	16	CP2424	CP2424G	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	2	Quarter-turn	5.00	127
CSD302412SS	30.00 x 24.00 x 12.00	762 x 610 x 305	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD302412SS6	30.00 x 24.00 x 12.00	762 x 610 x 305	14	16	CP3024	CP3024G	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	2	Quarter-turn	5.00	127
CSD303012SS	30.00 x 30.00 x 12.00	762 x 762 x 305	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD303012SS6	30.00 x 30.00 x 12.00	762 x 762 x 305	14	16	CP3030	CP3030G	28.20 x 28.20	716 x 716	28.50 x 28.50	724 x 724	2	Quarter-turn	5.00	127
CSD362412SS	36.00 x 24.00 x 12.00	914 x 610 x 305	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD362412SS6	36.00 x 24.00 x 12.00	914 x 610 x 305	14	16	CP3624	CP3624G	34.20 x 22.20	869 x 564	34.50 x 22.50	876 x 572	2	Quarter-turn	5.00	127
CSD363012SS	36.00 x 30.00 x 12.00	914 x 762 x 305	14	14	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD363012SS6	36.00 x 30.00 x 12.00	914 x 762 x 305	14	14	CP3630	CP3630G	34.20 x 28.20	869 x 716	34.50 x 28.50	876 x 724	2	Quarter-turn	5.00	127
CSD242416SS	24.00 x 24.00 x 16													


 SECTION Y-Y
(WITH PANEL INSTALLED)

Standard Product One-Door with Window

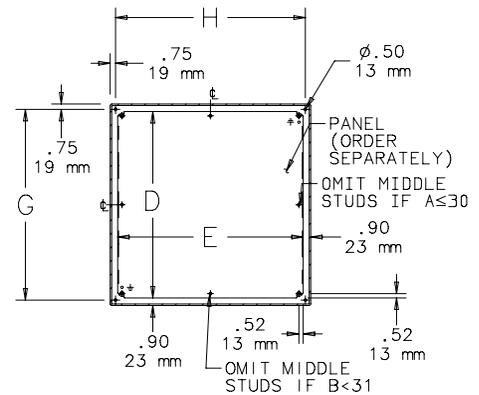
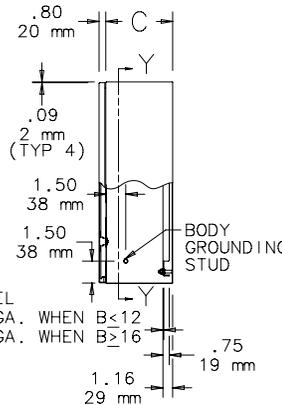
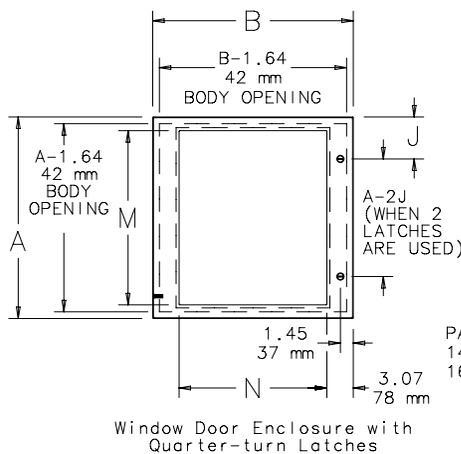
Catalog Number	AxBxC in.	AxBxC mm	Door Ga.	Body Ga.	Panel	Panel Size D x E (in.)	Panel Size D x E (mm)	Mounting G x H (in.)	Mounting G x H (mm)	Window Size M x N (in.)	Window Size M x N (mm)	Latch Qty.	Style	J (in.)	J (mm)
CSD12126WSS	12.00 x 12.00 x 6.00	305 x 305 x 152	16	16	CP1212	10.20 x 10.20	259 x 259	10.50 x 10.50	267 x 267	8.74 x 7.10	222 x 180	1	Quarter-turn	6.00	152
CSD16126WSS	16.00 x 12.00 x 6.00	406 x 305 x 152	16	16	CP1612	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	12.74 x 7.10	324 x 180	1	Quarter-turn	8.00	203
CSD20166WSS	20.00 x 16.00 x 6.00	508 x 406 x 152	16	16	CP2016	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	16.74 x 11.10	425 x 282	1	Quarter-turn	10.00	254
CSD20206WSS	20.00 x 20.00 x 6.00	508 x 508 x 152	16	16	CP2020	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	16.74 x 15.10	425 x 384	1	Quarter-turn	10.00	254
CSD20168WSS	20.00 x 16.00 x 8.00	508 x 406 x 203	16	16	CP2016	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	16.74 x 11.10	425 x 282	1	Quarter-turn	10.00	254
CSD20208WSS	20.00 x 20.00 x 8.00	508 x 508 x 203	16	16	CP2020	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	16.74 x 15.10	425 x 384	1	Quarter-turn	10.00	254
CSD24208WSS	24.00 x 20.00 x 8.00	610 x 508 x 203	16	16	CP2420	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	20.74 x 15.10	527 x 384	1	Quarter-turn	12.00	305
CSD24248WSS	24.00 x 24.00 x 8.00	610 x 610 x 203	14	16	CP2424	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	20.74 x 17.68	527 x 449	2	Quarter-turn	5.00	127
CSD30248WSS	30.00 x 24.00 x 8.00	762 x 610 x 203	14	16	CP3024	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	26.74 x 17.68	679 x 449	2	Quarter-turn	5.00	127
CSD161210WSS	16.00 x 12.00 x 10.00	406 x 305 x 254	16	16	CP1612	14.20 x 10.20	361 x 259	14.50 x 10.50	368 x 267	12.74 x 7.10	324 x 180	1	Quarter-turn	8.00	203
CSD201610WSS	20.00 x 16.00 x 10.00	508 x 406 x 254	16	16	CP2016	18.20 x 14.20	462 x 361	18.50 x 14.50	470 x 368	16.74 x 11.10	425 x 282	1	Quarter-turn	10.00	254
CSD202010WSS	20.00 x 20.00 x 10.00	508 x 508 x 254	16	16	CP2020	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	16.74 x 15.10	425 x 384	1	Quarter-turn	10.00	254
CSD242010WSS	24.00 x 20.00 x 10.00	610 x 508 x 254	16	16	CP2420	22.20 x 18.20	564 x 462	22.50 x 18.50	572 x 470	20.74 x 15.10	527 x 384	1	Quarter-turn	12.00	305
CSD242410WSS	24.00 x 24.00 x 10.00	610 x 610 x 254	14	16	CP2424	22.20 x 22.20	564 x 564	22.50 x 22.50	572 x 572	20.74 x 17.68	527 x 449	2	Quarter-turn	5.00	127
CSD302410WSS	30.00 x 24.00 x 10.00	762 x 610 x 254	14	16	CP3024	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	26.74 x 17.68	679 x 449	2	Quarter-turn	5.00	127
CSD202012WSS	20.00 x 20.00 x 12.00	508 x 508 x 305	14	16	CP2020	18.20 x 18.20	462 x 462	18.50 x 18.50	470 x 470	16.74 x 15.10	425 x 384	1	Quarter-turn	10.00	254
CSD302412WSS	30.00 x 24.00 x 12.00	762 x 610 x 305	14	16	CP3024	28.20 x 22.20	716 x 564	28.50 x 22.50	724 x 572	26.74 x 17.68	679 x 449	2	Quarter-turn	5.00	127

Purchase panels separately.

Optional NEMA style steel and stainless steel panels require conversion kit catalog number CCPM4.

Material is stainless steel Type 304.

For Conductive Panels, add a "C" to the panel catalog number.

CONCEPT Single-Door Wall-Mounted Enclosures with Windows

 SECTION Y-Y
(WITH PANEL INSTALLED)

T-SERIES COMPACT OUTDOOR


T15
800 BTU/Hr.
234 Watts

T20
2000 BTU/Hr.
586 Watts

INDUSTRY STANDARDS

UL/cUL Listed; Type 12, 3R, 4; 4X optional; File No. SA6453
UR/cUR Recognized

UR/cUR Recognized on select models, reference performance data tables.

CE
EAC
Telcordia GR-487 capable

APPLICATION

- Industrial automation
- Telecommunications equipment
- Package handling equipment
- Security and defense systems
- And more

FEATURES

- Stock models equipped with head pressure control for low-ambient operation, compressor heater, coated condenser coil, malfunction switch, thermostat and heater package
- R134A earth-friendly refrigerant
- Models for 115, 230 and 460 VAC power input
- UL Listed to save customers time and money with agency approvals (some models UL recognized)
- Outdoor model operating temperature range from -40 F/-40 C to 131 F/55 C
- Exterior and fully recessed mounting options on many models
- Compact footprint to minimize real estate and maximize capacity
- Reliable mechanical thermostat on enclosure side of the unit
- Dual condenser-side air movers for performance redundancy

- Painted galvanized sheet-metal cover for rugged factory and outdoor environments
- Easy-mount flanges for simple installation
- Cleanable, reusable aluminum mesh filter protects coils for maximum cooling performance
- Mounting hardware, gaskets and user manual furnished with the unit
- Every unit functionally tested before shipping
- Standard Outdoor Air Conditioner models also include:
 - Telcordia GR-487 capable
 - Thermostat
 - Corrosion-resistant components
 - Malfunction switch
 - Compressor heater
 - Head pressure control
 - Enclosure heater

FINISH

- RAL 7035 light-gray, semi-textured powder-coat paint
- Other colors and textures available

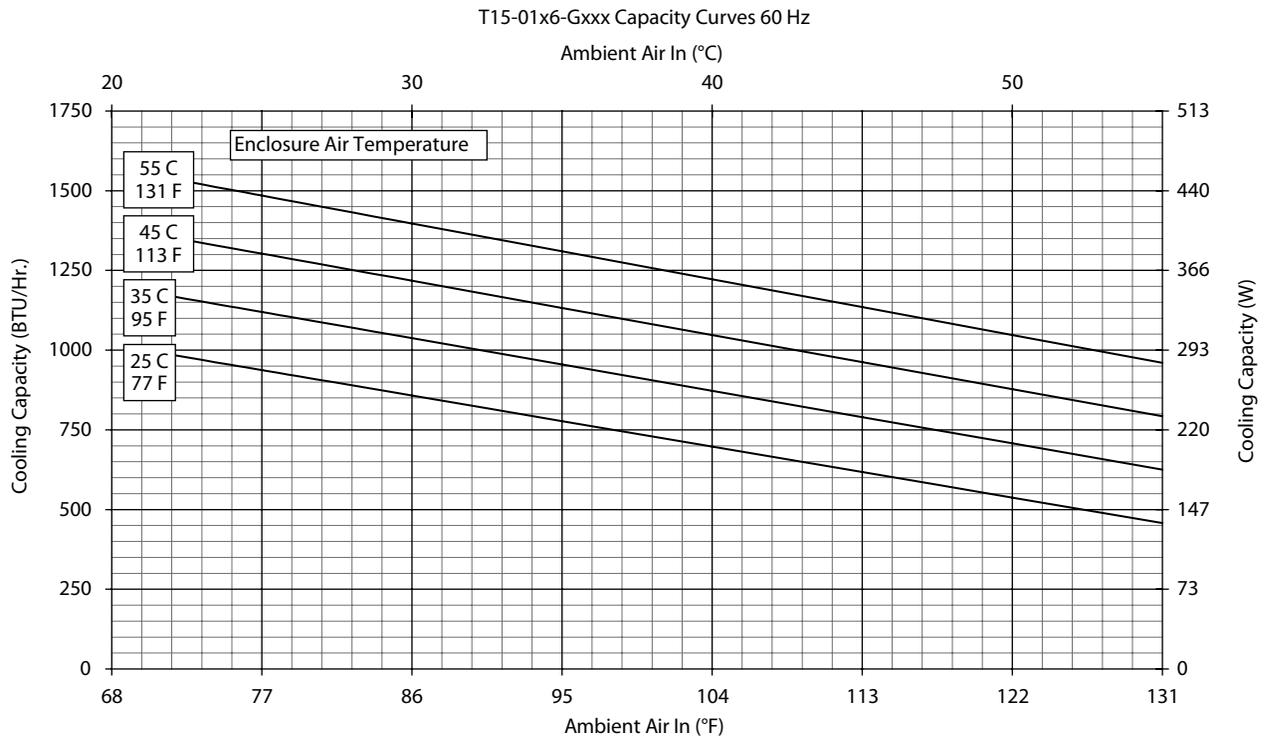
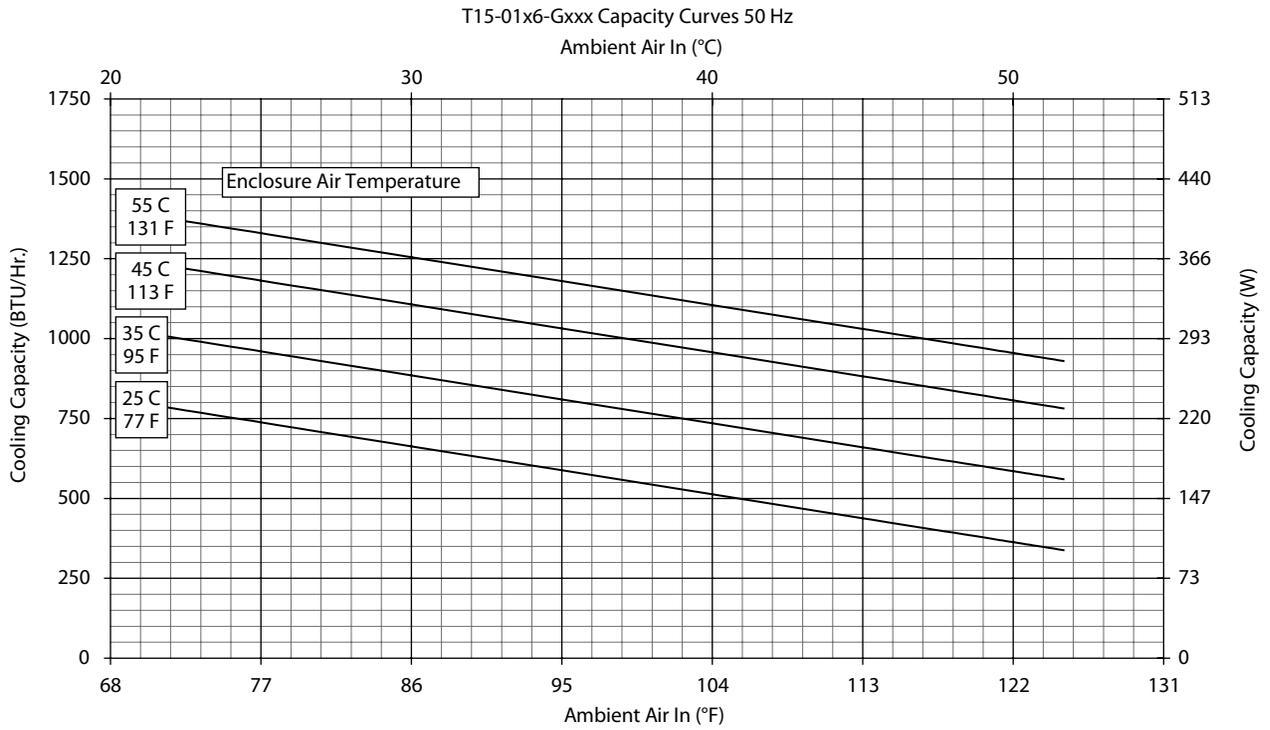
OPTIONS

- Thermostat Malfunction Package
- Special Voltage Package
- Outdoor Package
- Harsh Environment Package*
- Stainless Steel Package*
- Heater Package
 - * PROAIR A/C may be more appropriate. Refer to PROAIR A/C Chapter. Consult the Factory for availability and catalog number.

Performance Data T15 800 BTU/Hr. (234 Watt) Models

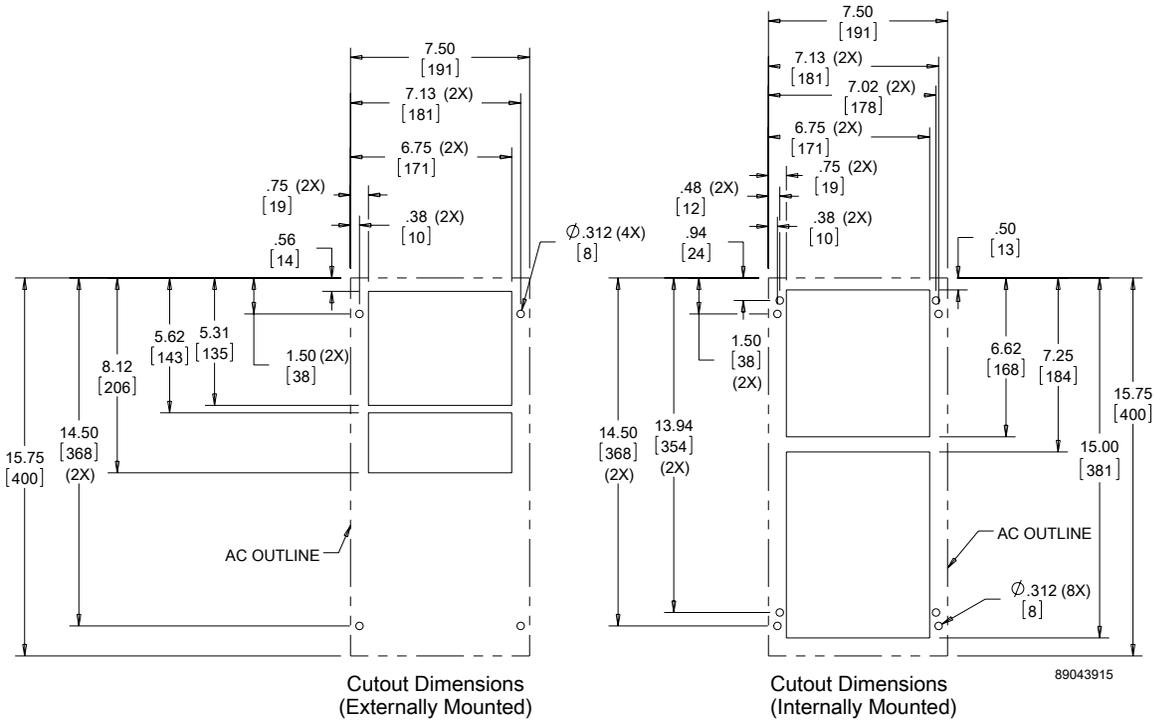
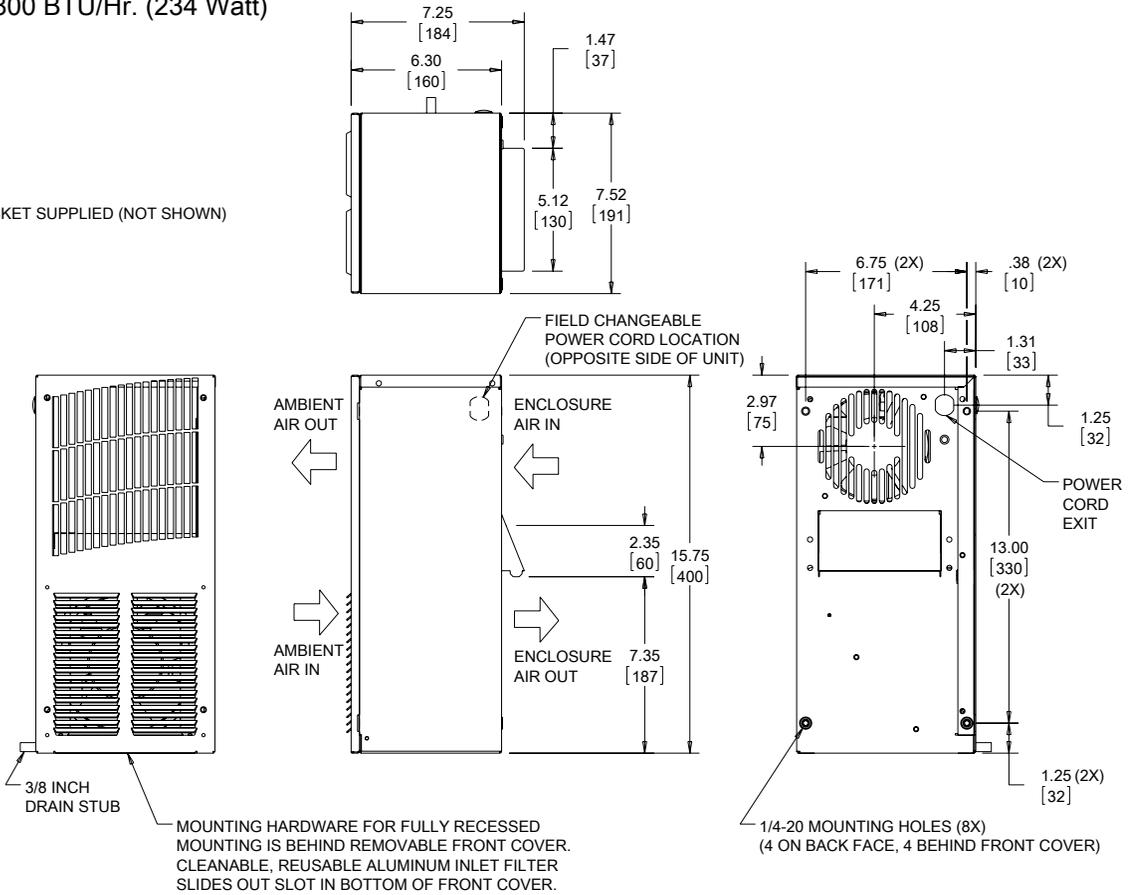
CATALOG NUMBER		
Indoor Model	T150116G120	T150126G120
Outdoor Model without Heat Pkg.	T150116G100	T150126G100
Outdoor Model with Heat Pkg.	T150116G150	T150126G150
Outdoor Model/SST/Corrosion/4X	T150116G152	T150126G104
Outdoor Model/SST/Corrosion/4X/Heater	T150116G151	-
COOLING PERFORMANCE		
Nominal:		
BTU/Hr.	800/800	800/900
Watts	235/235	235/264
At Maximum Operating Temperatures:		
BTU/Hr. (50/60 Hz)	819	920/960
W (50/60 Hz)	240	270/281
At 95 F/95 F (35 C/35 C):		
BTU/Hr. (50 /60 Hz)	948	810/955
W (50/60 Hz)	278	237/280
Refrigerant	R-134A	R-134A
Refrigerant Charge (ounces/grams)	4/113	3.8/107
Operating Temperature Range:		
Maximum (°F/°C)	125/131/52/55	125/131/52/55
Minimum (°F/°C)	-40/-40	-40/-40
Airflow at 0 Static Pressure:		
Internal loop 50 Hz (CFM / m ³ /hr.)	25/42	25/42
External loop 50 Hz (CFM / m ³ /hr.)	48/82	48/82
Internal loop 60 Hz (CFM / m ³ /hr.)	30/51	30/51
External loop 60 Hz (CFM / m ³ /hr.)	53/90	53/90
Max. Heater W (Outdoor Models)	150	150
ELECTRICAL DATA		
Rated Voltage	100/115	220/230
Frequency (Hz)	50/60	50/60
Operating Range	+/- 10%	+/- 10%
Max. Power Consumption (W at 50/60 Hz)	360/403	330/345
Max. Nominal Current (A at 50/60 Hz)	3.6/3.5	1.5/1.5
Starting Current (A)	8.0/9.2	3.3/3.1
Agency Approvals	UL/cUL Listed CE EAC Others available upon request	
Power Input Description	6-ft. cord with NEMA 5-15 plug	6-ft. cord with NEMA 6-15 plug
ENCLOSURE PROTECTION		
UL Type	Type 12, 3R, 4 standard Type 4X Stainless steel optional	
CONTROLLER		
Description	Basic mechanical thermostat	
Thermostat Location	Enclosure behind front panel	
Factory Thermostat Setting (°F/°C)	80/27	
SOUND LEVEL		
At 1.5 Meters	63 dB(A)	
UNIT CONSTRUCTION		
Material	Galvanized sheet metal standard Stainless steel optional	
Finish	RAL 7035 light-gray, semi-textured powder-coat paint standard	
UNIT DIMENSIONS		
Height (in./mm)	15.75/400	
Width (in./mm)	7.5/191	
Depth (in./mm)	6.3/160	
Weight (lb./kg)	27/12	

Performance Curves for T15 Models 800 BTU/Hr. (234 Watt)



T15 Models 800 BTU/Hr. (234 Watt)

NOTE:
 1. MOUNTING GASKET SUPPLIED (NOT SHOWN)
 2. UNITS: in. [mm]

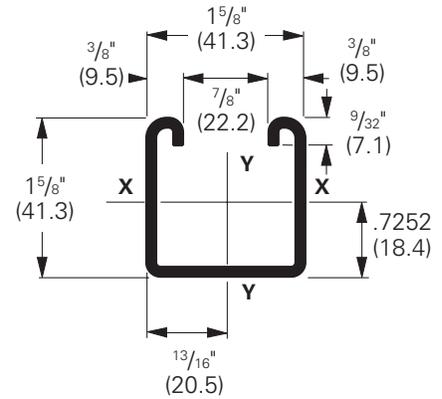
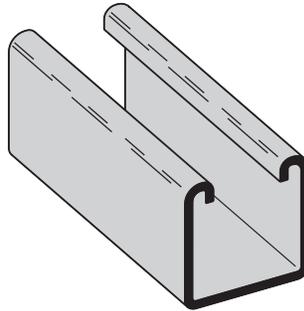


Visit www.nVent.com/HOFFMAN to download 2D and 3D CAD drawings into the overall design of your electrical system.

B22 Channel

B22

- Thickness: 12 Gauge (2.6 mm)
- Standard lengths: 10' (3.05 m) & 20' (6.09 m)
- Standard finishes: Plain, DURA GREEN™, Pre-Galvanized, Hot-Dipped Galvanized, Stainless Steel Type 304 or 316, Aluminum
- Weight: 1.90 Lbs./Ft. (2.83 kg/m)

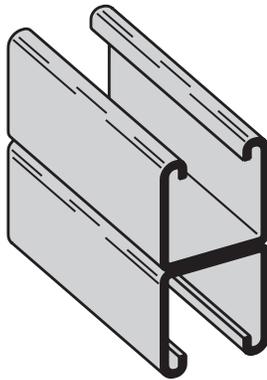


Note:

Aluminum loading, for B22 & B22A, can be determined by multiplying load data times a factor of 0.38

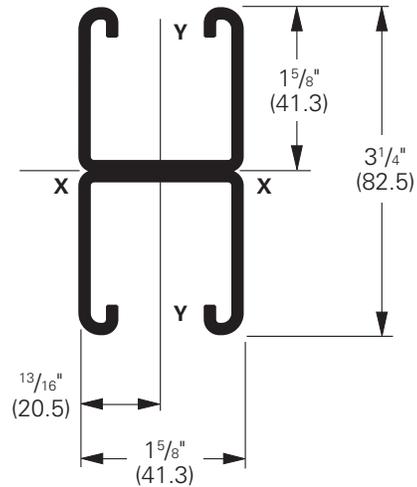
Section Properties			X - X Axis				Y - Y Axis				
Channel	Weight lbs./ft. kg/m	Areas of Section sq. in. cm ²	Moment of Inertia (I) in. ⁴ cm ⁴	Section Modulus (S) in. ³ cm ³	Radius of Gyration (r) in. cm	Moment of Inertia (I) in. ⁴ cm ⁴	Section Modulus (S) in. ³ cm ³	Radius of Gyration (r) in. cm			
B22	1.910 (2.84)	.562 (3.62)	.1912 (7.96)	.2125 (3.48)	.583 (1.48)	.2399 (9.99)	.2953 (4.84)	.653 (1.66)			
B22A	3.820 (5.69)	1.124 (7.25)	.9732 (40.51)	.5989 (9.81)	.931 (2.36)	.4798 (19.97)	.5905 (9.68)	.653 (1.66)			
B22X	6.649 (9.89)	1.956 (12.62)	4.1484 (172.67)	1.7019 (27.89)	1.456 (3.70)	1.1023 (45.88)	1.2027 (19.71)	.751 (1.91)			

Calculations of section properties are based on metal thicknesses as determined by the AISI Cold-Formed Steel Design Manual.

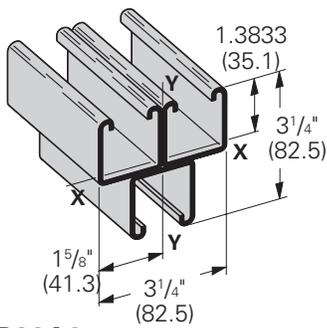


B22A

Wt. 3.80 Lbs./Ft. (5.65 kg/m)

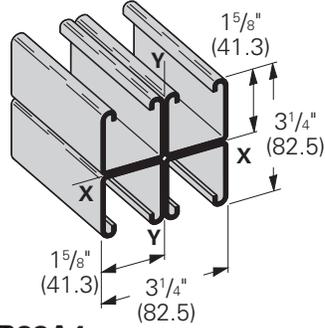


B22 Combinations



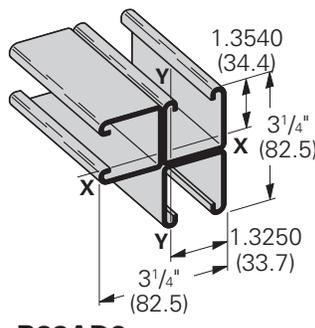
B22A3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



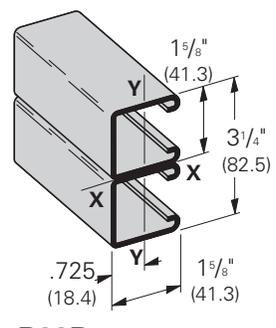
B22A4

Wt. 7.60 Lbs./Ft. (11.31 kg/m)



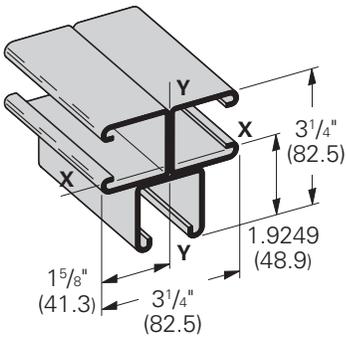
B22AD3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



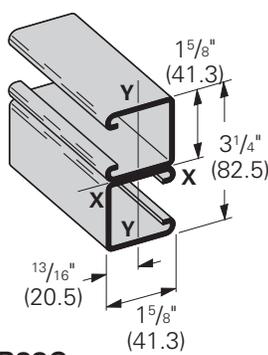
B22B

Wt. 3.80 Lbs./Ft. (5.65 kg/m)



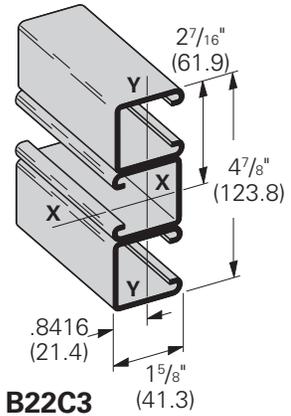
B22B3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



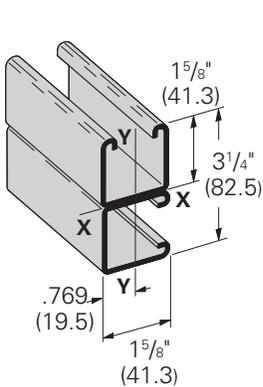
B22C

Wt. 3.80 Lbs./Ft. (5.65 kg/m)



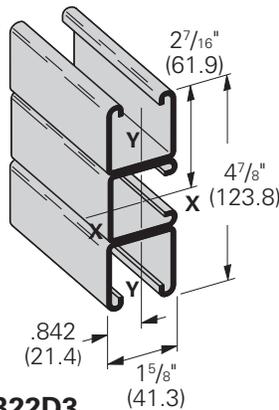
B22C3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



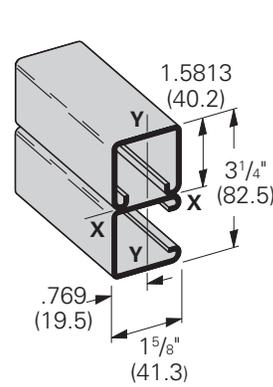
B22D

Wt. 3.80 Lbs./Ft. (5.65 kg/m)



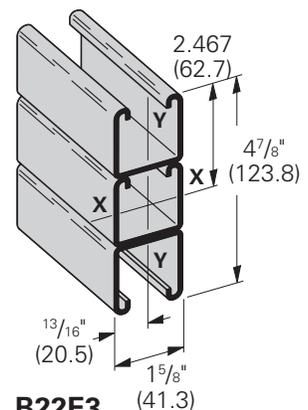
B22D3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



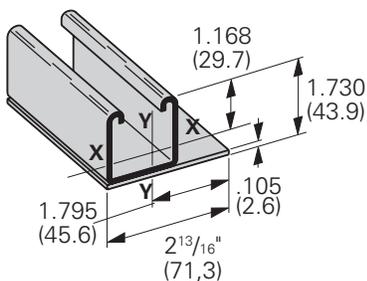
B22E

Wt. 3.80 Lbs./Ft. (5.65 kg/m)



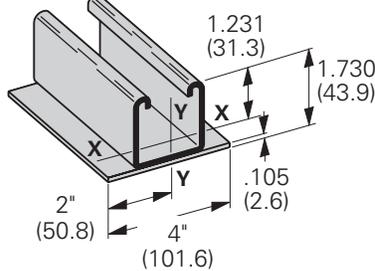
B22E3

Wt. 5.70 Lbs./Ft. (8.48 kg/m)



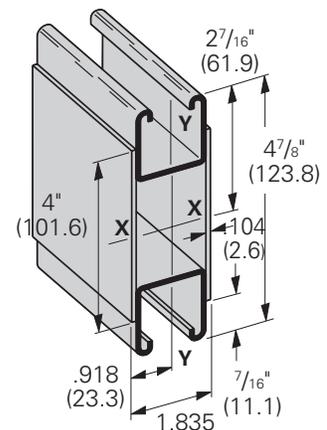
B22LPL

Wt. 2.90 Lbs./Ft. (4.31 kg/m)



B22PL

Wt. 3.35 Lbs./Ft. (4.98 kg/m)



B22X

Wt. 6.70 Lbs./Ft. (9.97 kg/m)

Reference page 48 for general fitting and standard finish specifications.

Channel & Combinations

B22 Beam loading data

Beam Loading

Beam Span In. mm	Channel Style	Uniform Load and Deflection				Uniform Load @ Deflection =			
		Lbs.	kN	In.	mm	1/240 Span Lbs.	kN	1/360 Span Lbs.	kN
12 (305)	B22	2610	(11.61)	.014	(.35)	2610	(11.61)	2610	(11.61)
	B22A	2610*	(11.61)	.002	(.05)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.001	(.02)	5790*	(25.75)	5790*	(25.75)
18 (457)	B22	2269	(10.09)	.031	(.79)	2269	(10.09)	2269	(10.09)
	B22A	2610*	(11.61)	.007	(.18)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.003	(.07)	5790*	(25.75)	5790*	(25.75)
24 (609)	B22	1702	(7.57)	.056	(1.42)	1702	(7.57)	1702	(7.57)
	B22A	2610*	(11.61)	.017	(.43)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.008	(.20)	5790*	(25.75)	5790*	(25.75)
30 (762)	B22	1361	(6.05)	.087	(2.21)	1361	(6.05)	1294	(5.75)
	B22A	2610*	(11.61)	.033	(.84)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.017	(.73)	5790*	(25.75)	5790*	(25.75)
36 (914)	B22	1135	(5.05)	.126	(3.20)	1135	(5.05)	899	(4.00)
	B22A	2610*	(11.61)	.057	(1.45)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.029	(.73)	5790*	(25.75)	5790*	(25.75)
42 (1067)	B22	972	(4.32)	.172	(4.37)	972	(4.32)	660	(2.93)
	B22A	2610*	(11.61)	.091	(2.31)	2610*	(11.61)	2610*	(11.61)
	B22X	5790*	(25.75)	.046	(1.17)	5790*	(25.75)	5790*	(25.75)
48 (1219)	B22	851	(3.78)	.224	(5.69)	758	(3.37)	505	(2.24)
	B22A	2405	(10.70)	.125	(3.17)	2405	(10.70)	2405	(10.70)
	B22X	5790*	(25.75)	.068	(1.73)	5790*	(25.75)	5790*	(25.75)
54 (1371)	B22	756	(3.36)	.284	(7.21)	599	(2.66)	399	(1.77)
	B22A	2138	(9.51)	.158	(4.01)	2138	(9.51)	2024	(9.00)
	B22X	5790*	(25.75)	.097	(2.46)	5790*	(25.75)	5790*	(25.75)
60 (1524)	B22	681	(3.03)	.351	(8.91)	485	(2.16)	323	(1.44)
	B22A	1924	(8.56)	.195	(4.95)	1924	(8.56)	1640	(7.29)
	B22X	5645	(25.11)	.130	(3.30)	5645	(25.11)	5645	(25.11)
66 (1676)	B22	619	(2.75)	.424	(10.77)	401	(1.78)	267	(1.19)
	B22A	1749	(7.78)	.236	(5.99)	1749	(7.78)	1355	(6.03)
	B22X	5132	(22.83)	.158	(4.01)	5132	(22.83)	5132	(22.83)
72 (1829)	B22	567	(2.52)	.505	(12.83)	337	(1.50)	225	(1.00)
	B22A	1603	(7.13)	.281	(7.14)	1603	(7.13)	1139	(5.06)
	B22X	4704	(20.92)	.188	(4.77)	4704	(20.92)	4704	(20.92)
78 (1981)	B22	524	(2.33)	.593	(15.06)	287	(1.27)	191	(0.85)
	B22A	1480	(6.58)	.330	(8.38)	1455	(6.47)	970	(4.31)
	B22X	4342	(19.31)	.220	(5.59)	4342	(19.31)	4270	(18.99)
84 (2133)	B22	486	(2.16)	.687	(17.45)	248	(1.10)	165	(0.73)
	B22A	1374	(6.11)	.383	(9.73)	1255	(5.58)	837	(3.72)
	B22X	4032	(17.93)	.255	(6.48)	4032	(17.93)	3682	(16.38)
90 (2286)	B22	454	(2.02)	.789	(20.04)	216	(0.96)	144	(0.64)
	B22A	1283	(5.71)	.440	(11.17)	1093	(4.86)	729	(3.24)
	B22X	3763	(16.74)	.293	(7.44)	3763	(16.74)	3207	(14.26)
96 (2438)	B22	425	(1.89)	.898	(22.81)	190	(0.84)	126	(0.56)
	B22A	1202	(5.35)	.500	(12.70)	961	(4.27)	640	(2.85)
	B22X	3528	(15.69)	.334	(8.48)	3528	(15.69)	2819	(12.54)
102 (2591)	B22	400	(1.78)	1.013	(25.73)	168	(0.75)	112	(0.50)
	B22A	1132	(5.03)	.565	(14.35)	851	(3.78)	567	(2.52)
	B22X	3320	(14.77)	.377	(9.57)	3320	(14.77)	2497	(11.11)
108 (2743)	B22	378	(1.68)	1.136	(28.85)	150	(0.67)	100	(0.44)
	B22A	1069	(4.75)	.633	(16.08)	759	(3.37)	506	(2.25)
	B22X	3136	(13.95)	.422	(10.72)	3136	(13.95)	2227	(9.90)
114 (2895)	B22	358	(1.59)	1.266	(32.15)	134	(0.59)	90	(0.40)
	B22A	1013	(4.50)	.706	(17.93)	681	(3.03)	454	(2.02)
	B22X	2971	(13.21)	.471	(11.96)	2971	(13.21)	1999	(8.89)
120 (3048)	B22	340	(1.51)	1.403	(35.63)	121	(0.54)	81	(0.36)
	B22A	962	(4.28)	.782	(19.86)	615	(2.73)	410	(1.82)
	B22X	2822	(12.55)	.521	(13.23)	2706	(12.04)	1804	(8.02)

Based on simple beam condition using an allowable design stress of 25,000 psi (172 MPa) in accordance with MFMA, with adequate lateral bracing (see page 12 for further explanation). Actual yield point of cold rolled steel is 42,000 psi. To determine concentrated load capacity at mid span, multiply uniform load by 0.5 and corresponding deflection by 0.8. *Failure determined by weld shear.

Reference page 48 for general fitting and standard finish specifications.

Column Loading

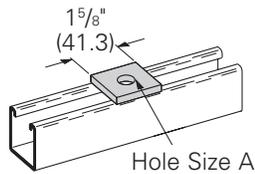
Unbraced Height		Channel Style	Max. Column Loading K = .80				Max. Column Loading (Loaded @ C.G.)					
			Loaded @ C.G.		Loaded @ Slot Face		K = .65		K = 1.0		K = 1.2	
			In.	mm	Lbs.	kN	Lbs.	kN	Lbs.	kN	Lbs.	kN
12	(305)	B22	10454	(46.50)	4276	(19.12)	10598	(47.14)	10222	(45.47)	9950	(44.26)
		B22A	21625	(96.19)	7002	(31.14)	21677	(96.42)	21539	(95.81)	21433	(95.34)
		B22X	46948	(208.83)	18975	(84.40)	47061	(209.34)	46761	(208.00)	46531	(206.98)
18	(457)	B22	9950	(44.26)	4153	(18.47)	10253	(45.62)	9481	(42.17)	8955	(39.83)
		B22A	21433	(95.34)	6959	(30.95)	21551	(95.86)	21239	(94.47)	21001	(93.42)
		B22X	46531	(206.98)	18859	(83.90)	46787	(208.12)	46110	(205.11)	45593	(202.81)
24	(609)	B22	9311	(41.42)	3993	(17.76)	9801	(43.60)	8582	(38.17)	7801	(34.70)
		B22A	21164	(94.14)	6898	(30.68)	21373	(95.07)	20819	(92.61)	20397	(90.73)
		B22X	45947	(204.38)	18693	(84.44)	46401	(206.40)	45198	(201.05)	44282	(196.97)
30	(762)	B22	8582	(38.17)	3802	(16.91)	9268	(41.22)	7601	(33.81)	6595	(29.33)
		B22A	20819	(92.61)	6821	(30.34)	21145	(94.06)	20279	(90.20)	19619	(87.27)
		B22X	45198	(201.05)	18485	(82.22)	45906	(204.20)	44026	(195.84)	42593	(189.46)
36	(914)	B22	7801	(34.70)	3589	(15.96)	8676	(38.59)	6595	(28.33)	5392	(23.98)
		B22A	20397	(90.73)	6728	(29.93)	20866	(92.81)	19619	(87.27)	18669	(83.04)
		B22X	44282	(196.97)	18233	(81.10)	45300	(201.50)	42593	(189.46)	40530	(180.28)
42	(1067)	B22	6998	(31.13)	3360	(14.94)	8048	(35.80)	5595	(24.89)	4444	(19.77)
		B22A	19898	(88.51)	6620	(29.45)	20537	(91.33)	18840	(83.80)	17546	(78.05)
		B22X	43198	(192.15)	17940	(79.80)	44586	(198.33)	40901	(181.94)	38092	(169.44)
48	(1219)	B22	6193	(27.55)	3118	(13.87)	7401	(32.92)	4718	(20.99)	3791	(16.86)
		B22A	19322	(85.95)	6496	(28.89)	20157	(89.66)	17940	(79.80)	16251	(72.29)
		B22X	41948	(186.59)	17604	(78.30)	43761	(194.57)	38948	(173.25)	35281	(156.94)
54	(1371)	B22	5392	(23.98)	2864	(12.74)	6746	(30.01)	4090	(18.19)	3310	(14.72)
		B22A	18669	(83.04)	6263	(27.86)	19276	(87.74)	16920	(75.26)	14782	(65.75)
		B22X	40530	(180.28)	16973	(75.50)	42825	(190.49)	36733	(163.39)	32092	(142.75)
60	(1524)	B22	4718	(20.99)	2631	(11.70)	6093	(27.10)	3616	(16.08)	2936	(13.06)
		B22A	17940	(79.80)	5340	(23.75)	19244	(85.60)	15781	(70.20)	13141	(58.45)
		B22X	38948	(173.25)	14471	(64.37)	41779	(185.84)	34260	(152.39)	28529	(126.90)
66	(1676)	B22	4202	(18.69)	2434	(10.83)	5441	(24.20)	3242	(14.42)	2634	(11.71)
		B22A	17134	(76.21)	4587	(20.40)	18712	(83.23)	14521	(64.59)	11328	(50.39)
		B22X	37198	(165.46)	12431	(55.29)	40624	(180.70)	31525	(140.23)	24593	(109.39)
72	(1829)	B22	3791	(16.86)	2264	(10.07)	4869	(21.66)	2936	(13.06)	2381	(10.59)
		B22A	16251	(72.29)	3968	(17.65)	18129	(80.64)	13141	(58.45)	9524	(42.36)
		B22X	35281	(156.94)	10753	(47.83)	39358	(175.07)	28529	(126.90)	20676	(91.97)
78	(1981)	B22	3456	(15.37)	2116	(9.41)	4412	(19.62)	2680	(11.92)	2166	(9.63)
		B22A	15291	(68.02)	3456	(15.37)	17496	(77.82)	11642	(51.78)	8115	(36.10)
		B22X	33197	(147.67)	9366	(41.66)	37984	(168.96)	25275	(112.43)	17617	(78.36)
84	(2133)	B22	3176	(14.13)	1984	(8.82)	4037	(17.96)	2461	(10.95)	1980	(8.81)
		B22A	14255	(63.41)	3028	(13.47)	16812	(74.78)	10076	(44.82)	6998	(31.13)
		B22X	30947	(137.66)	8206	(36.50)	36499	(162.35)	21875	(97.30)	15192	(67.58)
90	(2286)	B22	2936	(13.06)	1867	(8.30)	3724	(16.56)	2270	(10.10)	1816	(8.08)
		B22A	13141	(58.45)	2667	(11.86)	16077	(71.51)	8778	(39.04)	6096	(27.11)
		B22X	28529	(126.90)	7227	(32.15)	34903	(155.25)	19057	(84.77)	13234	(58.87)
96	(2438)	B22	2728	(16.58)	1761	(7.83)	3456	(15.37)	2101	(9.34)	1671	(7.43)
		B22A	11951	(53.16)	2359	(10.49)	15291	(68.02)	7715	(34.32)	5357	(23.83)
		B22X	25945	(115.41)	6393	(28.44)	33197	(147.67)	16749	(74.50)	11630	(51.73)
102	(2591)	B22	2545	(11.32)	1664	(7.40)	3225	(14.34)	1951	(8.68)	1542**	(6.34)
		B22A	10678	(47.50)	2093	(9.31)	14455	(64.30)	6834	(30.40)	4746	(21.11)
		B22X	23182	(103.12)	5672	(25.23)	31382	(139.59)	14836	(65.99)	10303	(45.83)
108	(2743)	B22	2381	(10.59)	1575	(7.00)	3022	(13.44)	1816	(8.08)	1426**	(68.60)
		B22A	9524	(42.36)	1867	(8.30)	13568	(60.35)	6096	(27.11)	4233	(18.83)
		B22X	20676	(91.97)	5059	(22.50)	29456	(131.03)	13234	(58.87)	9190	(40.88)
114	(2895)	B22	2234	(9.94)	1494	(6.64)	2842	(12.64)	1694	(7.53)	1322**	(5.88)
		B22A	8548	(38.02)	1675	(7.45)	12630	(56.18)	5471	(24.33)	3799**	(16.90)
		B22X	18558	(82.55)	4539	(20.19)	27420	(121.97)	11877	(52.83)	8247	(36.68)
120	(3048)	B22	2101	(9.34)	1418	(6.31)	2680	(11.92)	1583**	(7.04)	1228**	(5.46)
		B22A	7715	(34.32)	1512	(6.72)	11642	(51.78)	4937	(21.96)	3429**	(15.25)
		B22X	16749	(74.50)	4097	(18.22)	25275	(112.43)	10718	(47.67)	7444	(33.11)

**Where the slenderness ratio $\frac{KL}{r}$ exceeds 200, and K = end fixity factor, L = actual length and r = radius of gyration.

Reference page 48 for general fitting and standard finish specifications.

B200-B202-2

- Standard finishes: ZN, GRN, HDG, SS4, SS6, AL

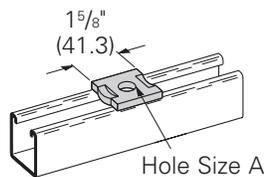


Square Washer

Part No.	A		Bolt Size		Wt./C	
	In.	mm	In.	mm	Lbs.	kg
B200	3/8"	(9.5)	5/16"	(7.9)	18	(8.1)
B201	7/16"	(11.1)	3/8"	(9.5)	18	(8.1)
B202	9/16"	(14.2)	1/2"	(12.7)	17	(7.7)
B202-1	11/16"	(17.4)	5/8"	(15.9)	16	(7.2)
B202-2	13/16"	(20.6)	3/4"	(19.0)	15	(6.8)
B202-3	15/16"	(23.8)	7/8"	(22.2)	14	(6.3)

B200D-B202-2D

- Standard finishes: ZN, GRN, HDG, SS4, SS6, AL



No Twist Square Washer

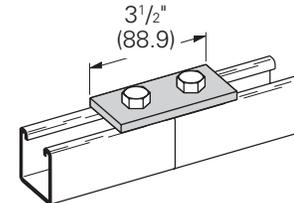
Part No.	A		Bolt Size		Wt./C	
	In.	mm	In.	mm	Lbs.	kg
B200D	3/8"	(9.5)	5/16"	(7.9)	18	(8.1)
B201D	7/16"	(11.1)	3/8"	(9.5)	18	(8.1)
B202D	9/16"	(14.2)	1/2"	(12.7)	17	(7.7)
B202-1D	11/16"	(17.4)	5/8"	(15.9)	16	(7.2)
B202-2D	13/16"	(20.6)	3/4"	(19.0)	15	(6.8)

B129

Two Hole Splice Plate

- Standard finishes: ZN, GRN
- Wt./C 37 Lbs. (16.8 kg)

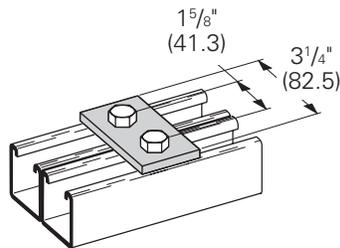
PA ^{ZN}
GRN



B340

Two Hole Splice Plate

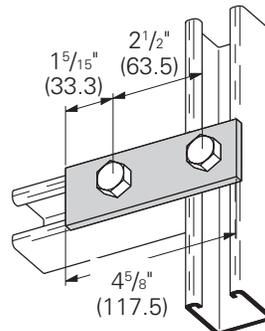
- Standard finishes: ZN, GRN
- Wt./C 34 Lbs. (15.4 kg)



B528

Two Hole Splice Plate

- Standard finishes: ZN, GRN
- Wt./C 50 Lbs. (22.7 kg)

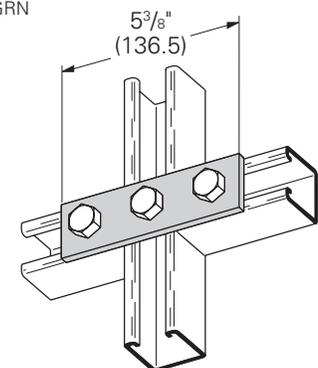


B141

Three Hole Splice Plate

- Standard finishes: ZN, GRN
- Wt./C 55 Lbs. (24.9 kg)

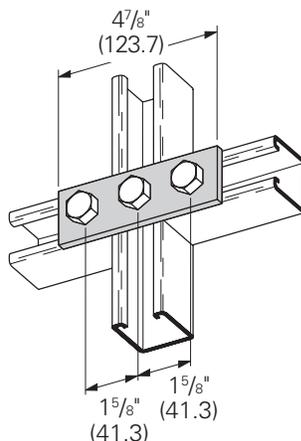
PA ^{ZN}
GRN



B557

Three Hole Splice Plate

- Standard finishes: ZN, GRN
- Wt./C 50 Lbs. (22.7 kg)

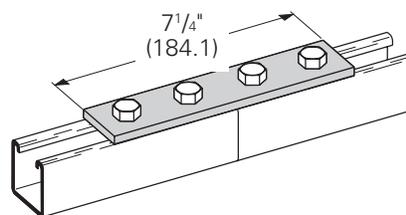


B341

Four Hole Splice Plate

- Standard finishes: ZN, GRN, HDG
- Wt./C 76 Lbs. (34.5 kg)

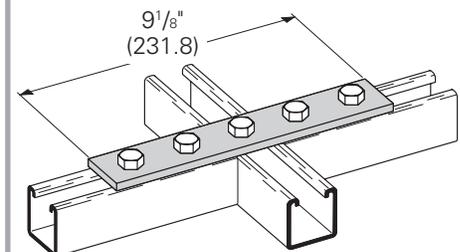
PA ^{ZN}
GRN



B342

Five Hole Splice Plate

- Standard finishes: ZN, GRN
- Wt./C 96 Lbs. (43.5 kg)

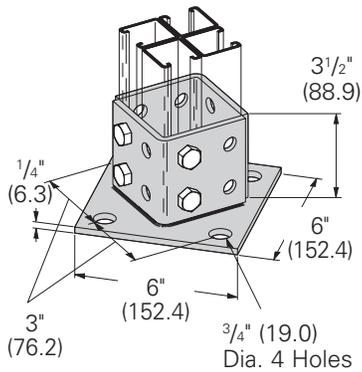


PA Pre-assembled fitting

Reference page 106 for general fitting and standard finish specifications.

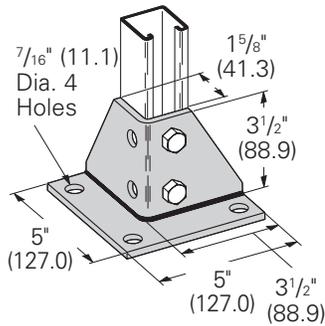
B570A Post Base for Four Channel Combinations

- Standard finishes: ZN, GRN
- Wt./C 550 Lbs. (249.5 kg)



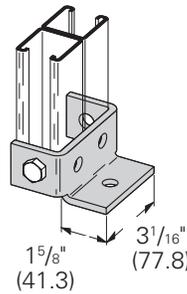
B278 Post Base for B22

- Standard finishes: ZN, GRN
- Wt./C 288 Lbs. (130.6 kg)



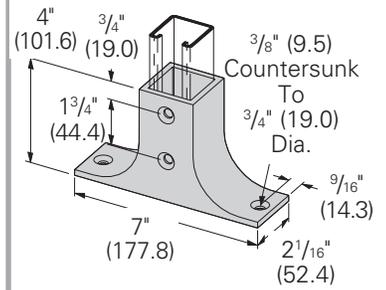
B585 Post Base for B22A

- Standard finishes: ZN, GRN
- Wt./C 97 Lbs. (44.0 kg)



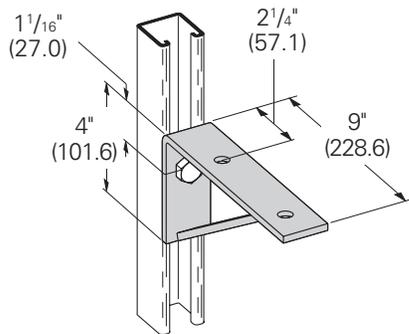
B300 Post Base

- Material: Malleable Iron
- Standard finishes: ZN, GRN
- Wt./C 259 Lbs. (117.5 kg)



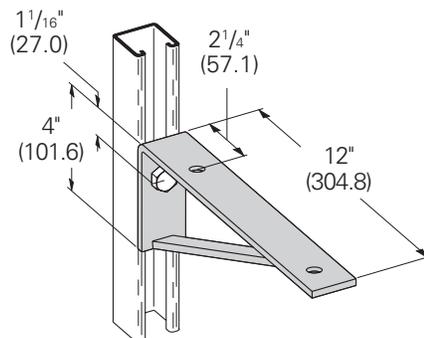
B187 Bracket

- Uniform Loading 1450 Lbs. (6.45 kN)
- Safety Factor of 2.5
- Hole Spacing on Bracket Top 5 5/16" (150.8) Center to Center
- Standard finishes: ZN, GRN
- Wt./C 193 Lbs. (87.5 kg)



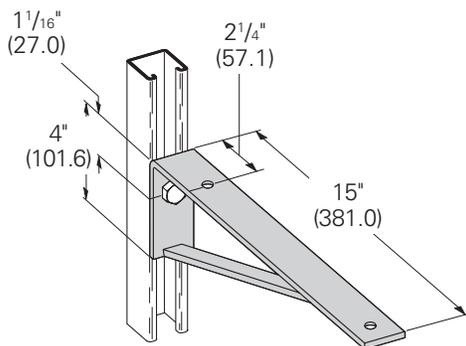
B188 Bracket

- Uniform Loading 1080 Lbs. (4.80 kN)
- Safety Factor of 2.5
- Hole Spacing on Bracket Top 8 15/16" (227.0) Center to Center
- Standard finishes: ZN, GRN
- Wt./C 241 Lbs. (109.3 kg)



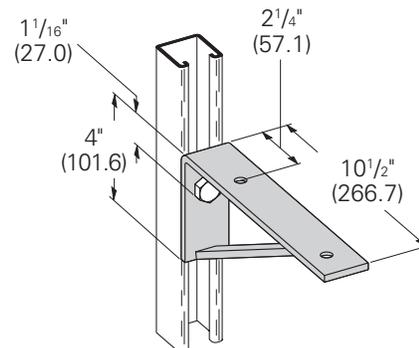
B189 Bracket

- Uniform Loading 870 Lbs. (3.87 kN)
- Safety Factor of 2.5
- Hole Spacing on Bracket Top 11 15/16" (303.2) Center to Center
- Standard finishes: ZN, GRN
- Wt./C 308 Lbs. (139.7 kg)



B541 Bracket

- Uniform Loading 1240 Lbs. (5.51 kN)
- Safety Factor of 2.5
- Hole Spacing on Bracket Top 7 7/16" (188.9) Center to Center
- Standard finishes: ZN, GRN
- Wt./C 201 Lbs. (91.2 kg)



Reference page 106 for general fitting and standard finish specifications.

XVI. EXHIBITS

A. PROJECT SIGN

B. SOILS REPORT



**GEOTECHNICAL ENGINEERING STUDY
KHA: WESTSIDE TRAIL – PHASE I
FARMERS BRANCH, TEXAS
KLEINFELDER PROJECT NO.: 20214410.001A**

DECEMBER 29, 2022

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ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.

December 29, 2022
Project No.: 20214410.001A

Kimley-Horn & Associates
2201 West Royal Lane, Suite 275
Irving, Texas 75063

Attention: Mr. Ryan Delmotte

**Subject: Geotechnical Engineering Study
Westside Trail – Phase I
Farmers Branch, Texas**

Dear Mr. Delmotte:

This report presents the findings of our geotechnical engineering study for the construction of the proposed Westside Trail – Phase I project in Farmers Branch, Texas. The results of this study are included along with our recommendations for use during the design of the proposed trail.

As an additional service, we would be pleased to review the plans and specifications which rely on this report. We can also provide construction phase services such as materials engineering, materials testing, and foundation installation observation.

If you have any questions regarding our report or wish to discuss any additional services, please call us at 972.868.5900.

Best Regards,

KLEINFELDER, INC.

Texas Registered Engineering Firm F-16438



George Ryan Anderson, PE
Staff Professional



Richard J. Hammerberg, PE
Senior Project Manager

A Report Prepared for:

Kimley-Horn & Associates
2201 West Royal Lane, Suite 275
Irving, Texas 75063

**GEOTECHNICAL ENGINEERING STUDY
WESTSIDE TRAIL – PHASE 1
FARMERS BRANCH, TEXAS**

Prepared by:



George Ryan Anderson, PE
Staff Professional



Richard J. Hammerberg, PE
Senior Project Manager



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Texas Registered Engineering Firm F-16438

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Phone: 972.868.5900
Fax: 972.409.0008

December 29, 2022

Kleinfelder Project No.: 20214410.001A

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APPENDIX A

Important Information Regarding This Geotechnical Report

APPENDIX B

Exploration Location Plan and Vicinity Map Figures 1A & 1B
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 Soil Description Key Figure 3
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 Trail Boring Logs..... Trail-02 to Trail-12
 Geotechnical Lab Summary Tables 1 to 5
 Swell Test Results (In-situ) Figures 4 to 15
 Swell Test Results (Dry Back) Figures 16 to 27
 Lime vs pH Series Results Figures 28 & 29
 Consolidated Undrained (CU) Triaxial Results Figures 30 to 39

**GEOTECHNICAL ENGINEERING STUDY
WESTSIDE TRAIL – PHASE I
FARMERS BRANCH, TEXAS**

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

This report presents the results of a geotechnical engineering study for the proposed Westside Trail – Phase I project in Farmers Branch, Texas. The proposed trail is located north of IH-635 and runs adjacent to President George Bush Turnpike (PGBT), Valley View Lane, and Harry Hines Blvd. as shown on Figure 1 - Exploration Location Plan and Vicinity Map included in Appendix B.

Based on the 30 percent plans provided by Kimley-Horn, dated December 10, 2019, available aerial imagery, and site visits we understand that the walkway expansion begins near the IH-635 Service Road and Valley View Lane intersection and meanders approximately 6,500 lineal feet eastward to just south of the Denton Drive and Farmers Branch Lane intersection. We further understand the proposed pavement will be a 12-foot-wide concrete trail and will include retaining walls varying in height from 10 to 15 feet.

1.2 SITE DESCRIPTION

The borings are located along Valley View Lane and Harry Hines Blvd. in Farmers Branch, Texas. The approximate locations of these borings are shown on Figures 1A and 1B in Appendix B. The site is located along existing roadways and open fields consisting of grass and small trees.

1.3 PURPOSE AND SCOPE

The purpose of the geotechnical study is to evaluate the subsurface soil conditions and provide geotechnical design recommendations for the above-mentioned project. To accomplish this purpose, the study has been conducted based on the following scope:

- Drilled 20 borings to evaluate general subsurface conditions and to obtain samples for testing.

- Performed laboratory tests on appropriate samples to evaluate pertinent physical and engineering properties of the subsurface materials.
- Performed engineering analyses, using the field and lab data, to develop geotechnical recommendations for the proposed structures.

The recommendations contained herein are based on a combination of the borings and laboratory data (performed by Kleinfelder), data supplied by Kimley-Horn, and our stated assumptions within this report. Once the design is complete and available, Kleinfelder should review this report again with respect to the project plans and specifications to evaluate whether the recommendations are correctly reflected in the design documents.

Our recommendations are also based on the provisions outlined in the Limitations section of this report. All individuals utilizing this report shall read the report Limitations along with the document from the Geoprofessional Business Association provided in Appendix A.

2 FIELD EXPLORATION AND LABORATORY TESTING

2.1 FIELD EXPLORATION

Subsurface conditions were evaluated by drilling and sampling twenty borings with a Geoprobe 7822DT track-mounted drill rig. Originally, twenty-one borings were planned for this project, however while drilling boring Trail-01, a concrete slab was encountered at 2 feet below the existing grade and was terminated due to auger refusal. Historical aerial photography indicates this area may have been used as a dumping ground for wasted concrete slabs. The retaining wall borings are designated as RW-01 to RW-09 and the trail borings are designated as Trail-02 to Trail-12. The borings were drilled to depths ranging from 10 to 25 feet below the existing grade at the approximate locations shown on Figures 1A and 1B in Appendix B.

The borings were located and marked by Kleinfelder personnel based on information provided by Kimley-Horn. GPS coordinates were obtained at each boring location using a hand-held GPS unit, with a horizontal accuracy of approximately 15 feet. GPS coordinates of the actual boring locations are shown on the top left of the individual boring logs, above the lithology.

At select locations, relatively undisturbed samples of cohesive soils were collected by using the drilling rig to push a seamless, steel tube sampler into the soil. The depths at which these samples were collected are indicated on the boring logs. After a tube was recovered, the sample was extruded in the field, examined, and logged. The sample was then sealed in a plastic bag to reduce moisture loss and protect the sample. During logging, an estimate of the sample consistency was obtained using a pocket penetrometer. This test provides relative strength data that is used as an approximate indicator of shear strength. The result of the penetrometer reading is recorded at a corresponding depth on the boring logs. Note that a reported value of "4.5+" indicates that the capacity of the penetrometer device was exceeded. Pocket penetrometer values must not be confused with or interchanged with unconfined compression tests. Typically, pocket penetrometer tests yield higher strength values than unconfined compression tests.

At select depths in the borings, samples were collected by driving a split-spoon sampler in conjunction with the Standard Penetration Test (SPT). This technique involves driving the spoon sampler a distance

into the soil using a free-falling hammer (based upon ASTM D1586). During the test, the logger records the number of blows required to drive the spoon sampler over three successive 6-inch increments. The first 6 inches is the “seating drive,” while the number of blows required to drive the sampler the last two 6-inch increments is the “penetration” in blows per foot. Where resistance was high, the number of inches of penetration for 50 blows of the hammer is recorded. When less than 6 inches of penetration is obtained for 50 blows of the hammer, the test is terminated regardless of the drive increment. The results of the penetration test are reported on the boring logs at the corresponding depth. Materials recovered from the split-spoon sampler are then placed in a plastic bag to reduce moisture loss and protect the sample.

Samples of the subsurface materials were removed from the samplers in the field, classified visually, and labeled as to location and depth. Samples were arranged in core boxes and transported to the laboratory for further evaluation and testing.

During the field operations, the borings were observed for subsurface water. These observations are noted at the bottom of the boring logs and are also discussed in subsequent sections of this report. The borings were loosely filled with soil cuttings up to and slightly above the existing ground surface at completion.

2.2 LABORATORY TESTS

Laboratory testing was performed on select samples collected from the borings. These samples were selected as being generally representative of that stratum and/or boring(s). Testing was performed in general accordance to the ASTM standards to allow for material classification according to the Unified Soil Classification System, and to evaluate the engineering properties of the materials. These tests included:

- Atterberg limits (liquid and plastic limits)
- Percent passing the No. 200 sieve
- In-situ dry unit weight and moisture content
- Unconfined compressive strength
- One-dimensional expansion or compression of cohesive soils
- Soluble sulfate concentration testing
- Lime vs pH series

- Consolidated Undrained (CU) triaxial strength testing

The results of these tests are presented at the corresponding depths on individual boring logs, Tables 1 to 5, and Figures 4 through 39 in Appendix B.

3 SUBSURFACE CONDITIONS

3.1 GEOLOGY

Based on the Dallas Sheet of the Geologic Atlas of Texas and the contents of the borings, in our opinion the site is underlain by alluvium and terrace deposits overlying the Eagle Ford Formation.

Alluvial and terrace deposits can consist of a variety of materials, including gravel, sand, silt, and clay. Alluvial deposits are associated with rivers and streams and are present along existing and historic channels, while terrace deposits are associated with deposition from low velocity floodwaters. The grain size of these deposits typically increases with increasing depth but is dependent upon channel geometry and flow rates. Water is often present within alluvial deposits but can be intermittent within terrace deposits. These deposits can often be soft or loose, especially in the presence of groundwater. The Eagle Ford Formation typically consists of residual clay and shaly clay overlying the primary shale that contains significant quantities of soluble sulfates. The clays and shaly clays of the Eagle Ford Formation vary in color from dark brown to yellow brown, are highly expansive. The clays are often jointed; contain silt and sand seams/partings, and bentonite seams/layers. The primary shale is commonly gray to dark gray in color and is not as hard as most regional rock materials. The shale is often calcareous and can contain very hard limestone and sandstone seams. Soft bentonite seams and layers can also be present.

3.2 SUBSURFACE STRATIGRAPHY

The various types and depths of subsurface strata observed in the borings drilled for this study are shown on the boring logs contained in Appendix B. The thickness range and general descriptions in the boring logs are based solely on the materials observed in the borings drilled for this study.

The descriptions are general, and the range of depths is approximate because boundaries between different strata are seldom clear and are generally not abrupt in the field. In addition, the lines separating major strata types on the boring logs do not necessarily represent distinct lines of demarcation for the various strata.

3.3 GROUNDWATER OBSERVATIONS

The borings were advanced drilled to depths ranging from 10 to 25 feet below the existing ground surface using techniques that allow for direct and indirect observations of seepage and groundwater during drilling operations. At the time of our field exploration, groundwater was encountered in six of the twenty borings as shown in Table 3.1.

TABLE 3.1: GROUNDWATER READINGS

Boring No.	Initial groundwater below existing ground surface (feet)	Delayed groundwater below existing ground surface (feet)
RW-01	23	21.5 (after 15 minutes)
RW-02	24	22 (after 15 minutes)
RW-07	13.5	13 (after 15 minutes)
RW-08	14	13 (after 15 minutes)
RW-09	12	11 (after 15 minutes)
Trail-07	8	6 (after 15 minutes)

It should be noted that these observations are representative only of conditions at the time and place indicated. The occurrence of and variations in groundwater levels can vary due to many factors, including seasonal changes, topography, surface runoff, the layering/permeability of subsurface strata, irrigation from adjacent tracts, and other factors not evident at the time this study. The possibility of groundwater and its fluctuation should be considered when developing this project. The water observations conducted for this study are short-term and should not be interpreted as a groundwater study. The presence of groundwater will affect construction and long-term performance of the proposed foundations.

3.4 EXPANSIVE SOIL CHARACTERISTICS

The subgrade at these sites includes expansive soil that will exhibit shrink and swell behavior. The amount of shrink/swell behavior will depend upon moisture fluctuations that occur over the design life of the structure. The total magnitude of the shrink/swell behavior is also dependent upon the thickness of the expansive soil and the depth of the active moisture zone. Moisture fluctuations occur due to seasonal

cycles but can also be influenced to varying degrees by drainage conditions; site grades/sloping ground, landscaping, irrigation practices, the presence of vegetation, groundwater, and the presence of flatwork or other impervious barriers. This large number of variables complicates the evaluation of the magnitude of shrink/swell movements that could occur.

An estimate of the potential vertical movement (PVM) was made using a variety of methods, including the Potential Vertical Rise (PVR) Method 124-E published by TxDOT, the results of laboratory index, swell testing, engineering judgment, and our experience. Based on the TxDOT method, the estimated soil movement or PVM has been calculated ranging between 2½ to 4½ inches based on dry soil moisture conditions. These are not exact values but are only an indication of the potential movements due to expansive soil for seasonal moisture fluctuations. Actual movements may be significantly larger than estimated due to inadequate site grading, poor drainage, ponding surface water, and/or leaks in utility lines. Significant changes to existing site grading can also alter actual vertical movements by changing the thickness of the expansive soil and/or altering the active moisture zone depth.

Select samples were used to perform one-dimensional swell tests. Due to high moisture contents in the near surface soils resulting from the above average precipitation in the Dallas/Ft. Worth area the one-dimensional swell tests were performed at in situ and at “dried back” moisture contents to simulate the swell potential in the warmer/drier months. The samples are dried by placing them in the odometer at overburden pressures with dry porous stones and filter paper. Every twelve hours the porous stones and filter paper are replaced, and the wet weight is measured. The moisture content is calculated at each 12-hour interval and when the target content is met the sample is inundated with water and the test is started. This ensures that the specimen is dried slowly and decreases the amount of observed surface cracking and radial shrinkage. The results of these tests are summarized below in Table 3.2.

TABLE 3.2: SWELL TEST SUMMARY

Location	Moisture Condition	Depth (feet)	Swell (percent)	Load Applied (psf)	Recommended Swell, Per Boring (in.)
Trail-02	In-situ	2 to 4	0.7	250	0.4
		4 to 6	0.3	500	
		8 to 10	0.0	1,000	
Trail-03	Dried Back	0 to 2	12.7	125	5.4
		4 to 6	0.2	500	
		8 to 10	2.3	1,000	
Trail-04	In-situ	2 to 4	0.7	125	0.5
		4 to 6	0.5	750	
		8 to 10	0.4	1,000	
Trail-05	Dried Back	2 to 4	-0.5	250	0.1
		6 to 8	0.5	500	
		0 to 2	0.4	1,000	
Trail-07	In-situ	2 to 4	0.3	250	0.4
		4 to 6	0.6	500	
		8 to 10	0.4	1,000	
Trail-09	Dried Back	2 to 4	0.9	250	3.5
		4 to 6	0.7	500	
		8 to 10	7.8	1,000	
Trail-10	In-situ	2 to 4	1.4	250	1.2
		4 to 6	1.7	500	
		8 to 10	0.2	1,000	
Trail-12	Dried Back	2 to 4	0.4	250	0.8
		6 to 8	-0.2	750	
		8 to 10	2.6	1,000	

Based on the results of the swell tests, which were performed by adding water to the samples while they are at in-situ moisture contents and dried back moisture contents, we estimate a PVM up to 1½ inches at existing moisture and soil overburden conditions and up to 5½ inches at dried back moisture content at soil overburden conditions along the trail’s alignment.

4 ANALYSIS AND RECOMMENDATIONS

4.1 GENERAL

Based on the results of our evaluation, in our opinion, the proposed structures can be developed at this site using conventional grading, excavation, and foundation construction techniques, provided that the recommendations presented herein are incorporated into the design and construction of the project. During field exploration, undocumented fill containing concrete and other construction debris and flowing sands were encountered. These materials and natural phenomenon would likely make drilling for deep foundations very difficult and costly. Therefore, recommendations are presented for shallow foundations for the retaining walls. Drilled pier foundation recommendations can be provided upon request. General recommendations regarding geotechnical aspects of the project design and construction are presented below.

Recommendations submitted herein are based, in part, upon data obtained from our subsurface exploration. The nature and extent of subsurface variations that may exist at the proposed project site may not become evident until construction. If variations appear evident, then the recommendations presented in this report should be re-evaluated. If any changes in the nature, design, location, or depth of the proposed structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed, and our recommendations modified in writing.

4.2 DESIGN RECOMMENDATIONS FOR RETAINING WALLS

We understand that several retaining walls are planned for this project varying in height from 10 to 15 feet. It is our opinion that conventional strip “continuous” footing foundations may be used to support the proposed retaining walls. The approximate load for these structures were not provided at the time of this report. The following subsections provide recommendations regarding lateral earth pressure design parameters and desired bearing pressure.

4.2.1 Equivalent Fluid Pressures

We understand that design and construction of retaining walls with heights of 10 to 15 feet will be required. The backfill will exert lateral pressures on the walls. Depending on the wall type, the design condition could be active or at-rest. The active condition occurs when the structure moves slightly away from the soil in response to the load (such as a cantilever wall). The at-rest condition generally develops for rigid structures that do not allow movement, such as basement and dock walls. Equivalent fluid pressures recommended to model this lateral pressure are provided in Table 4.1 and may be used for horizontal backfill. The recommended lateral earth pressures must be modified if slopes are planned either on top or toe of the retaining wall. Kleinfelder can provide guidance for the lateral earth pressures for these walls with sloping grades once final design details are available. The provided values do not include load factors and should be applied using a triangular distribution. If a drained condition is selected, then the wall must include a back-drainage system.

TABLE 4.1: EQUIVALENT FLUID PRESSURES

Material	Earth Pressure Condition	Equivalent Fluid Pressure, psf/ft	
		Drained	Undrained
On-Site Soil $\phi' = 22^\circ$, $\gamma_t = 120$ pcf	At-rest, $k_o = 0.63$	75	98
	Active, $k_a = 0.46$	55	89
	Passive, $k_p = 2.20$	264	189
Select Fill Soil $\phi' = 30^\circ$, $\gamma_t = 120$ pcf	At-rest, $k_o = 0.50$	60	91
	Active, $k_a = 0.33$	40	82
	Passive, $k_p = 3.0$	360	235
Granular Backfill $\phi' = 32^\circ$, $\gamma_t = 120$ pcf	At-rest, $k_o = 0.47$	56	89
	Active, $k_a = 0.31$	37	80
	Passive, $k_p = 3.26$	391	250

Backfill should be placed and compacted as recommended in Section 5 of this report. Over-compaction will result in excessive lateral earth pressures. Hand-operated tampers or other lightweight compactors are recommended in the 3-foot area behind the wall. The impact of surcharge loads (if present) should be included in design. Surcharge loads can include construction equipment, vehicular loads, soil and material stockpiles, and other items. The additional lateral loads due to these surcharge items can be factored using the earth-pressure coefficients provided in Table 4.1.

Equivalent fluid pressure values for the select fill require a triangular wedge of the material behind the wall. The material should slope upward and away from the bottom of the wall and edge of the heel at a slope of 1(H) to 1(V) or flatter. The upper 18 inches, where exposed to infiltration, should consist of plastic clay to reduce surface water infiltration into the fill.

Lateral forces on the retaining wall foundation can cause sliding of the walls. These forces can be resisted by a variety of components, including friction between the footing and soil, passive pressure on shear keys, and possibly the shear strength of the soil. For frictional resistance, an ultimate coefficient of friction of 0.40 may be used when the footing is founded on select fill or flex base materials. The frictional force may be calculated by using the dead weight of the wall, and the soil that is above the footing. A minimum factor of safety of 1.5 is recommended for the sliding analysis.

To depend upon passive pressures as shown in Table 4.1, there must be a certainty of no soil loss in the wedge area in front of the wall. Due to possible soil disturbance, passive pressure should only be counted for a shear key that is present below the bottom of the footing. No passive resistance should be used for the soil or fill within 3 feet of final grades at the toe of the wall. A wall drain is recommended for collection and removal of surface water percolation and groundwater seepage behind the walls. Proper control of surface water percolation will help to prevent buildup of higher wall pressures.

4.2.2 Allowable Soil Bearing Pressure

We recommend footings be designed for a net allowable soil bearing pressure of 2,500 pounds per square foot (psf) for dead plus sustained live loads. Footings should be embedded at least 24 inches below the lowest adjacent grade. All footings should bear on at least 2 feet of compacted select fill (TxDOT Item 132) or flexible base (TxDOT Item 247). The footing dimension and reinforcement should be designed by the structural engineer; however, strip “continuous” footings should have a minimum width of 18. A modulus of subgrade reaction (k) of 150pci may be used for properly compacted select fill or flex base materials. Due to large amounts of undocumented fill encountered in Borings RW-04 and RW-07 an over excavation of up to 6 feet below the strip “continuous” footing foundations will be necessary to ensure a uniform bearing surface.

Footing excavations should be at least 2 feet below footing elevation and extend a minimum of 5 feet beyond the edge of the footing. Additional excavation shall be performed if the base of the excavation is not in competent material. The exposed subgrade should be scarified, and moisture conditioned to a depth of 8 inches and recompacted to a minimum of 95 percent of standard Proctor density (ASTM D698).

The select fill or flexible base materials should then be placed in maximum 8-inch loose lifts and compacted per Table 5.1.

4.2.3 Construction Considerations

Allowable bearing capacity recommendations provided in this report are based on proper construction procedures and the presence of minimal anomalies beneath the footing, including maintaining a dry foundation excavation and proper cleaning of bearing surfaces prior to placing reinforcing steel and concrete. Excavations for the foundations, placement of concrete and steel, and any required backfilling should proceed in as continuous a manner as practical. This will serve to reduce deterioration of the bearing surfaces. Exposed foundation bearing surfaces, including the modified (moisture conditioned) subgrade soils, should be protected by a minimum 4-inch-thick seal slab of lean concrete, if the bearing surface will remain exposed for more than 72 hours. Soil exposed at the bottoms of all satisfactory foundation excavations should be protected against detrimental changes in conditions, such as disturbance or excessive drying as discussed previously. Foundation bearing surfaces should be observed by the geotechnical engineer or his representative, prior to concrete placement, to evaluate if the foundation will be supported on satisfactory material.

4.3 TRAIL PAVEMENTS

The pavement thickness calculation for the new rigid pavement section was performed using Pavement Analysis Software (WinPAS), Version 1.0.4, which is based on the AASHTO pavement design procedures. Values used in the analysis of the pavement capacity are as follows:

- 20-Year Design Life
- 85% Reliability
- 0.35 Overall (Standard) Deviation
- 4,000 (psi) Concrete compressive strength at 28 days
- 3,600,000 psi Concrete Modulus of Elasticity
- 3.6 Load Transfer Coefficient
- 67 psi/in Modulus of Subgrade Reaction
- 1.0 Drainage Coefficient (assumes slow, positive drainage)

- 4.5 Initial Serviceability
- 2.0 Terminal Serviceability

These values were selected based upon guidance in the AASHTO and TXDOT pavement design guides, local experience, and engineering judgment. Projected traffic volumes and loads were not provided and therefore were estimated, assuming the trail would be restricted to lightly loaded service vehicles only. If our assumption is incorrect, we should be notified to review our recommendations and provide updated recommendations where appropriate. Minimum pavement thickness values are provided in Table 4.2 below.

TABLE 4.2: PAVEMENT THICKNESS

Traffic	Pavement and Subgrade Thickness	Capacity in ESAL
Hike and Bike Trail	5 inches Portland Cement Concrete	70,000
	6 inches Lime Stabilized Subgrade (TxDOT Item 260) or 6 inches of Flexible Base (TxDOT Item 247)	

Concrete should have a minimum flexural strength of 550 psi at 28 days (approximately 4,000 psi compressive strength). Concrete should be steel reinforced and include joints to control the formation of temperature and shrinkage cracks. Concrete should include air entrainment to increase freeze-thaw resistance.

The recommended pavement is intended to provide a sufficient thickness of structural materials, such that wheel loads are widely distributed. While the pavement may be structurally adequate, it can still experience cracking and movement due to the expansive subgrade.

4.3.1 Pavement Material Specifications

The following pavement material specifications are based on the Texas Department of Transportation’s (TxDOT) Standard Specifications, November 1, 2014.

- Portland Cement Concrete – Concrete should have a minimum compressive strength of 4,000 psi at 28 days. Concrete should be steel reinforced and include joints to control the formation of temperature and shrinkage cracks. Concrete should include air entrainment to increase temperature resistance.
- Lime-Stabilized Subgrade – When stabilizing dark brown clay, apply and mix hydrated lime at an application rate of a minimum of 7 percent by dry unit weight (32 lbs/sq.yd.) for a 6-inch stabilization depth. The application rate of hydrated lime should be verified during construction by performing lime series tests. The well mixed material should be compacted per Table 5.1. See Section 4.4 for additional details.

The soil subgrade prior to paving, should be uniform as practical in both moisture content and density. In all areas to be paved, subgrade earthwork operations should be performed under the supervision of qualified contractor personnel working in conjunction with the project geotechnical or materials testing engineer. Adequate field density tests should be performed on the final compacted subgrade throughout all areas to be paved.

4.3.2 Pavement Subgrade Modification

Pavements constructed over high to moderate plasticity clay soils could experience significant movements. As stated in Section 3.4 of this report, the estimated values of PVR based on index testing in the dry condition to vary from 2½ to 4½ inches and we estimate a PVM based on swell testing of up to 1½ inches at existing moisture and soil overburden conditions and up to 5½ inches at dried back moisture content at soil overburden conditions along the trail’s alignment. We understand that the preferred subgrade modification is removal of the existing clay soils and replacement with a select fill material. However, we believe that this site would be a good candidate for moisture conditioning and recompaction of the native clay soils with a moisture barrier (see Section 4.3.5 for recommendations) and or a combination of the two methods. The depths of subgrade modification required to reduce the PVR to approximately 2 inches for the three different options are shown in Table 4.3.

TABLE 4.3: SUBGRADE MODIFICATION DEPTH

Subgrade Modification Type	Depth of Removal and Replacement (ft)	Depth of Moisture Conditioning (ft)
Removal and Replacement with Select Fill	4	0
Moisture Conditioning	0	5
Removal and Replacement with Select Fill and Moisture Conditioning	2	3

There is a possibility that portions of the trail may be aligned over undocumented fill and proof rolling may not identify the potential for long term settlement which could cause excessive settlement of the trail over time. Due to large amounts of undocumented fill encountered in Borings Trail-06 to Trail-08 an over excavation of up to 6 feet will be necessary to ensure a uniform bearing surface.

4.3.3 Soluble Sulfates

Concentrations below 3,000 ppm are typically considered below the action level (based on National Lime Association issued a Technical Memorandum, Guidelines for Stabilization of Soils Containing Sulfates, August 2000). Sulfate levels between 3,000 to 5,000 ppm have moderate risk, while levels between 5,000 and 8,000 ppm have a moderate to high risk. Based on the results shown in Table 4.4, sulfate induced heave for the near surface clay soil can considered to be low risk for this site.

TABLE 4.4: SULFATE RESULTS

Boring No.	Depth (feet)	Sulfate (ppm)	Water Soluble Sulfate in Water, % by mass
B-01	4 to 6	200	0.020
B-03	2 to 4	140	0.014
P-01	0 to 2	140	0.014
P-03	0 to 2	120	0.012
P-04	2 to 4	140	0.014
P-05	0 to 2	120	0.012
P-06	0 to 2	120	0.012
P-07	2 to 4	140	0.014
P-08	2 to 4	140	0.014
P-09	0 to 2	120	0.012
P-10	2 to 4	120	0.012
P-11	0 to 2	140	0.014
P-12	2 to 4	100	0.010

4.3.4 Additional Pavement Considerations

The subgrade treatment should extend a minimum of 1 foot behind the edge of pavement. If flexible base subgrade is required, then the treatment should extend a minimum of 2 feet behind the back of edge of pavement. This will improve the support for the edge of the pavement and lessen the "edge effect" associated with shrinkage during dry periods. The use of sand or select fill as a leveling course below pavement in expansive clay areas should be prevented as these porous soils can allow water inflow between the pavement and subgrade, facilitating heave and strength loss within the subgrade soil.

It is important to reduce moisture changes in the pavement subgrade. The pavement and adjacent areas should be well drained. The pavement and surrounding grades must have positive drainage that quickly removes surface water and inhibits the absorption of surface water into the subgrade soils. Regular maintenance should be performed on cracks in the pavement surface to reduce water passing through to the base or subbase material. Even with these precautions, some distress may still occur, which will require periodic maintenance.

Consideration should be given to the location of existing and proposed trees, as they have been documented to desiccate surrounding subgrade soil and result in soil shrinkage and settlement. The zone of the desiccation varies by tree, but it is generally recommended that trees are set back so that the dripline of the mature tree will not extend over or near the pavement structure. If existing mature trees are allowed to remain adjacent to the roadway, we recommend the installation of root barriers to keep these trees from causing differential movement of the new roadway.

A moisture barrier consisting of at least 10 mil poly sheeting should be placed directly over the moisture conditioned portion of the subgrade extending at least two feet beyond the pavement edge on either side of the pavement on a neat line. The intent of the poly sheeting is to protect the moisture treated subgrade by moving the wetting and drying zone outward and away from the moisture treated zone. The barrier should be covered with 12 inches of lightly compacted soil. Care should be taken not to rip or tear the sheeting during placement of the cover fill to maintain the moisture condition. We recommend coordination of utility installation prior to poly sheeting installation to reduce the risk of damaging the poly sheeting. We recommend trees be planted at least 10 feet from the pavement edge.

4.4 SEISMIC CONSIDERATIONS

For structural designs based upon the 2018 IBC the following parameters as listed in Table 4.5 may be used in the design.

TABLE 4.5: SEISMIC DESIGN PARAMETERS

Class	F_a	F_v	S_s	S₁	S_{M5}	S_{M1}	S_{D5}	S_{D1}
D	1.6	2.4	0.102	0.055	0.163	0.131	0.109	0.087

Seismic hazards associated with slope stability, soil liquefaction, surface rupture, and lateral spreading are not considered to be a significant constraint with this site.

5 CONSTRUCTION RECOMMENDATIONS

5.1 SITE PREPARATION, GRADING, AND DRAINAGE CONSIDERATIONS

All surficial vegetation, root systems, utilities, and any other underground structures must be removed beneath planned foundation and pavement areas prior to construction. The stripping depth must be based on field observations with particular attention given to old drainage areas, plow depths, uneven topography, and excessively wet soils. The stripped subgrade must be firm and able to support the construction equipment without displacement. Soft or yielding subgrade must be corrected and made stable before construction proceeds. Proof-rolling must be used to detect soft spots or pumping subgrade areas. Proof-rolling must be performed using a heavy pneumatic tired roller, loaded dump truck, or similar piece of equipment weighing at least 25 tons.

Proof-rolling is intended to achieve additional compaction and to locate unstable areas and must be observed by the Geotechnical Engineer or their representative. Soft spots or areas of pumping subgrade observed by the Geotechnical Engineer, or their representative must be undercut and reworked. Where fill placement is planned, the proof-rolling must occur once the existing soils have been excavated and before the fill is placed and compacted. Proof-rolling is intended within all areas of pavement, and other locations that will support surface loads. Footing excavations should be observed by the geotechnical engineer to evaluate the subgrade ability to receive fill. Prior to fill placement, the exposed subgrade must be scarified to a depth of approximately 12 inches; moisture conditioned, and recompacted to the density specified for fill.

5.2 EXCAVATIONS AND TEMPORARY CONSTRUCTION SLOPES

5.2.1 General

Excavation at this site is likely to encounter native clay soils and undocumented fill. The soil materials can be excavated using conventional excavation equipment. However, the fill may require using heavy equipment suitable for rock excavation because of the concrete encountered in the borings.

5.2.2 Excavations and Slopes

Our comments on excavation characteristics are based on our experience with the regional geology and examination of the field test data from the boring logs. Excavation in these materials depends on not only the relative consistency, but also the contractor's equipment, capabilities, and experience. Therefore, we recommend that the earthwork contractor be familiar with local excavation conditions. Furthermore, it should be the contractor's responsibility to determine the most effective methods for excavation with the approval of Owner. The above comments are intended for informational purposes for the design team only and may be used to review the contractor's proposed excavation methods.

All excavations must comply with applicable local, state, and federal safety regulations. **The responsibility for excavation safety lies solely with the contractor.** We are providing this information below solely as a service to our client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the Contractors activities, such responsibility is not being implied and should not be inferred.

The contractor is responsible for designing any excavation slopes or temporary sheeting or shoring, including 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.

Excavations should be cut to a stable slope or be temporarily braced, depending on the excavation depths and the subsurface conditions encountered. **Temporary construction slopes should be designed in strict compliance with the most recent governing regulations.** Construction slopes should be closely observed for signs of mass movement: tension cracks at the crest, bulging at the toe, etc. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. **The responsibility for stability of temporary construction slopes lies solely with the contractor.**

Groundwater control and dewatering should be the responsibility of the general contractor. The site should have proper drainage during construction to avoid ponding of water at the site. Once the subgrade under the proposed structures is moisture conditioned and compacted as specified in the previous sections of this report, concrete should be placed promptly (same day). Prolonged exposure or inundation of the bearing surface with water may result in changes in bearing strength and compressibility characteristics.

5.2.3 Construction Considerations

Stockpiles should be placed well away from the edge of the excavations and their height should be controlled so they do not surcharge the sides of the excavations. Surface drainage should be carefully controlled to reduce the flow of water into the excavations. The material specifications and compaction recommendations are presented in the Material Requirement and Testing section of this report.

5.3 COMPACTION AND TESTING

Table 5.1 provides material, moisture, and density requirements for a variety of materials and applications. Compaction of each lift should be continuous over its entire area. Fill should be placed in loose horizontal lifts not exceeding 9 inches, with the intent of providing a compacted lift thickness of 6 inches. Fill placed along slopes should be placed in horizontal lifts that are benched into the slope. Bench heights should generally not exceed two feet in height.

TABLE 5.1: MATERIAL AND COMPACTION REQUIREMENTS

Material Use	Material Requirements	Proctor Test Method	Minimum Density Requirement ⁽¹⁾	Moisture Requirement ⁽¹⁾
Moisture Conditioned - On-Site Clay (CH-CL) Soils	Organics < 2%	Standard (ASTM D698)	95 % minimum	+2 to +5% of Optimum
Lime Stabilized Subgrade	TxDOT Item 260 Organics < 2%	Standard (ASTM D 698)	95 % minimum	+2 to +5% of Optimum
“Non-expansive” Select Fill	PI: 7 to 15, LL: ≤35 -#200 Sieve: ≤70% Organics < 2%	Standard (ASTM D698)	98 % minimum	-1 to +3% of Optimum
Flexible Base	TxDOT Item 247, Grade 1-2, Type A or D	Standard (ASTM D698)	98 % minimum	-2 to +2% of Optimum

(1) Based upon Maximum Dry Density and Optimum Moisture Content

The material should be consistent with regard to type and moisture content. Clods should be processed and mixed, and water should be evenly applied, so that each lift has a uniform moisture and density. Each lift should be tested to evaluate if it has the specified moisture and compaction. One moisture/density verification test should be performed for every 2,500 square-feet of compacted area, or for every 100 lineal feet of utility backfill. For smaller areas, a minimum of three tests should be provided for each lift. Subsequent lifts should not be placed until the exposed lift has the specified moisture and density. Lifts failing to meet the moisture and density requirements should be reworked to meet the required specifications.

The specified moisture content must be maintained until compaction of the overlying lift, or construction of overlying flatwork. Failure to maintain the moisture content could result in excessive soil movement and can also have a detrimental effect on overlying plastic concrete. The contractor must provide some means of controlling the moisture content (such as water hoses, water trucks, etc.). Maintaining subgrade moisture is always critical, but will require the most effort during warm, windy, and/or sunny conditions. Density and moisture verification testing is recommended to provide some indication that adequate earthwork is being provided. However, the quality of the fill is the sole responsibility of the contractor. Satisfactory testing is not a guarantee of the quality of the contractor's earthwork operations.

6 DESIGN REVIEW

Kleinfelder was provided with the preliminary site location and project information. We must be informed of any changes so that we may re-evaluate our recommendations. We also must be given the opportunity to review construction documents to affirm that our recommendations have been interpreted correctly. We cannot be responsible for misinterpretations if not given the opportunity to review aspects of the project that are based on the contents of this report. Such a review is considered an additional service.

7 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Kimley-Horn. If Kimley-Horn does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, the Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

The scope of services was limited to drilling and testing 20 borings drilled to depths ranging from 10 to 25 feet at locations selected by Kleinfelder to provide limited and specific geotechnical design and construction recommendations for use in the design of the proposed structures. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on subsurface exploration including borings drilled to a maximum depth of 25 feet, groundwater conditions at the time of our field activities, laboratory testing, and engineering analyses.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more

information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil, rock or groundwater conditions could vary between or beyond the points explored. If soil, rock or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated loads, and the design depths or locations of the foundations, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

As the geotechnical engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project, and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify our recommendations if variations in the soil conditions are encountered. As a minimum Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications;
- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, slabs-on-grade, and placement of engineered fill;
- Confirm engineered fill for the structure and other improvements is placed and compacted per the project specifications; and
- Observe foundation bearing soils to confirm conditions are as anticipated.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site. The scope of this investigation does not include specific activities and investigations designed to reveal whether a solid waste landfill exists upon the subject land tract other than what may be determined through incidental encounter in the soil borings. The scope of this investigation does not include environmental evaluations of surface and subsurface conditions, and the lack of that information in this report does not indicate an absence of potential environmental problems.

Kleinfelder cannot be responsible for interpretation by others of this report, or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, and placement of engineered fill. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. Furthermore, the contractor should be prepared to handle contamination conditions encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of worker.



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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



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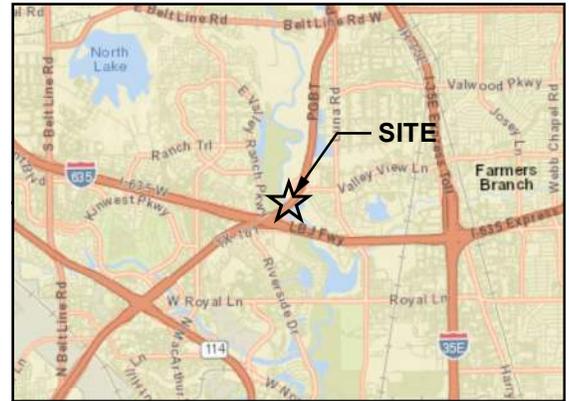


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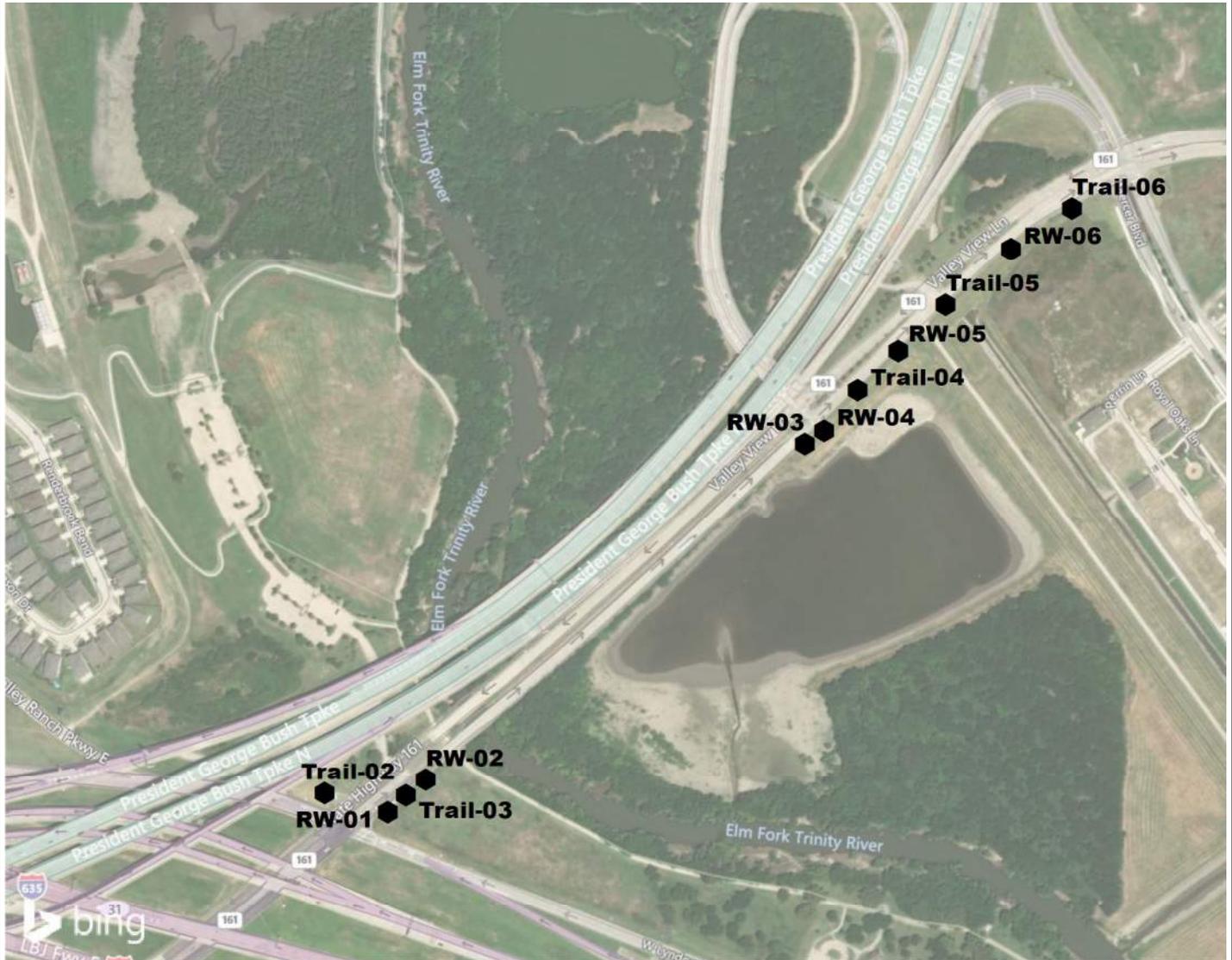


LEGEND	
●	SOIL BORING



VICINITY MAP NOT TO SCALE

NOTE:
 BASE MAPPING AND VICINITY MAP CREATED FROM LAYERS
 COMPILED BY ESRI PRODUCTS AND 2021 MICROSOFT CORPORATION.
 COORDINATE SYSTEM: NAD 1983 2011 STATEPLANE TEXAS NORTH CENTRAL
 FIPS 4202



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	PROJECT NO. 20214410.001A	EXPLORATION LOCATION PLAN AND VICINITY MAP	FIGURE 1A
	DRAWN BY: GRA CHECKED BY: RJH DATE: 06-25-2021		



LEGEND	
●	SOIL BORING



VICINITY MAP NOT TO SCALE

NOTE:
 BASE MAPPING AND VICINITY MAP CREATED FROM LAYERS
 COMPILED BY ESRI PRODUCTS AND 2021 MICROSOFT CORPORATION.
 COORDINATE SYSTEM: NAD 1983 2011 STATEPLANE TEXAS NORTH CENTRAL
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	PROJECT NO. 20214410.001A	EXPLORATION LOCATION PLAN AND VICINITY MAP	FIGURE 1B
	DRAWN BY: GRA CHECKED BY: RJH DATE: 06-25-2021		

SAMPLE/SAMPLER TYPE GRAPHICS

	HOLLOW STEM AUGER
	PUSH TUBE SAMPLER
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, i.e., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS

WOH - Weight of Hammer
WOR - Weight of Rod

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

GRAVELS (More than half of coarse fraction is larger than the #200 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
		Cu < 4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
	GRAVELS WITH 5% TO 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES	
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES	
		Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES	
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES	
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES	
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES	
	COARSE GRAINED SOILS (More than half of material is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu < 6 and/or 1 > Cc > 3		SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES	
Cu < 6 and/or 1 > Cc > 3				SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES	
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES	
SANDS WITH > 12% FINES				SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES	
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES	
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES	
FINE GRAINED SOILS (Half or more of material is smaller than the #200 sieve)		SILTS AND CLAYS (Liquid Limit less than 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	SILTS AND CLAYS (Liquid Limit 50 or greater)		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY		
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT		
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY			

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDED ON THIS LEGEND.



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

CHECKED BY: GRA

DATE: 6/21/2021

GRAPHICS KEY

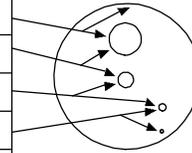
KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

2

GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



SECONDARY CONSTITUENT

Term of Use	AMOUNT	
	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N ₆₀ (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q _u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N ₆₀ (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

PLASTICITY

DESCRIPTION	LL	PI
Non-Plastic	NP	NP
Low	< 30	< 15
Medium	30 - 50	15 - 25
High	> 50	> 25

LL is from Casagrande, 1948. PI is from Holtz, 1959.

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.



PROJECT NO.:
20214410.001A

 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

SOIL DESCRIPTION KEY

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

3

PLOTTED: 07/09/2021 04:02 PM BY: GAnderson

Date Begin - End: 5/20/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 83°, sunny **Exploration Diameter:** 8 in. O.D.

BORING LOG RW-01

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91261° Longitude: -96.93908° Surface Condition: Grass											
		Fat to Lean CLAY with Sand: dark brown, moist to wet, medium stiff to hard	PP=3.75										
			PP=4.5+		CH	18.1		100	79	50	34		
5		- brown below 6 feet	PP=3.75										
			PP=3.25										
			PP=3.25		CL	19.9	108.3	100	82	48	34	Sulfates= 160ppm Unc. Comp. Str.= q _u : 2.3 tsf Strain at Failure: 11.0%	
10													
		- trace gravel below 13 feet	PP=4.5+										
15													
		- grayish brown below 18 feet	PP=0.5			24.5							
20													
			PP=4.5+										
25													

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 20, 2021.

GROUNDWATER LEVEL INFORMATION:

- ~ Seepage was observed at approximately 23 ft. below ground surface during drilling.
- ∇ Groundwater was observed at approximately 21.5 ft. below ground surface during drilling.

GENERAL NOTES:

The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG RW-01

KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

RW-01

PLOTTED: 07/09/2021 04:02 PM BY: GAnderson

Date Begin - End: 5/21/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** T. Cennette
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 78°F, Overcast **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91288° Longitude: -96.93870° Surface Condition: Grass											
		Fat to Lean CLAY with Sand: dark brown, moist to wet, medium stiff to hard	PP=3.25										
			PP=3.5										
5			PP=4.5+		CL	17.8		95	77	48	33		
			PP=4.5+										
			PP=4.5+		CH	16.5		100	86	51	36		
10													
		- trace gravel below 13'											
			PP=3.25			17.7	109.2						
15													
		- shaly below 18'											
			PP=0.75			15.4							
20													
25			BC=6 9 14										

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 21, 2021.

GROUNDWATER LEVEL INFORMATION:

- ⚡ Seepage was observed at approximately 24 ft. below ground surface during drilling.
- ⚡ Groundwater was observed at approximately 22 ft. below ground surface during drilling.

GENERAL NOTES:

The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG RW-02

KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

RW-02

PLOTTED: 07/09/2021 04:02 PM BY: GAnderson

Date Begin - End: 5/19/2021 **Drilling Company:** West Drilling **BORING LOG RW-03**
Logged By: L. Lancaster **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 75°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91563° Longitude: -96.93491° Surface Condition: Grass											
5		Fat CLAY: dark brown, moist, stiff to hard	PP=3.0										
			PP=1.75										
			PP=2.75		CH	20.4		100	88	52	36		
			PP=2.5									Sulfates= 180ppm	
			PP=3.75		CH	21.3	109.3	100	85	53	38	Unc. Comp. Str.= q _u : 2.4 tsf Strain at Failure: 13.2%	
10													
		- grayish brown below 13 feet											
			PP=3.25										
15													
			PP=4.5+			19.1							
20													
			PP=2.75										
25													

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 19, 2021.

GROUNDWATER LEVEL INFORMATION:

Groundwater was not observed during drilling or after completion.

GENERAL NOTES:

The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT LIBRARY: 2021.GLB [KLF_BORING/TEST PIT SOIL LOG]
 KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG RW-03

KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

RW-03

PLOTTED: 07/09/2021 04:02 PM BY: GAnderson

Date Begin - End: 5/19/2021	Drilling Company: West Drilling	BORING LOG RW-04
Logged By: R. Mitchell	Drill Crew: B. Williams	
Hor.-Vert. Datum: Not Available	Drilling Equipment: Geoprobe 7822DT	Hammer Type - Drop: 140 lb. Auto - 30 in.
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger	
Weather: 80°F, Sunny	Exploration Diameter: 8 in. O.D.	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91574° Longitude: -96.93472° Surface Condition: Grass											
5	(FILL) Lean CLAY with Sand: dark brown, moist, very stiff to hard, trace gravel	PP=3.25											
		PP=2.25				16.9		100	75	39	25		
		PP=4.5+				17.7	110.6					Unc. Comp. Str.= q _u : 3 tsf Strain at Failure: 9.0%	
	Lean CLAY with Sand: dark brown, moist, very stiff to hard	PP=4.25											
		PP=4.5+			CL	17.4		100	80	47	32	Sulfates= 120ppm	
15		PP=4.5+				19.4	107.2					Unc. Comp. Str.= q _u : 4.1 tsf Strain at Failure: 6.0%	
20	- grayish brown below 18 feet	PP=4.5+											
25		PP=2.75				28.2							

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

	PROJECT NO.: 20214410.001A	BORING LOG RW-04	BORING
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	RW-04

PLOTTED: 07/09/2021 04:03 PM BY: GAnderson

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 5/19/2021 **Drilling Company:** West Drilling **BORING LOG RW-05**
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 88°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91639° Longitude: -96.93397° Surface Condition: Grass											
5		Lean CLAY with Sand: dark brown, moist, stiff to hard	PP=1.75										
			PP=4.5+		CL	16.9		100	78	44	30		
			PP=4.5+									Sulfates= 140ppm	
			PP=4.5+										
			PP=4.5+		CL	16.7	113.7	100	78	48	32	Unc. Comp. Str.= q _u : 6 tsf Strain at Failure: 6.5%	
			PP=4.5+										
			PP=4.5+										
10			PP=3.0			22.3							
			PP=3.0										
15			PP=3.0										
			PP=3.0										
20		- grayish brown, with increase in sand content below 18 feet											
25													

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 19, 2021.

GROUNDWATER LEVEL INFORMATION:
 Groundwater was not observed during drilling or after completion.
GENERAL NOTES:
 The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

	PROJECT NO.: 20214410.001A	BORING LOG RW-05	BORING RW-05
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		

PLOTTED: 07/09/2021 04:03 PM BY: GAnderson

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
GINT LIBRARY: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: <u>5/20/2021</u>	Drilling Company: <u>West Drilling</u>	BORING LOG RW-06
Logged By: <u>R. Mitchell</u>	Drill Crew: <u>B. Williams</u>	
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>Geoprobe 7822DT</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	
Weather: <u>74°F, Overcast</u>	Exploration Diameter: <u>8 in. O.D.</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS						
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)
5	Lean CLAY with Sand : dark brown, moist, very stiff to hard	PP=2.25										Sulfates= 1,000ppm Unc. Comp. Str.= q _u : 4.2 tsf Strain at Failure: 6.5%
		PP=3.75	CL	18.3	100	83	46	32				
10	Sandy Fat CLAY : brown, moist, very stiff - trace gravel below 13'	PP=4.5+		20.1	106.9							Unc. Comp. Str.= q _u : 3.4 tsf Strain at Failure: 14.8%
		PP=4.5+	CH	19.6	98	65	58	40				
15		PP=2.25		14.5	121.1							
		PP=3.0		20.4								
20		PP=3.75										
		PP=3.75										
25		The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 20, 2021.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.						

	PROJECT NO.: 20214410.001A	BORING LOG RW-06	BORING
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	RW-06
			PAGE: 1 of 1

PLOTTED: 07/09/2021 04:03 PM BY: GAnderson

Date Begin - End: 5/26/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 83°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91384° Longitude: -96.89833° Surface Condition: Grass											
	(FILL)												
		Fat CLAY with Sand: dark brown, moist, very stiff, with asphalt fragments and other construction debris	PP=4.0										
			PP=2.0										
5			PP=2.0			21.1		98	78	58	42		
			PP=2.0									Sulfates= 140ppm	
		Fat CLAY with Sand: dark brown, moist, very stiff	PP=2.0		CH	21.0	103.5	97	79	64	45	Unc. Comp. Str.= q _u : 1.8 tsf Strain at Failure: 6.5%	
10		- trace gravel below 10 feet											
		Clayey SAND: brown, wet, loose	PP=0.25			17.9		100	24				
15													
		- flowing sands encountered from 13 to 22 feet											
20													
		Weathered SHALE: gray and dark gray, moist, soft											
25			BC=20 30 36			19.0							

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 26, 2021.

GROUNDWATER LEVEL INFORMATION:
 ~ Seepage was observed at approximately 13.5 ft. below ground surface during drilling.
 ∇ Groundwater was observed at approximately 13 ft. below ground surface during drilling.
GENERAL NOTES:
 The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

	PROJECT NO.: 20214410.001A	BORING LOG RW-07 KHA: Westside Trail - Phase I Farmers Branch, Texas	BORING RW-07
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		

PLOTTED: 07/09/2021 04:03 PM BY: GAnderson

Date Begin - End: 5/25/2021 **Drilling Company:** West Drilling **BORING LOG RW-08**
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 69°F, Overcast **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
0		Latitude: 32.91339° Longitude: -96.89742° Surface Condition: Grass											
0 - 13		Fat CLAY with Sand: dark brown and brown, moist, stiff to very stiff	PP=2.25										
5			PP=2.25		CH	22.2		100	76	58	40		
			PP=1.75										
			PP=3.0		CH	22.8		100	83	71	50		
		- trace gravel below 8'	PP=2.75										
13 - 20		Clayey SAND: brown, wet, medium dense	PP=1.0			23.2							
15													
		- flowing sands encountered from 13 to 20 feet											
20			BC=7 9 10										

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings on May 25, 2021.

GROUNDWATER LEVEL INFORMATION:
 ~ Seepage was observed at approximately 14 ft. below ground surface during drilling.
 ∇ Groundwater was observed at approximately 13 ft. below ground surface during drilling.

GENERAL NOTES:
 The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

	PROJECT NO.: 20214410.001A	BORING LOG RW-08 KHA: Westside Trail - Phase I Farmers Branch, Texas	BORING
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		RW-08 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:04 PM BY: GAnderson

Date Begin - End: 5/21/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** T. Cennette
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 84°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PF)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
0 - 5		Sandy Lean CLAY: dark brown, moist, very stiff to hard, trace gravel	PP=3.0										Sulfates= 120ppm
5 - 10		Clayey SAND: dark brown and brown, moist to wet, loose, trace gravel	PP=4.5+		CL	13.1	122.2	94	61	48	32	Unc. Comp. Str.= q _u : 5 tsf Strain at Failure: 10.0%	
10 - 15		Clayey SAND with Gravel: dark brown and brown, wet, loose	PP=0.5			21.0		100	38				
15 - 20			PP=0.5			17.6		79	20				
20 - 25			PP=1.0			19.4		66	25				
25		Weathered SHALE: gray, moist, soft	BC=23 25 50/5"										

The boring was terminated at approximately 25 ft. below ground surface. The boring was backfilled with auger cuttings on May 21, 2021.

GROUNDWATER LEVEL INFORMATION:
 Seepage was observed at approximately 12 ft. below ground surface during drilling.
 Groundwater was observed at approximately 11 ft. below ground surface during drilling.
GENERAL NOTES:
 The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG RW-09
 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING
RW-09
 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:04 PM BY: GAnderson

Date Begin - End: <u>5/20/2021</u>	Drilling Company: <u>West Drilling</u>	BORING LOG Trail-02
Logged By: <u>R. Mitchell</u>	Drill Crew: <u>B. Williams</u>	
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>Geoprobe 7822DT</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	
Weather: <u>78°F, Overcast</u>	Exploration Diameter: <u>8 in. O.D.</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS						
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
	Latitude: 32.91278° Longitude: -96.93970° Surface Condition: Grass												
5		Sandy Fat CLAY: dark brown, moist, very stiff, trace gravel	PP=2.25										Sulfates= 120ppm
			PP=2.25		CH	20.5	102.5	96	65	53	37	Expansion/Compression= Expansion= 0.7% under 250 psf when wetted.	
			PP=2.25			19.0	107.5					Expansion/Compression= Expansion= 0.3% under 500 psf when wetted.	
			PP=2.0										
			PP=2.25			17.8	111.0					Expansion/Compression= Compression= 0% under 1000 psf when wetted.	
10		The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 20, 2021.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.						
15													
20													
25													

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]

 KLEINFELDER <i>Bright People. Right Solutions.</i>	PROJECT NO.: 20214410.001A	BORING LOG Trail-02	BORING
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	Trail-02

PLOTTED: 07/09/2021 04:04 PM BY: GAnderson

BORING LOG Trail-03

Date Begin - End: 5/20/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 75°F, Light Rain **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS							
		Latitude: 32.91275° Longitude: -96.93890° Surface Condition: Grass		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
Lithologic Description														
5		Lean CLAY with Sand: dark brown, moist, very stiff		PP=2.75				9.6	128.1					Expansion/Compression= Expansion= 12.7% under 125 psf when wetted. Sulfates= 120ppm
				PP=2.0										
				PP=2.0		CL	17.9	121.9	100	80	44	30	Expansion/Compression= Expansion= 0.2% under 500 psf when wetted. Expansion/Compression= Expansion= 2.3% under 1000 psf when wetted.	
				PP=3.25										
				PP=3.0			14.4	115.4						
10		<p>The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 20, 2021.</p> <p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u> The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.</p>												

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.:
20214410.001A

 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG Trail-03

 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

Trail-03

 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:04 PM BY: GAnderson

BORING LOG Trail-04

Date Begin - End: 5/19/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 83°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS						
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91607° Longitude: -96.93438° Surface Condition: Grass											
5	Fat CLAY with Sand: dark brown, moist, very stiff to hard		PP=2.0										Sulfates= 120ppm
			PP=4.25			17.9	109.6						Expansion/Compression= Expansion= 0.7% under 250 psf when wetted.
			PP=3.25										
	- increase in sand content below 6'		PP=4.5+		CH	19.1	107.6	100	82	50	35	Expansion/Compression= Expansion= 0.5% under 750 psf when wetted.	
10			PP=4.5+			19.2	102.5					Expansion/Compression= Expansion= 0.4% under 1000 psf when wetted.	
15	<p>The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 19, 2021.</p> <p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u> The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.</p>												

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG Trail-04
 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING
Trail-04
 PAGE: 1 of 1

Date Begin - End: 5/19/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 90°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
5		(FILL) Clayey SAND with Gravel: brown, moist, medium dense	PP=3.0										
			PP=4.5+			9.7		79	46	41	27		
			PP=4.5+										
		Fat CLAY with Sand: brown, moist, very stiff to hard, trace gravel	PP=4.5+			19.1							
10			PP=2.25										
<p>The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 19, 2021.</p> <p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u> The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.</p>													



PROJECT NO.:
20214410.001A

 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG Trail-06

 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

Trail-06

 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:05 PM BY: GAnderson

Date Begin - End: 5/24/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 73°F, Light Rain **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Latitude: 32.91443° Longitude: -96.89974° Surface Condition: Grass											
	(FILL) Sandy Fat CLAY: dark brown, moist, very stiff to hard, trace gravel	PP=4.5+											Sulfates= 140ppm
		PP=2.5				18.0	109.4	91	53	52	37		Expansion/Compression= Expansion= 0.3% under 250 psf when wetted.
5		PP=2.0				21.7	103.6						Expansion/Compression= Expansion= 0.6% under 500 psf when wetted.
	Fat CLAY with Sand: dark brown, wet, very stiff	PP=2.5											
		PP=2.5				23.5	100.8						Expansion/Compression= Expansion= 0.4% under 1000 psf when wetted.
10													
15	The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 24, 2021.				GROUNDWATER LEVEL INFORMATION: √ Seepage was observed at approximately 8 ft. below ground surface during drilling. ∇ Groundwater was observed at approximately 6 ft. below ground surface during drilling. GENERAL NOTES: The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.								

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG Trail-07
 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING
Trail-07
 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:05 PM BY: GAnderson

Date Begin - End: 5/24/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** B. Williams
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 73°F, Overcast **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Latitude: 32.91404° Longitude: -96.89875° Surface Condition: Grass											
5		(FILL) Sandy Lean CLAY: brown, moist, very stiff, trace gravel	PP=2.5										Sulfates= 120ppm
		Fat CLAY with Sand: brown, moist, stiff to very stiff	PP=1.5										
			PP=2.25			17.6	100	53	39	26			
						14.8							
10		<p>The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 24, 2021.</p> <p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u> The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.</p>											

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.:
20214410.001A

 DRAWN BY: DBJ
 CHECKED BY: GRA

 DATE: 6/21/2021

BORING LOG Trail-08

 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING

Trail-08

 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:05 PM BY: GAnderson

BORING LOG Trail-10

Date Begin - End: 5/21/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** T. Cennette
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 83°F, Sunny **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Latitude: 32.91441° Longitude: -96.89640° Surface Condition: Grass		Sample Type	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description		Sample Type	Recovery	USCS	Water	Dry Unit Wt.	Passing #4	Passing #200	Liquid Limit	Plasticity Index	Additional Tests/ Remarks		
5		Fat CLAY with Sand: brown, moist, very stiff to hard, trace gravel	PP=2.75								Sulfates= 160ppm Expansion/Compression= Expansion= 1.4% under 250 psf when wetted. Expansion/Compression= Expansion= 1.7% under 500 psf when wetted. Expansion/Compression= Expansion= 0.2% under 1000 psf when wetted.		
			PP=4.5+			18.8	108.1						
			PP=3.75		CH	15.3	110.7	97	75	65		47	
			PP=3.0										
			PP=3.0				20.3	107.5					
10		The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 21, 2021.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.							

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
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 DATE: 6/21/2021

BORING LOG Trail-10
 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING
Trail-10
 PAGE: 1 of 1

PLOTTED: 07/09/2021 04:06 PM BY: GAnderson

BORING LOG Trail-12

Date Begin - End: 5/21/2021 **Drilling Company:** West Drilling
Logged By: R. Mitchell **Drill Crew:** T. Cennette
Hor.-Vert. Datum: Not Available **Drilling Equipment:** Geoprobe 7822DT **Hammer Type - Drop:** 140 lb. Auto - 30 in.
Plunge: -90 degrees **Drilling Method:** Hollow Stem Auger
Weather: 79°F, Overcast **Exploration Diameter:** 8 in. O.D.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Latitude: 32.91691° Longitude: -96.89579° Surface Condition: Grass											
5		Clayey SAND: dark brown and brown, moist, medium dense, trace gravel	PP=2.5										Sulfates= 100ppm
			PP=3.0		SC	12.2	124.8	100	39	25	11		Expansion/Compression= Expansion= 0.4% under 250 psf when wetted.
			PP=4.5+										
			PP=4.5+			1.9	138.7						Expansion/Compression= Compression= 0.2% under 750 psf when wetted.
10		Sandy Fat CLAY: dark brown and brown, moist, hard, trace gravel	PP=4.5+			8.5	128.8						Expansion/Compression= Expansion= 2.6% under 1000 psf when wetted.
15		The boring was terminated at approximately 10 ft. below ground surface. The boring was backfilled with auger cuttings on May 21, 2021.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: The drilled location was recorded using a hand-held GPS device with a horizontal accuracy of approximately 15 feet.							

PROJECT NUMBER: 20214410.001A OFFICE FILTER: DALLAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20214410.001A
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

BORING LOG Trail-12
 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

BORING
Trail-12
 PAGE: 1 of 1

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
RW-01	2.0	FAT CLAY WITH SAND (CH)	18.1			100	79	50	16	34	
RW-01	8.0	LEAN CLAY WITH SAND (CL)	19.9	108.3		100	82	48	14	34	Sulfates= 160ppm Unconfined Compressive Strength= q _u : 2.3 tsf Strain at Failure: 11.0%
RW-01	18.0		24.5								
RW-02	2.0										Sulfates= 120ppm
RW-02	4.0	LEAN CLAY WITH SAND (CL)	17.8			95	77	48	15	33	
RW-02	8.0	FAT CLAY (CH)	16.5			100	86	51	15	36	
RW-02	13.0		17.7	109.2							
RW-02	18.0		15.4								
RW-03	4.0	FAT CLAY (CH)	20.4			100	88	52	16	36	
RW-03	6.0										Sulfates= 180ppm
RW-03	8.0	FAT CLAY (CH)	21.3	109.3		100	85	53	15	38	Unconfined Compressive Strength= q _u : 2.4 tsf Strain at Failure: 13.2%
RW-03	18.0		19.1								
RW-04	2.0	LEAN CLAY WITH SAND (CL)	16.9			100	75	39	14	25	
RW-04	4.0		17.7	110.6							Unconfined Compressive Strength= q _u : 3 tsf Strain at Failure: 9.0%
RW-04	8.0	LEAN CLAY WITH SAND (CL)	17.4			100	80	47	15	32	Sulfates= 120ppm
RW-04	13.0		19.4	107.2							Unconfined Compressive Strength= q _u : 4.1 tsf Strain at Failure: 6.0%
RW-04	23.0		28.2								
RW-05	2.0	LEAN CLAY WITH SAND (CL)	16.9			100	78	44	14	30	
RW-05	4.0										Sulfates= 140ppm
RW-05	8.0	LEAN CLAY WITH SAND (CL)	16.7	113.7		100	78	48	16	32	Unconfined Compressive Strength= q _u : 6 tsf Strain at Failure: 6.5%
RW-05	18.0		22.3								
RW-06	2.0	LEAN CLAY WITH SAND (CL)	18.3			100	83	46	14	32	



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

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DATE: 6/21/2021

LABORATORY TEST
RESULT SUMMARY

KHA: Westside Trail - Phase I
Farmers Branch, Texas

TABLE

1

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
RW-06	4.0		20.1	106.9							Sulfates= 1,000ppm Unconfined Compressive Strength= q _u : 4.2 tsf Strain at Failure: 6.5%
RW-06	8.0	SANDY FAT CLAY (CH)	19.6			98	65	58	18	40	
RW-06	13.0		14.5	121.1							Unconfined Compressive Strength= q _u : 3.4 tsf Strain at Failure: 14.8%
RW-06	18.0		20.4								
RW-07	4.0	FAT CLAY WITH SAND (CH)	21.1			98	78	58	16	42	
RW-07	6.0										Sulfates= 140ppm
RW-07	8.0	FAT CLAY WITH SAND (CH)	21.0	103.5		97	79	64	19	45	Unconfined Compressive Strength= q _u : 1.8 tsf Strain at Failure: 6.5%
RW-07	13.0		17.9			100	24				
RW-07	23.0		19.0								
RW-08	2.0	FAT CLAY WITH SAND (CH)	22.2			100	76	58	18	40	
RW-08	6.0	FAT CLAY WITH SAND (CH)	22.8			100	83	71	21	50	
RW-08	8.0										Sulfates= 880
RW-08	13.0		23.2								
RW-09	0.0										Sulfates= 120ppm
RW-09	2.0	SANDY LEAN CLAY (CL)	13.1	122.2		94	61	48	16	32	Unconfined Compressive Strength= q _u : 5 tsf Strain at Failure: 10.0%
RW-09	8.0		21.0			100	38				
RW-09	13.0		17.6			79	20				
RW-09	18.0		19.4			66	25				
Trail-02	0.0										Sulfates= 120ppm
Trail-02	2.0	SANDY FAT CLAY (CH)	20.5	102.5		96	65	53	16	37	Expansion/Compression= Expansion= 0.7% under 250 psf when wetted.
Trail-02	4.0		19.0	107.5							Expansion/Compression= Expansion= 0.3% under 500 psf when wetted.



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

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DATE: 6/21/2021

LABORATORY TEST
RESULT SUMMARY

KHA: Westside Trail - Phase I
Farmers Branch, Texas

TABLE

2

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
Trail-02	8.0		17.8	111.0							Expansion/Compression= Compression= 0% under 1000 psf when wetted.
Trail-03	0.0		9.6	128.1							Expansion/Compression= Expansion= 12.7% under 125 psf when wetted.
Trail-03	2.0										Sulfates= 120ppm
Trail-03	4.0	LEAN CLAY WITH SAND (CL)	17.9	121.9		100	80	44	14	30	Expansion/Compression= Expansion= 0.2% under 500 psf when wetted.
Trail-03	8.0		14.4	115.4							Expansion/Compression= Expansion= 2.3% under 1000 psf when wetted.
Trail-04	0.0										Sulfates= 120ppm
Trail-04	2.0		17.9	109.6							Expansion/Compression= Expansion= 0.7% under 250 psf when wetted.
Trail-04	6.0	FAT CLAY WITH SAND (CH)	19.1	107.6		100	82	50	15	35	Expansion/Compression= Expansion= 0.5% under 750 psf when wetted.
Trail-04	8.0		19.2	102.5							Expansion/Compression= Expansion= 0.4% under 1000 psf when wetted.
Trail-05	0.0										Sulfates= 160ppm
Trail-05	2.0	LEAN CLAY WITH SAND (CL)	15.3	124.8		100	73	43	13	30	Expansion/Compression= Compression= 0.5% under 250 psf when wetted.
Trail-05	4.0		14.6	117.7							Expansion/Compression= Expansion= 0.5% under 500 psf when wetted.
Trail-05	8.0		14.3	116.4							Expansion/Compression= Expansion= 0.4% under 1000 psf when wetted.
Trail-06	2.0	CLAYEY SAND WITH GRAVEL (SC)	9.7			79	46	41	14	27	
Trail-06	6.0		19.1								
Trail-07	0.0										Sulfates= 140ppm
Trail-07	2.0	SANDY FAT CLAY (CH)	18.0	109.4		91	53	52	15	37	Expansion/Compression= Expansion= 0.3% under 250 psf when wetted.



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

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DATE: 6/21/2021

LABORATORY TEST
RESULT SUMMARY

KHA: Westside Trail - Phase I
Farmers Branch, Texas

TABLE

3

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
Trail-07	4.0		21.7	103.6							Expansion/Compression= Expansion= 0.6% under 500 psf when wetted.
Trail-07	8.0		23.5	100.8							Expansion/Compression= Expansion= 0.4% under 1000 psf when wetted.
Trail-08	0.0										Sulfates= 120ppm
Trail-08	4.0	SANDY LEAN CLAY (CL)	17.6			100	53	39	13	26	
Trail-08	8.0		14.8								
Trail-09	0.0										Sulfates= 120ppm
Trail-09	2.0	FAT CLAY WITH SAND (CH)	19.4	119.6		99	83	65	19	46	Expansion/Compression= Expansion= 0.9% under 250 psf when wetted.
Trail-09	4.0		10.9	125.0							Expansion/Compression= Expansion= 0.7% under 500 psf when wetted.
Trail-09	8.0		11.2	124.5							Expansion/Compression= Expansion= 7.8% under 1000 psf when wetted.
Trail-10	2.0		18.8	108.1							Sulfates= 160ppm Expansion/Compression= Expansion= 1.4% under 250 psf when wetted.
Trail-10	4.0	FAT CLAY WITH SAND (CH)	15.3	110.7		97	75	65	18	47	Expansion/Compression= Expansion= 1.7% under 500 psf when wetted.
Trail-10	8.0		20.3	107.5							Expansion/Compression= Expansion= 0.2% under 1000 psf when wetted.
Trail-11	0.0										Sulfates= <100ppm
Trail-11	2.0	SANDY LEAN CLAY (CL)	15.0			91	54	48	16	32	
Trail-11	4.0		18.1								
Trail-11	8.0		19.5								
Trail-12	0.0										Sulfates= 100ppm
Trail-12	2.0	CLAYEY SAND (SC)	12.2	124.8		100	39	25	14	11	Expansion/Compression= Expansion= 0.4% under 250 psf when wetted.



PROJECT NO.:
20214410.001A

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DATE: 6/21/2021

**LABORATORY TEST
RESULT SUMMARY**

KHA: Westside Trail - Phase I
Farmers Branch, Texas

TABLE

4

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
Trail-12	6.0		1.9	138.7							Expansion/Compression= Compression= 0.2% under 750 psf when wetted.
Trail-12	8.0		8.5	128.8							Expansion/Compression= Expansion= 2.6% under 1000 psf when wetted.



PROJECT NO.:
20214410.001A

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CHECKED BY: GRA

DATE: 6/21/2021

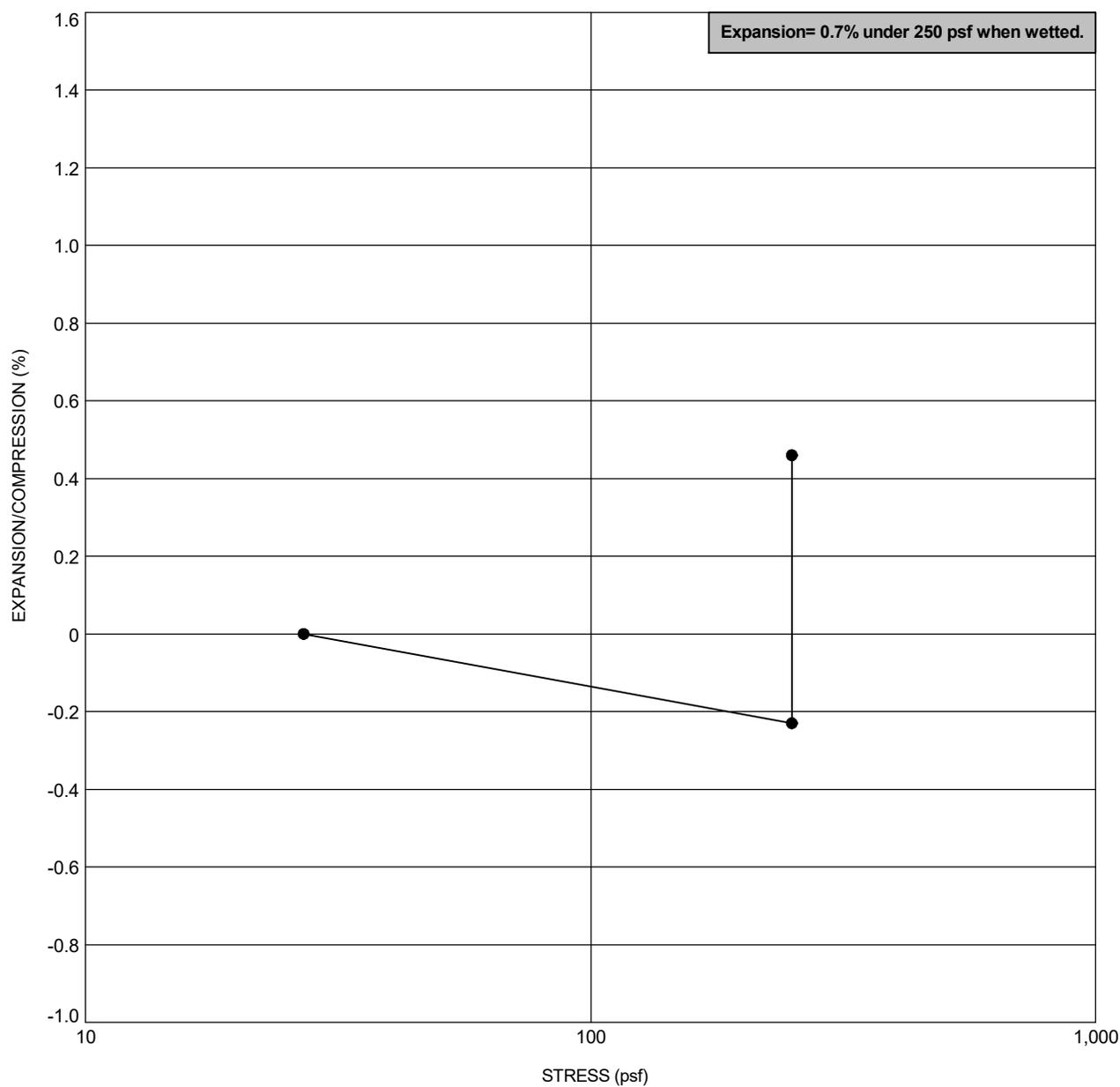
LABORATORY TEST
RESULT SUMMARY

KHA: Westside Trail - Phase I
Farmers Branch, Texas

TABLE

5

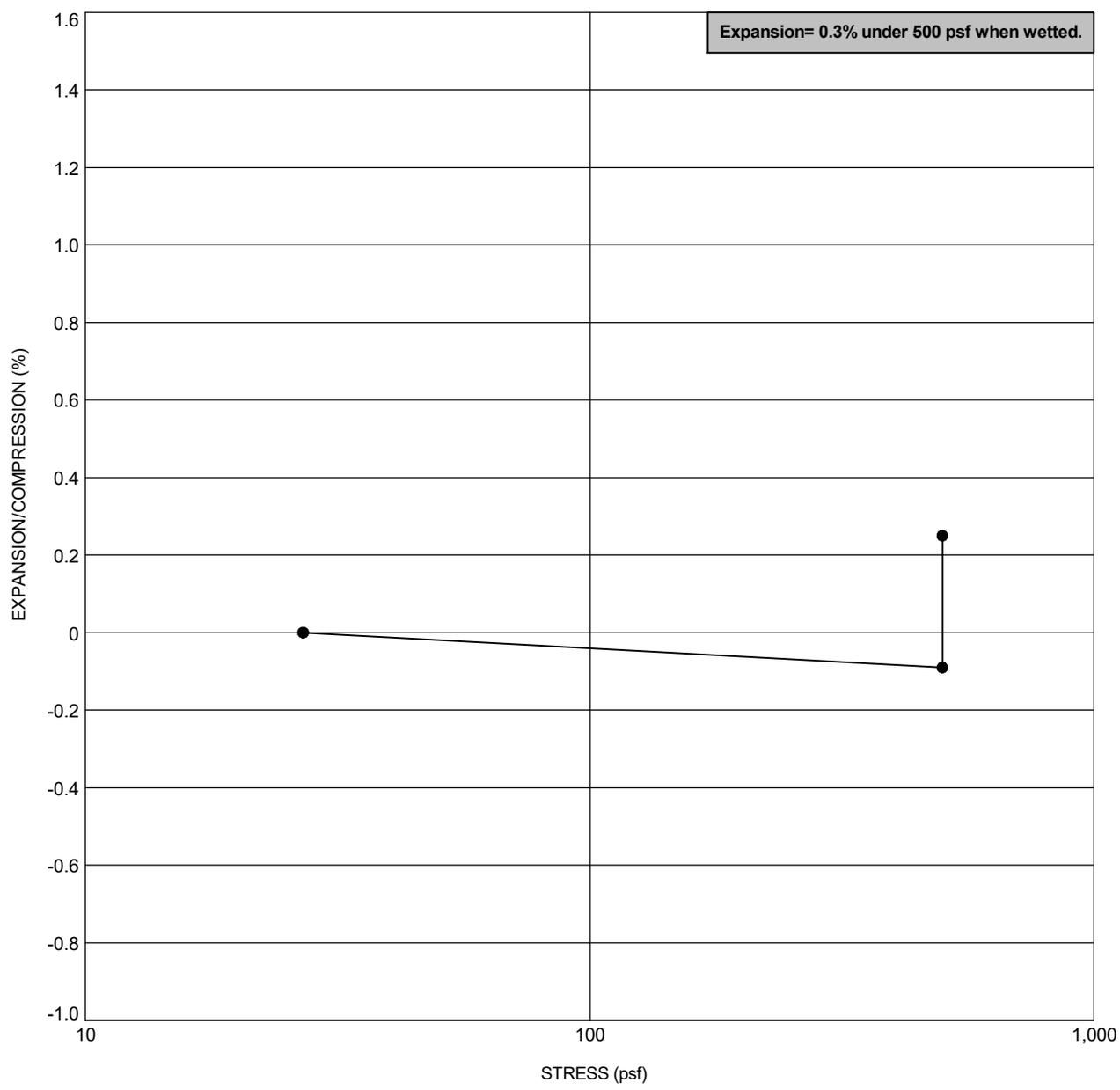
Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-02	2	SANDY FAT CLAY (CH)	22.2	102.5	23.1	101.8

Testing performed in general accordance with ASTM D4546 C.

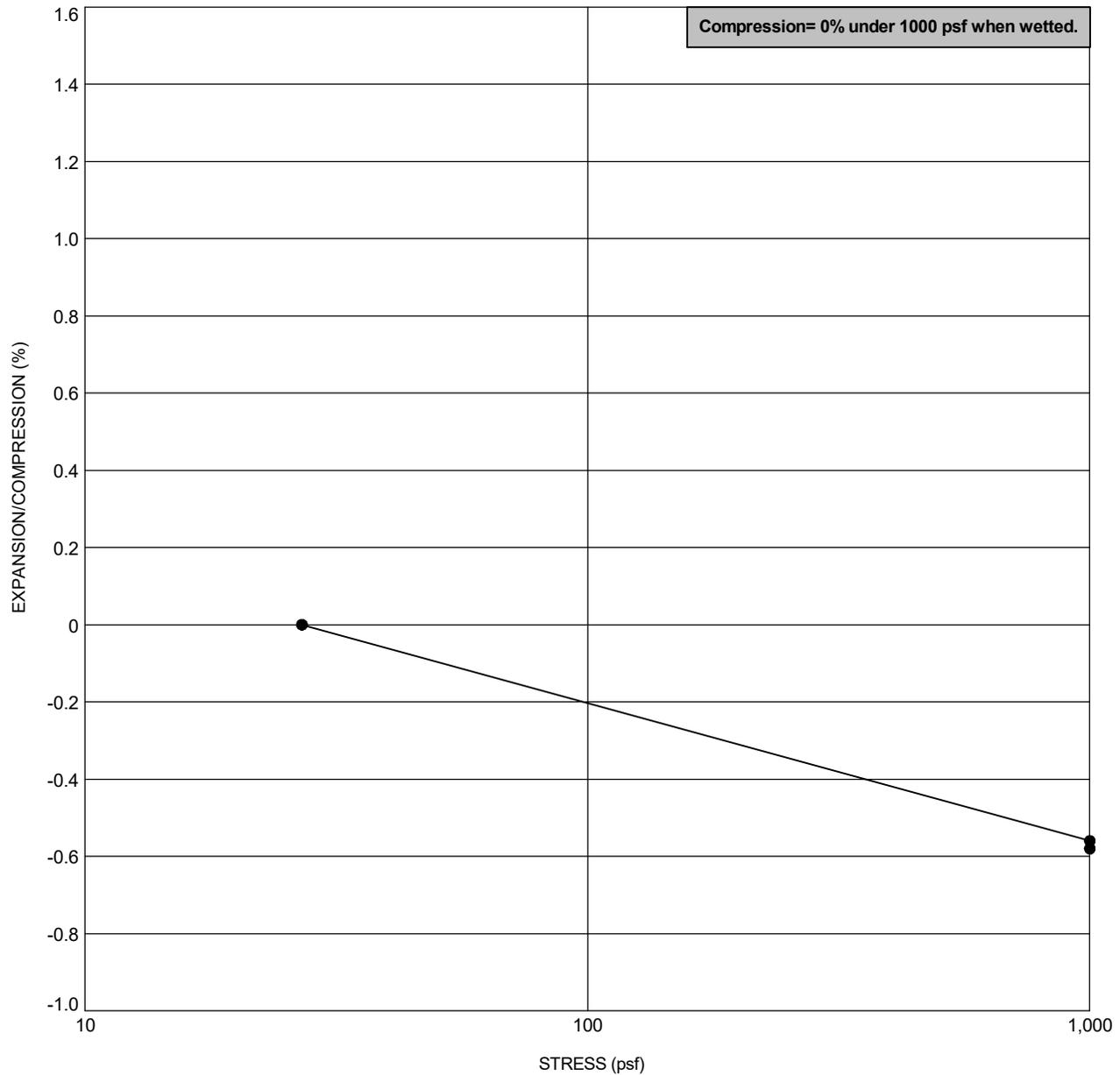
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	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-02	4	SANDY FAT CLAY (CH)	19.0	107.5	19.6	107.1

Testing performed in general accordance with ASTM D4546 C.

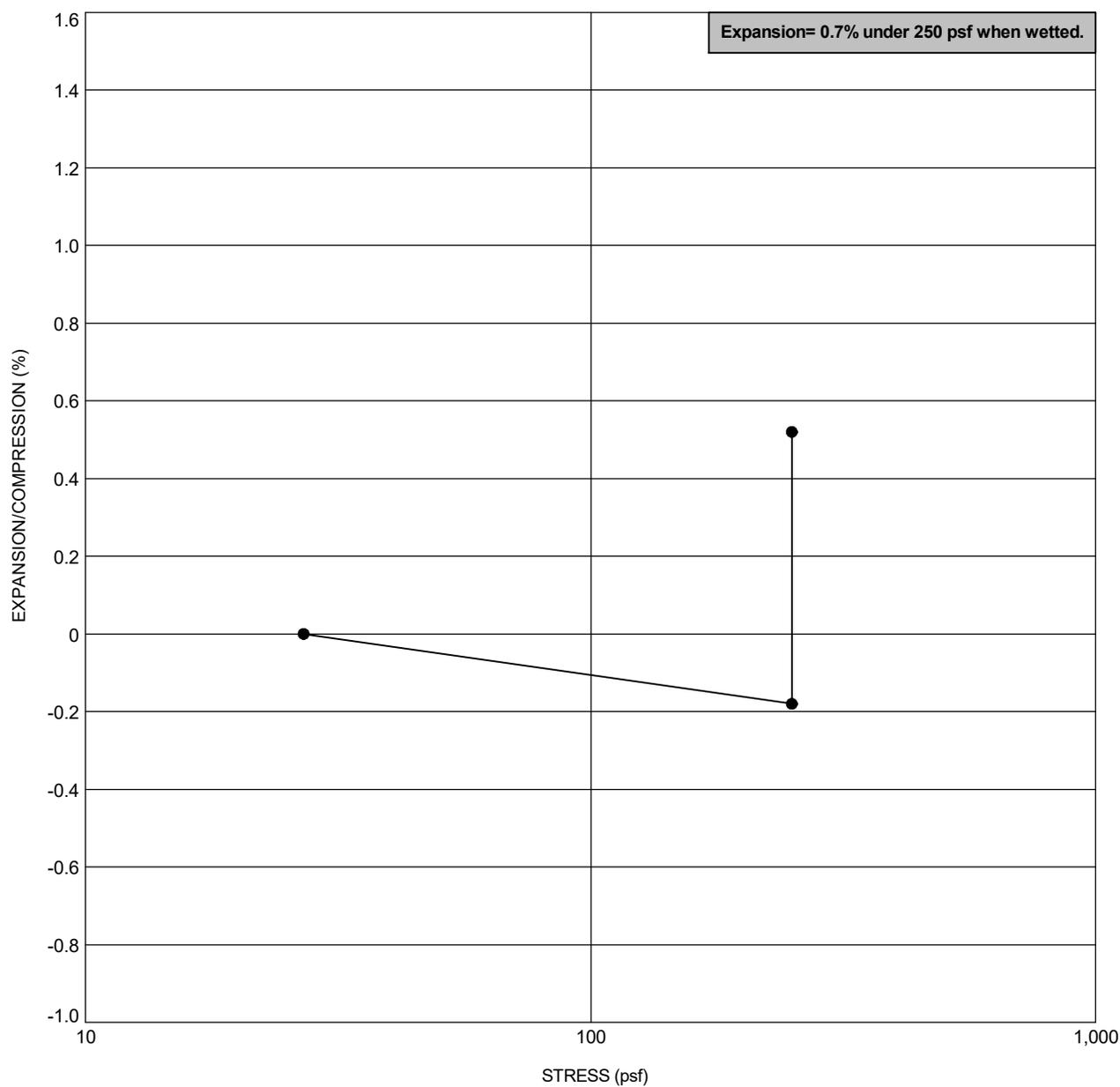
	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 5
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-02	8	SANDY FAT CLAY (CH)	17.8	111.0	18.0	111.0

Testing performed in general accordance with ASTM D4546 C.

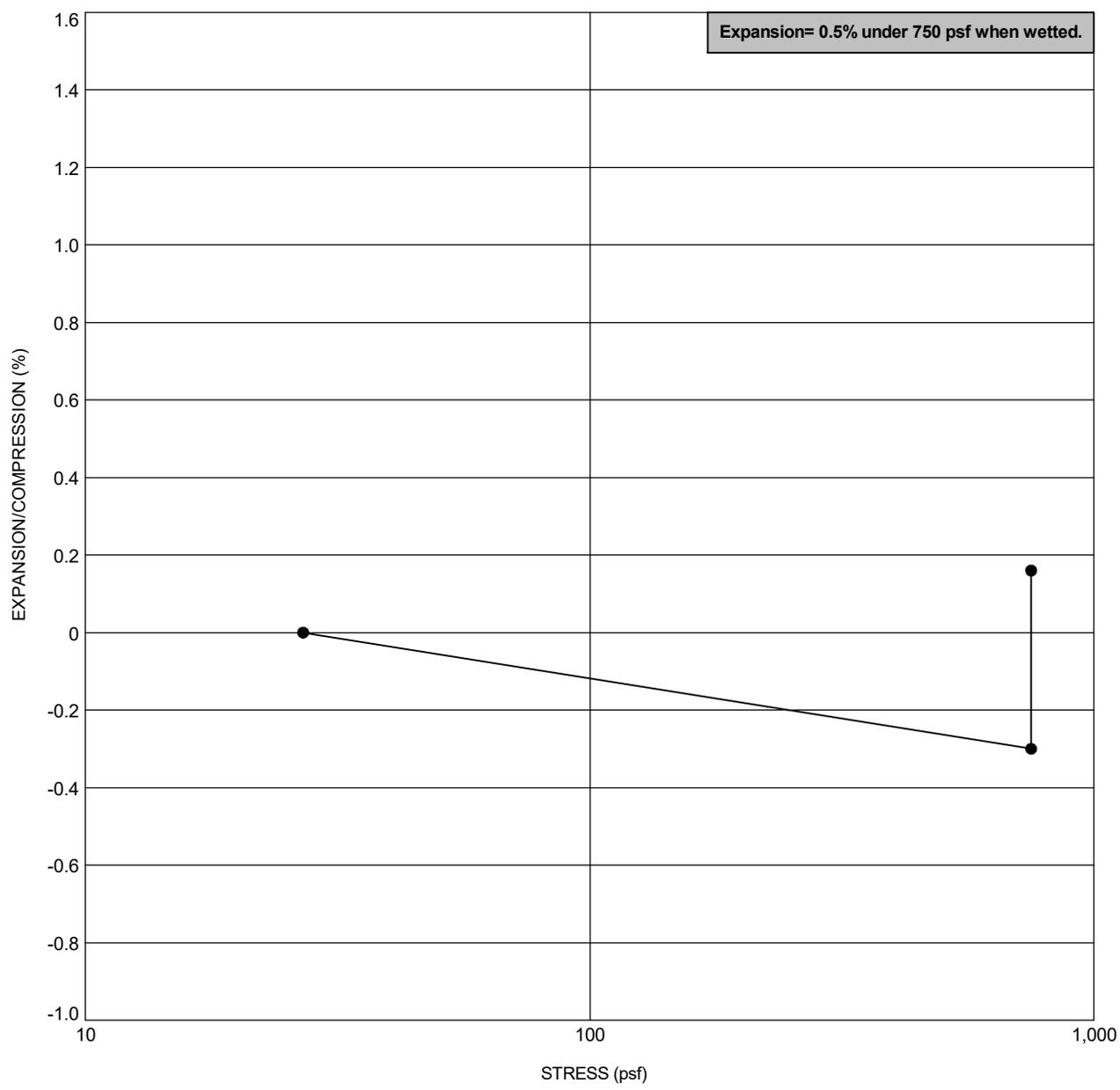
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	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-04	2	FAT TO LEAN CLAY WITH SAND (CH-CL)	17.9	109.6	18.8	108.9

Testing performed in general accordance with ASTM D4546 C.

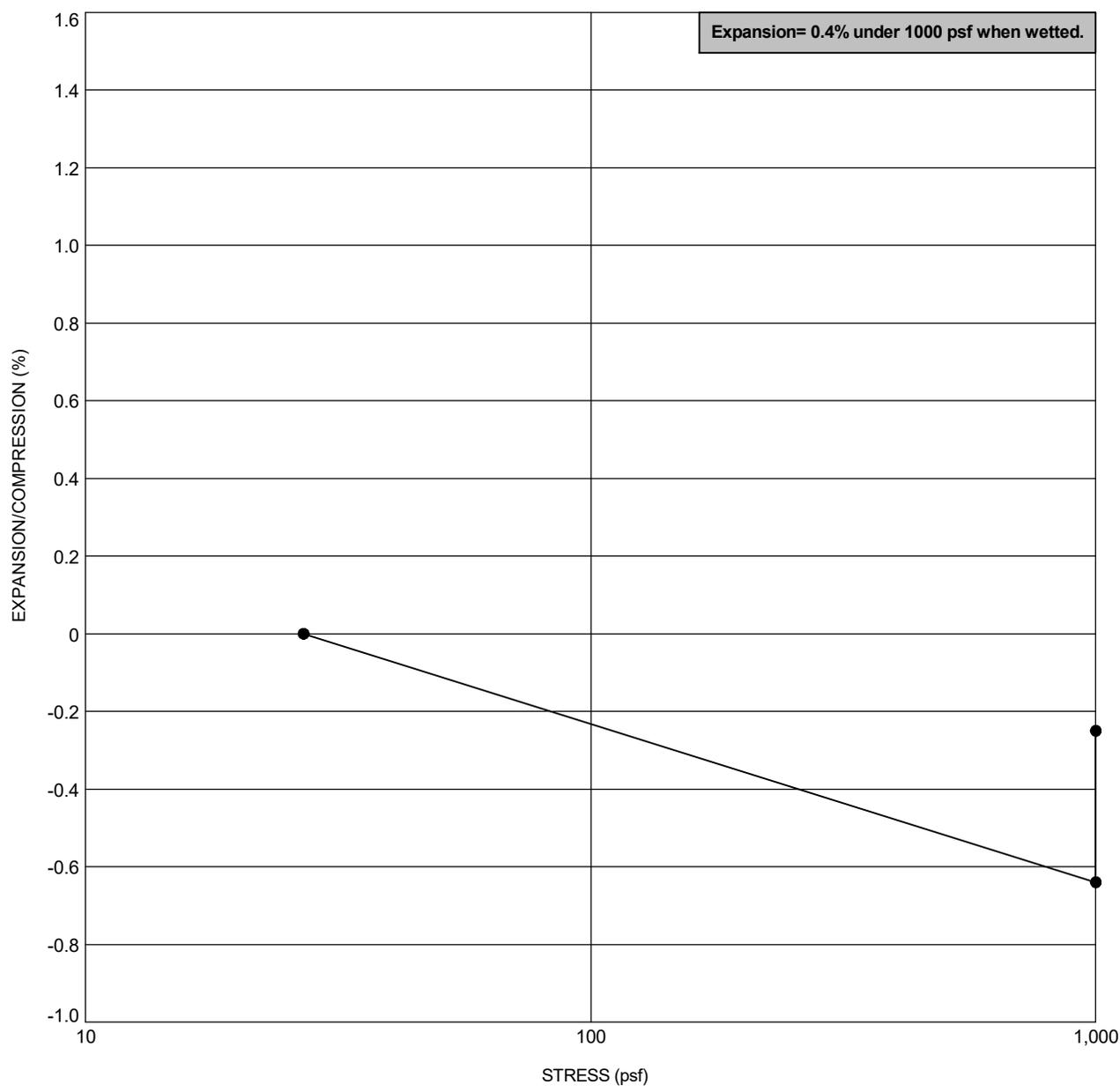
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	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-04	6	FAT TO LEAN CLAY WITH SAND (CH-CL)	19.4	107.6	19.7	107.1

Testing performed in general accordance with ASTM D4546 C.

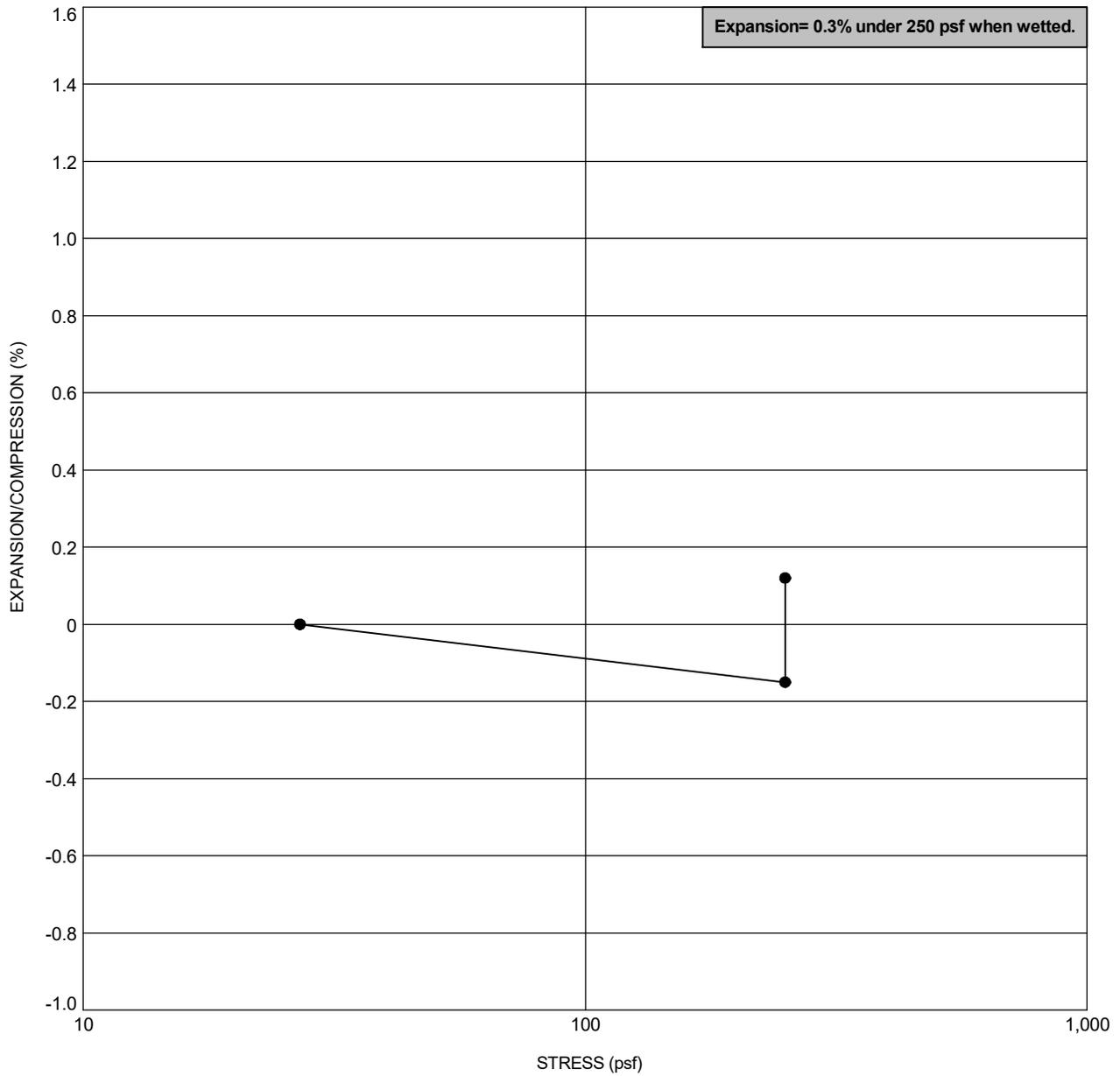
	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 8
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-04	8	FAT TO LEAN CLAY WITH SAND (CH-CL)	19.2	102.5	19.7	102.1

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 9
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-07	2	SANDY FAT CLAY (FILL)	17.8	109.4	18.7	109.1

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
 20214410.001A

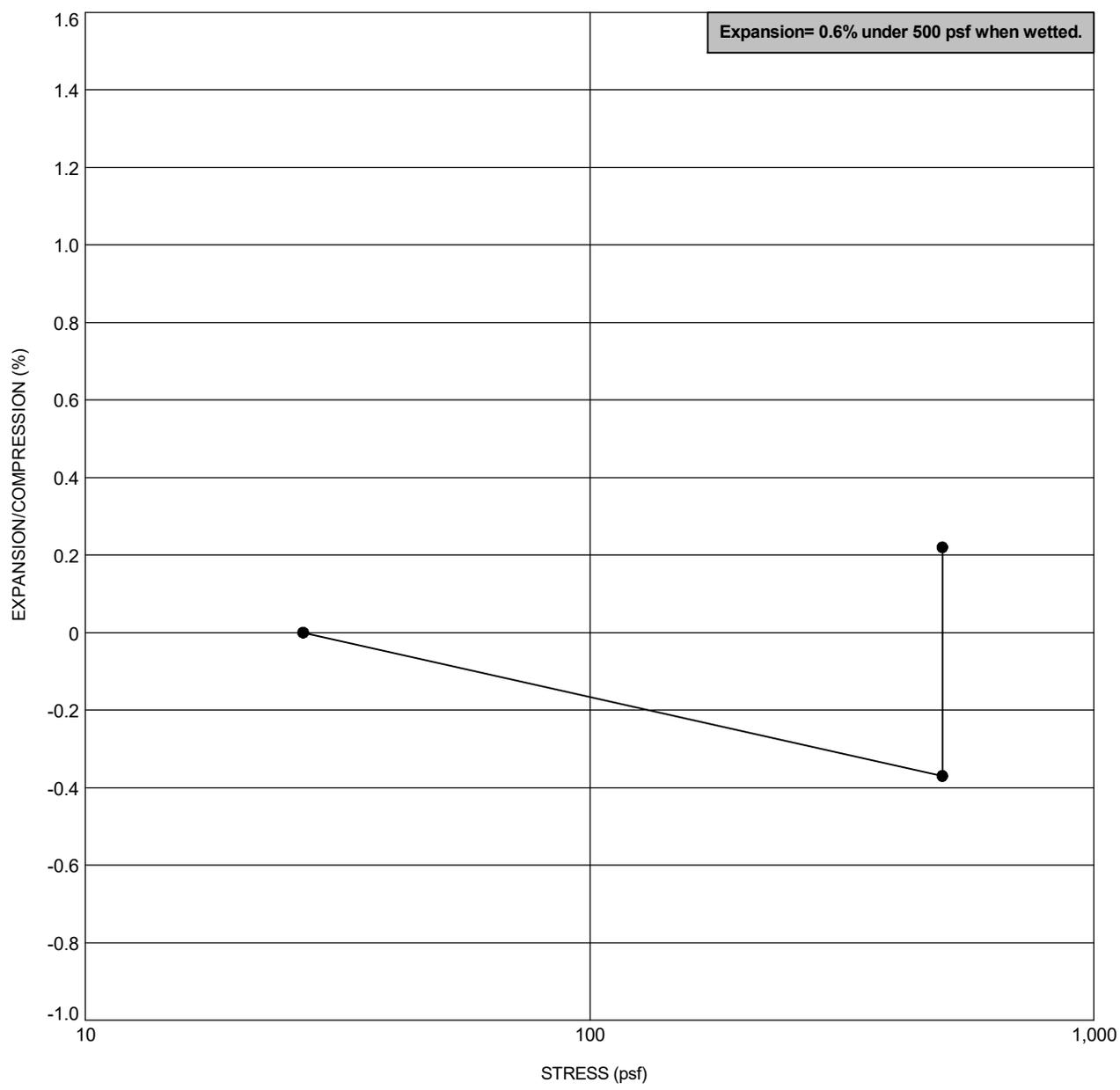
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR
COMPRESSION OF COHESIVE SOILS
"IN-SITU"

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

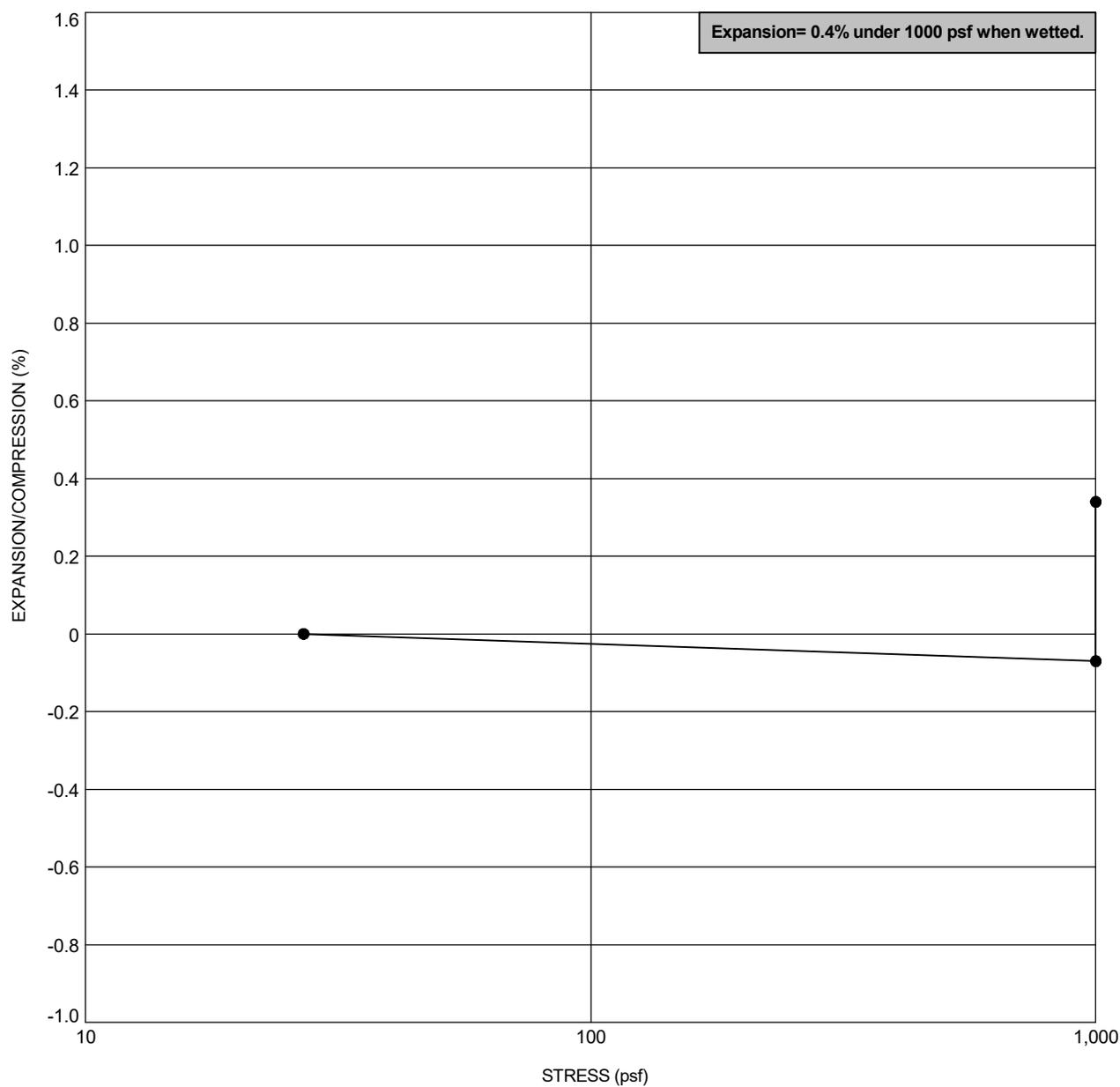
10



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-07	4	SANDY FAT CLAY (FILL)	21.7	103.6	22.1	103.0

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 11
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-07	8	FAT CLAY WITH SAND (CH)	23.5	100.8	23.7	100.4

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
 20214410.001A

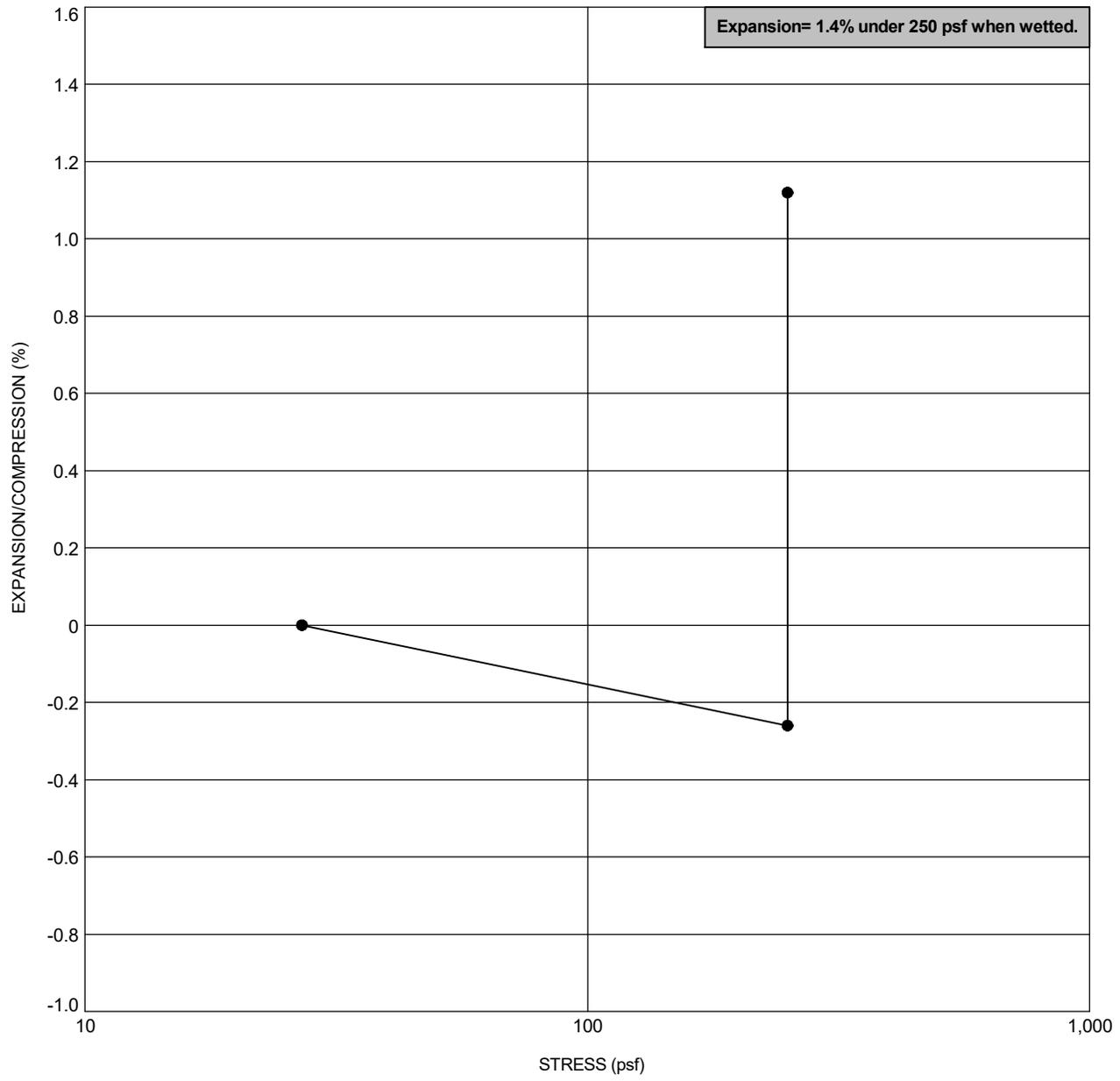
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR
 COMPRESSION OF COHESIVE SOILS
 "IN-SITU"

 KHA: Westside Trail - Phase I
 Farmers Branch, Texas

FIGURE

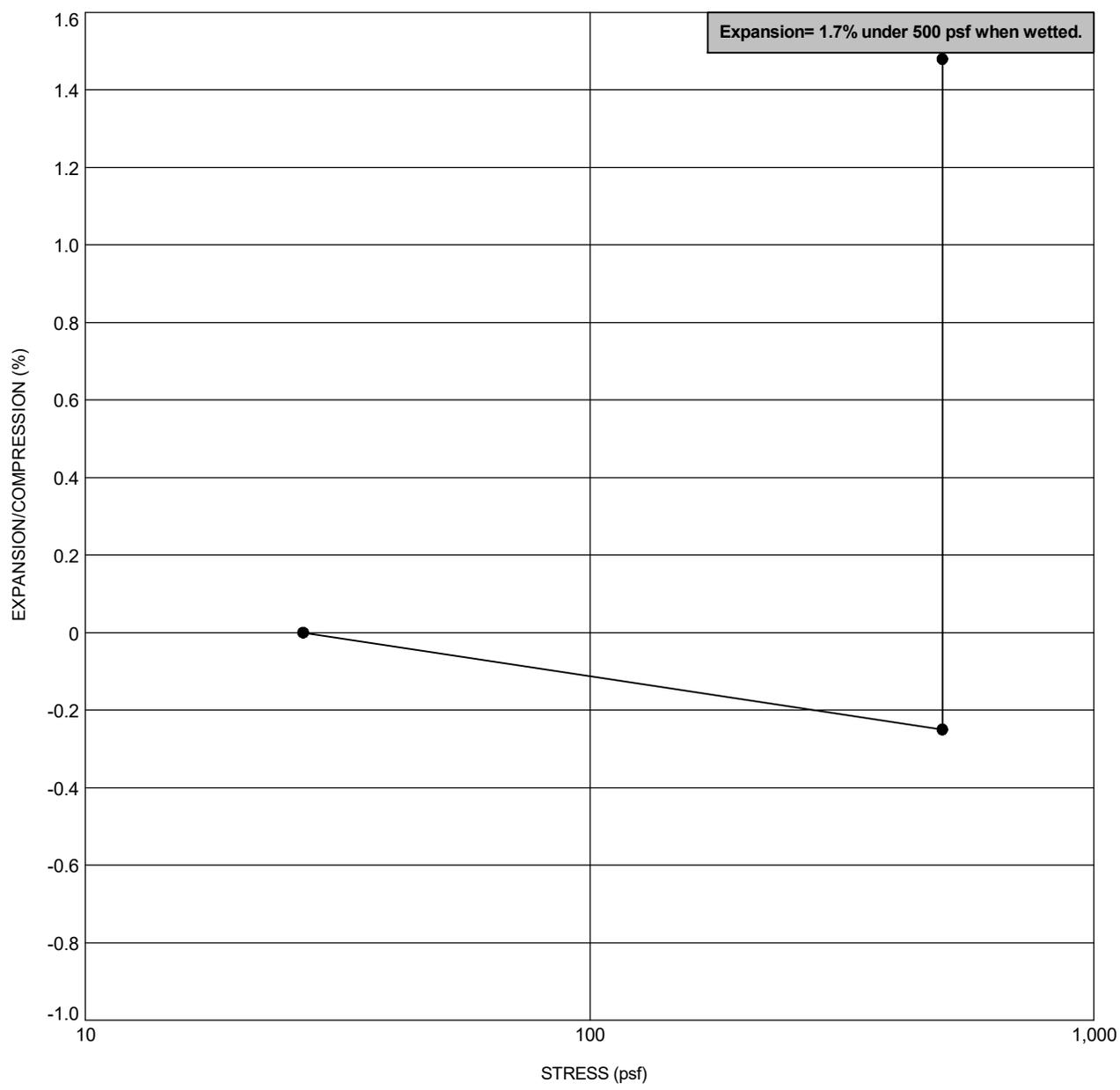
 12



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-10	2	FAT CLAY WITH SAND (CH)	18.8	108.1	19.9	106.6

Testing performed in general accordance with ASTM D4546 C.

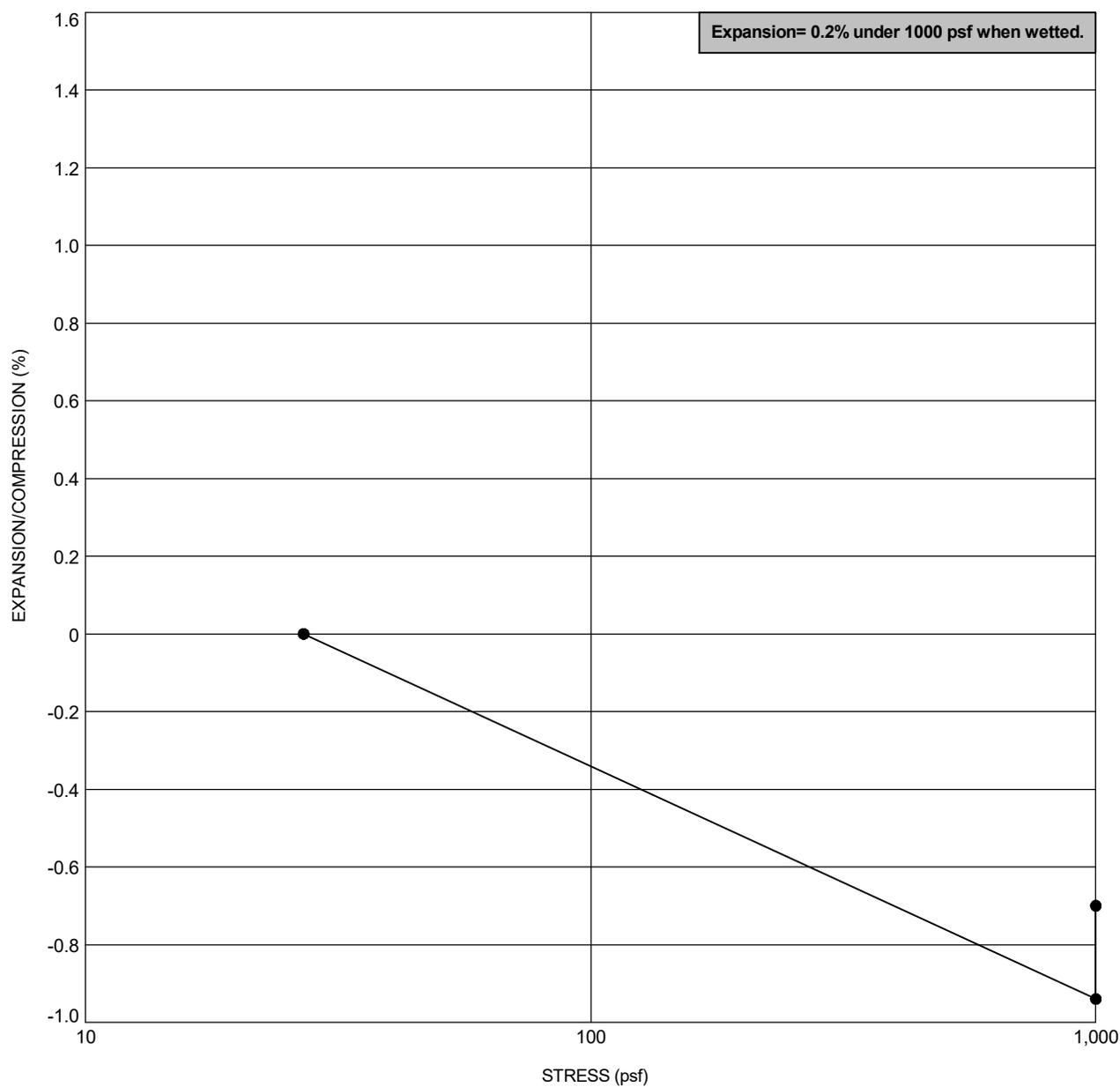
	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 13
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-10	4	FAT CLAY WITH SAND (CH)	16.9	110.7	18.4	108.8

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"	FIGURE 14
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-10	8	FAT CLAY WITH SAND (CH)	20.3	107.5	20.8	107.2

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
 20214410.001A

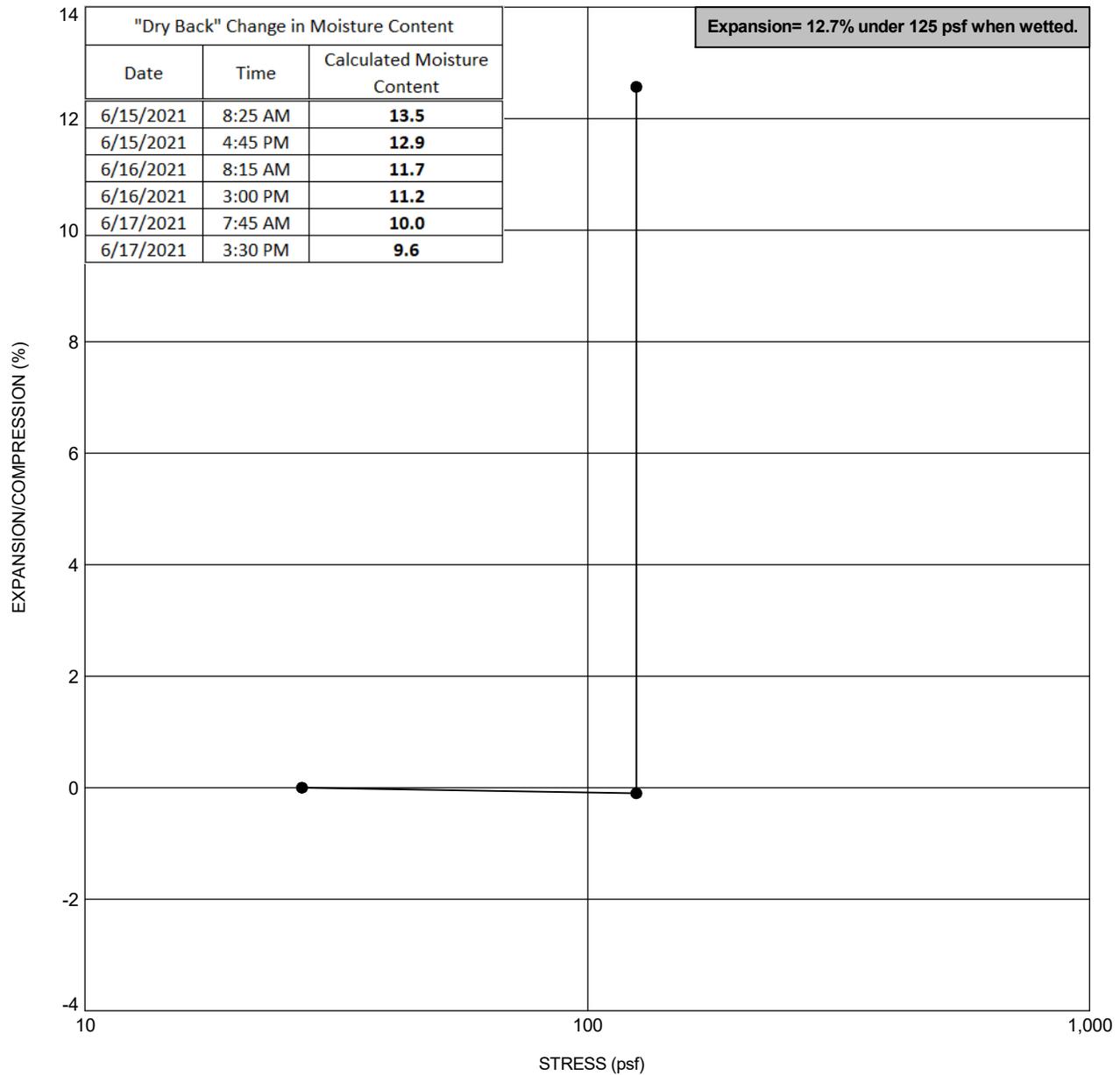
 DRAWN BY: DBJ
 CHECKED BY: GRA
 DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "IN-SITU"

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

15

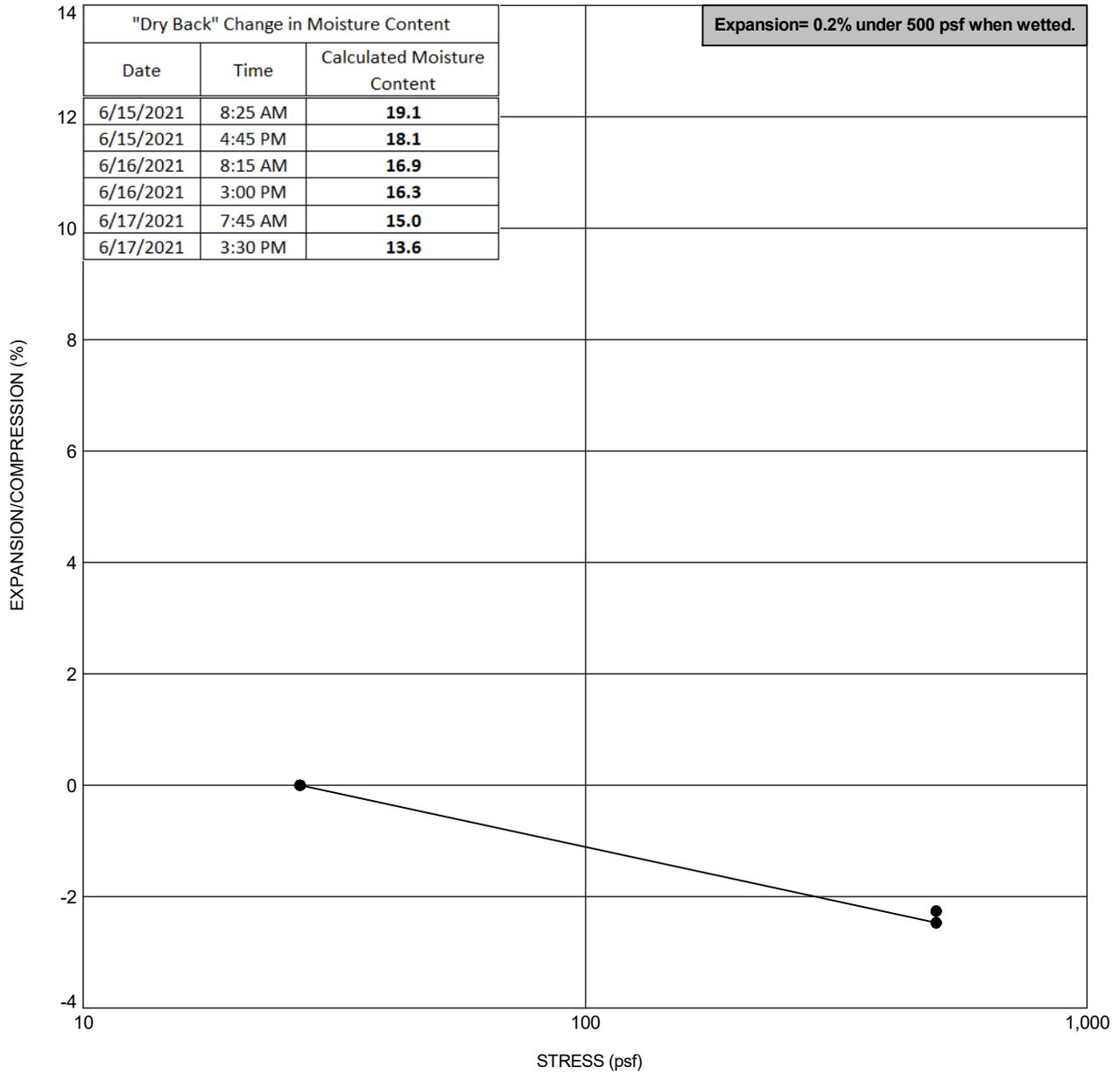


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-03	0	LEAN CLAY WITH SAND (CL)	9.6	128.1	18.9	113.7

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	16



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-03	4	LEAN CLAY WITH SAND (CL)	13.6	121.9	18.4	121.7

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
20214410.001A

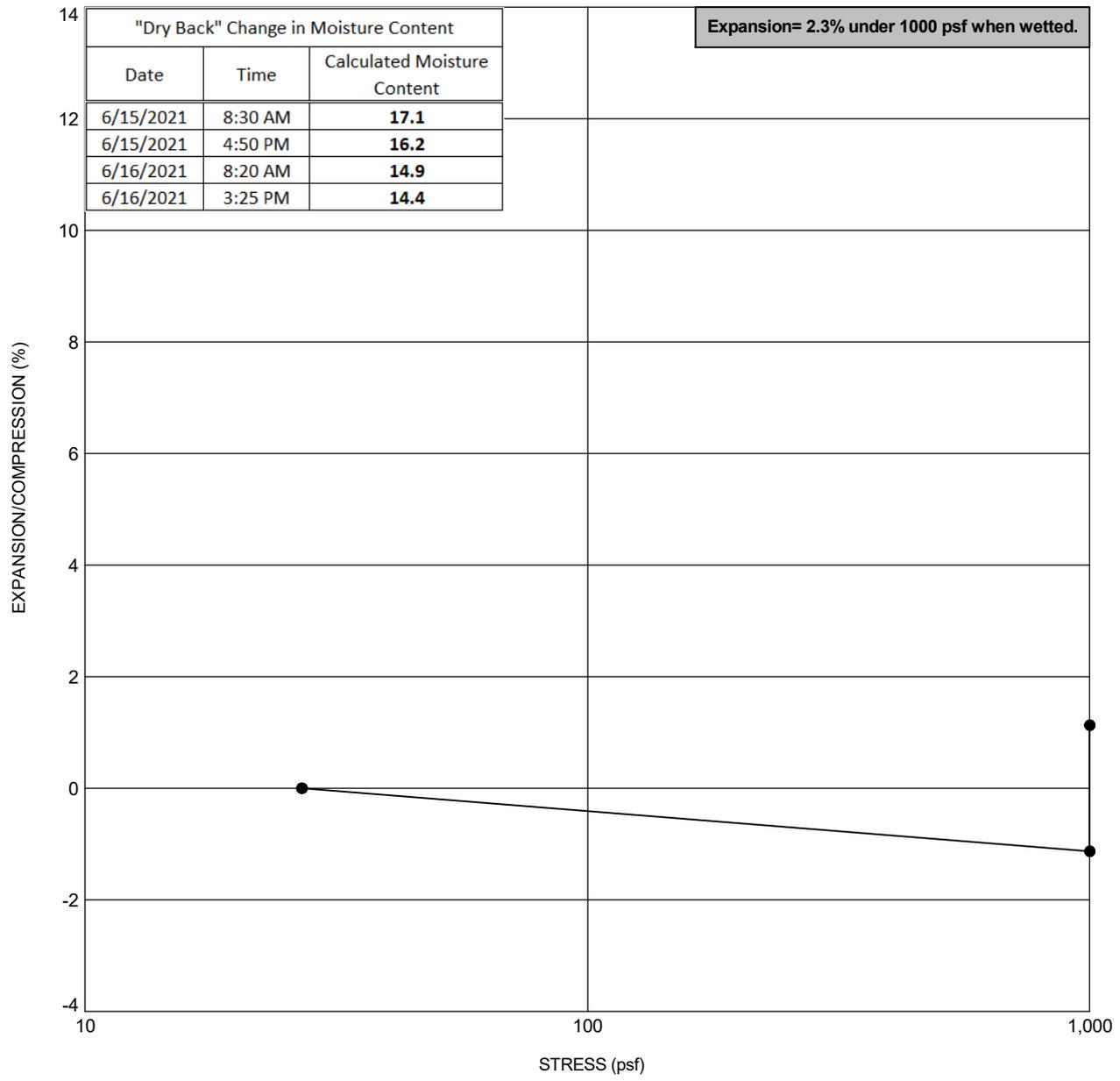
DRAWN BY: DBJ
CHECKED BY: GRA
DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR
COMPRESSION OF COHESIVE SOILS
"DRY BACK"

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

17

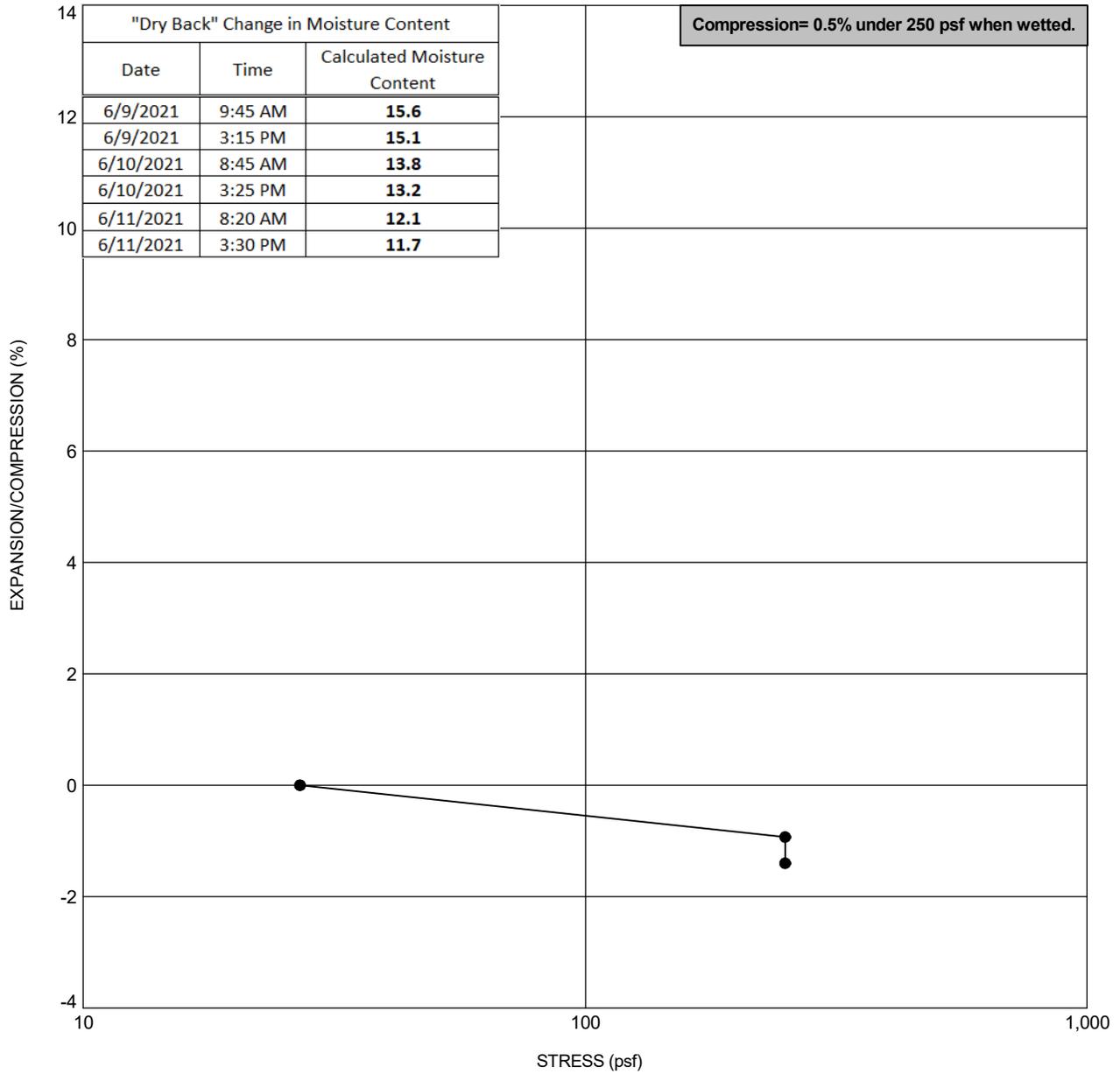


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-03	8	LEAN CLAY WITH SAND (CL)	14.4	115.4	19.4	112.9

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE 18
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-05	2	LEAN CLAY WITH SAND (CL)	11.7	124.8	18.4	125.4

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

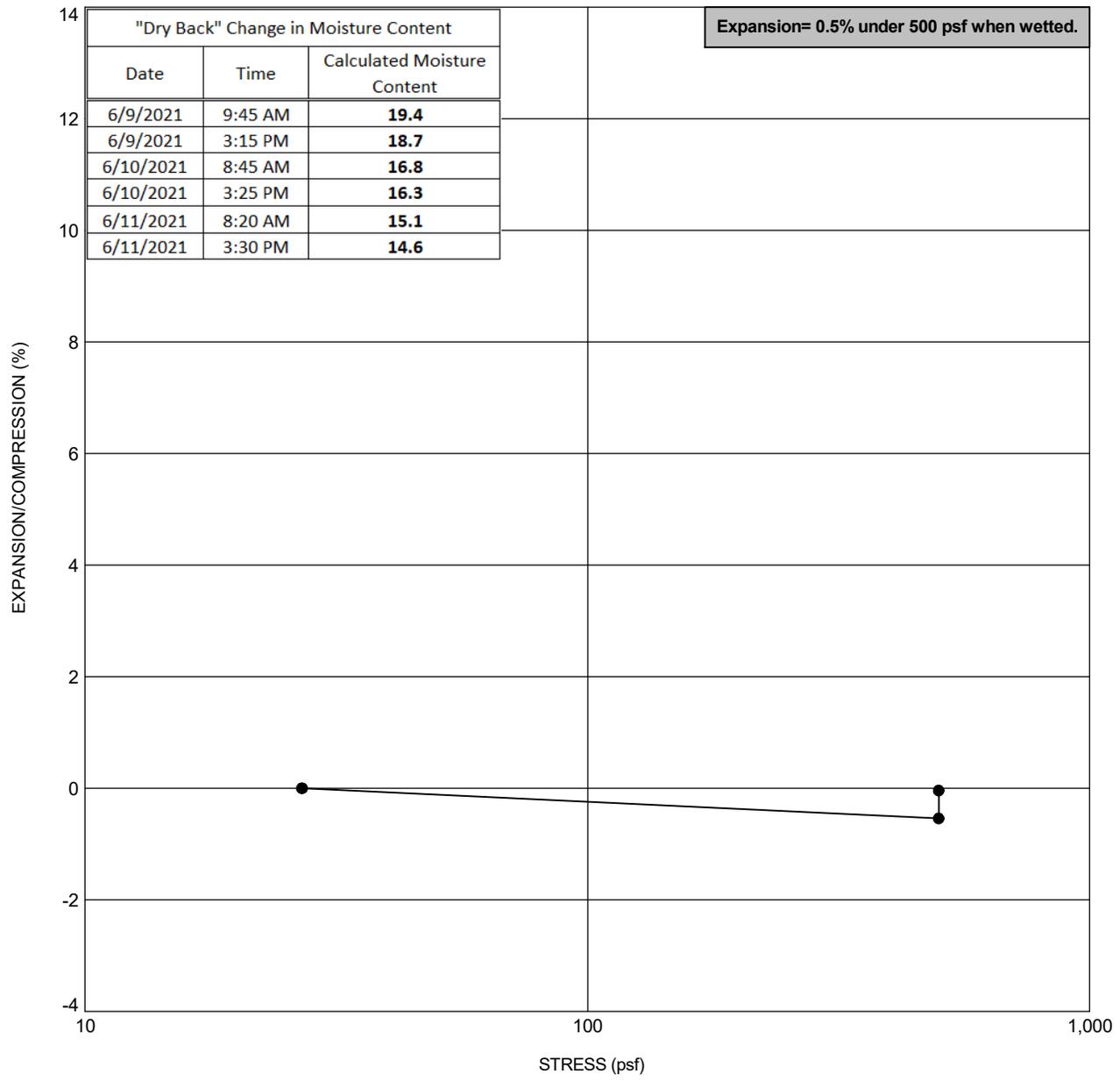
CHECKED BY: GRA

DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR
COMPRESSION OF COHESIVE SOILS
"DRY BACK"

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE
19

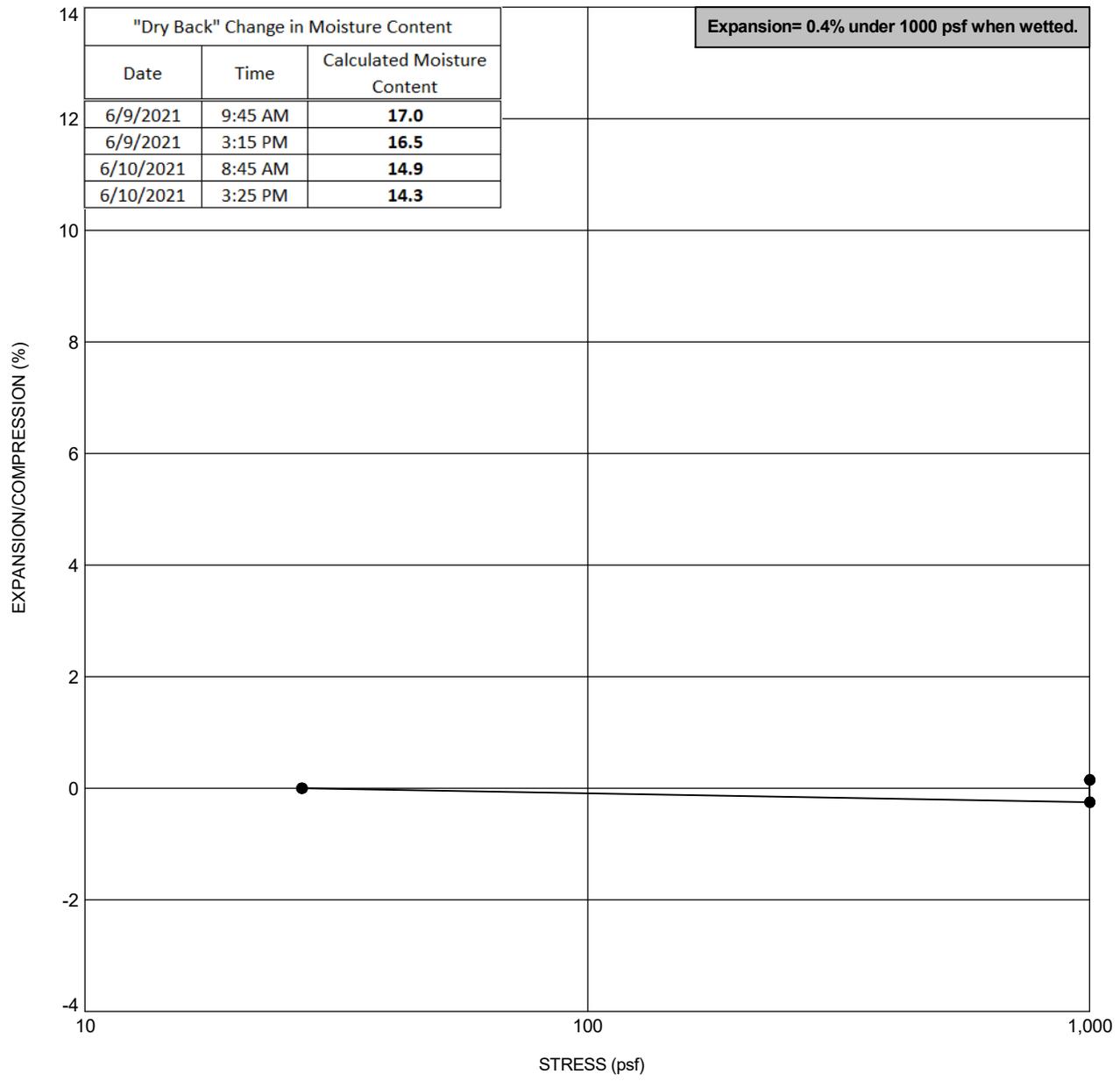


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-05	4	LEAN CLAY WITH SAND (CL)	14.6	117.7	22.6	117.1

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK" KHA: Westside Trail - Phase I Farmers Branch, Texas	FIGURE 20
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



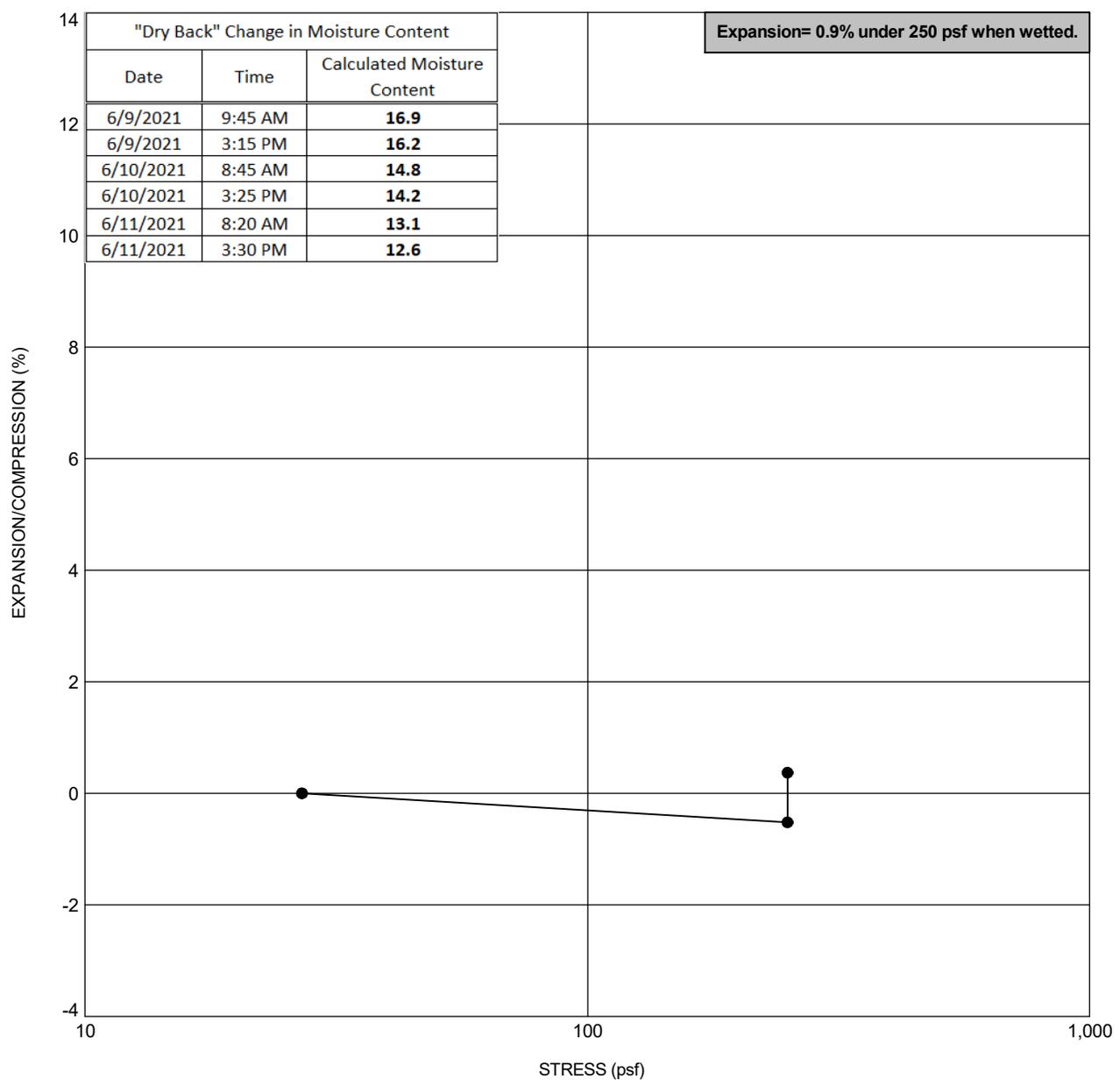
Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-05	8	LEAN CLAY WITH SAND (CL)	14.3	116.4	19.8	115.9

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE 21
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		

PROJECT NUMBER: 20214410.001A
 OFFICE FILTER: DALLAS
 PLOTTED: 06/25/2021 10:28 AM BY: GAnderson
 GINT FILE: Kf_gint_master_2021
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2021.GLB [KLF_EXPANSION/COMPRESSION (SINGLE)(PSF)]

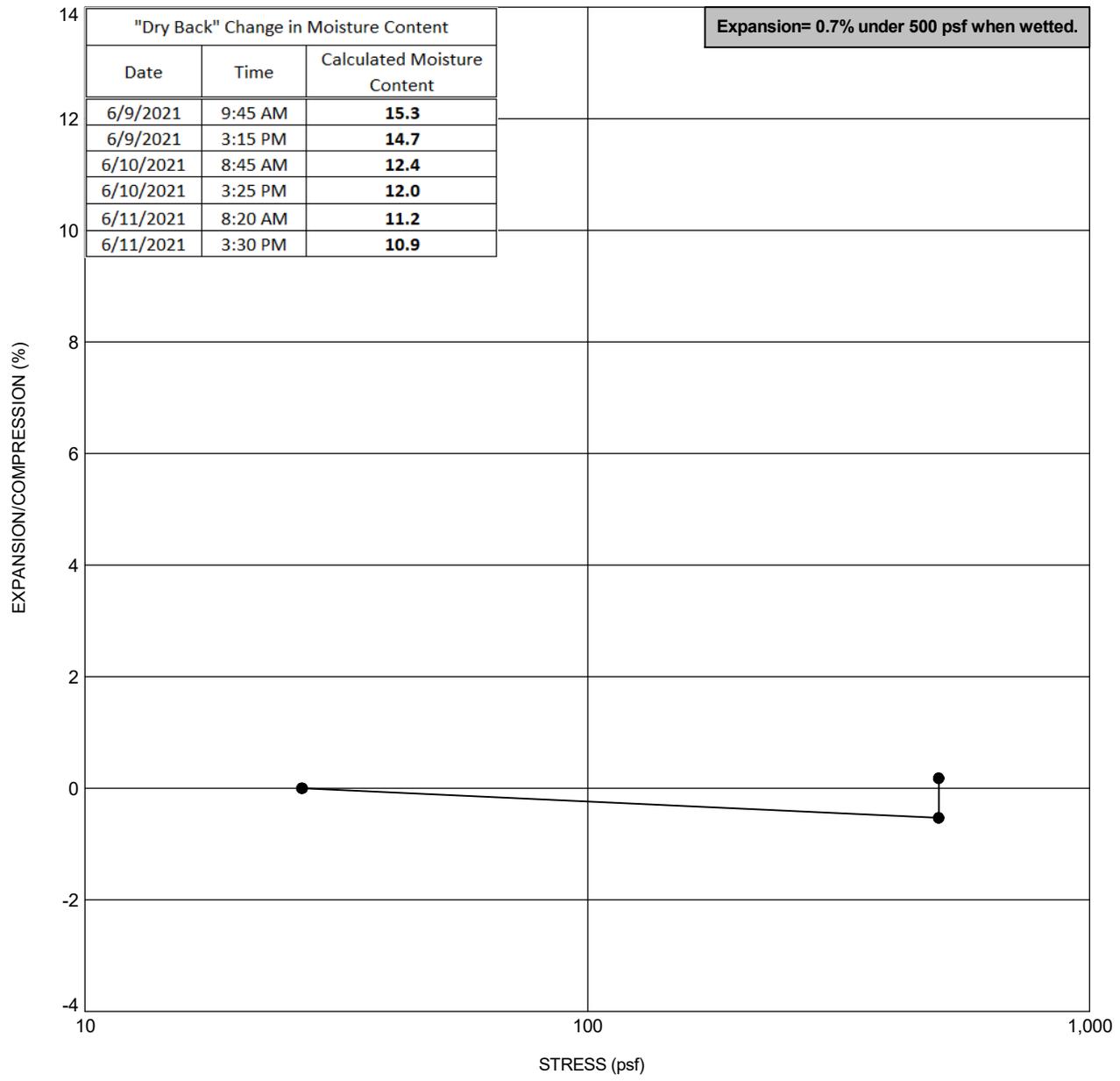


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-09	2	FAT CLAY WITH SAND (CH)	12.6	119.6	20.6	118.6

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE 22
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		

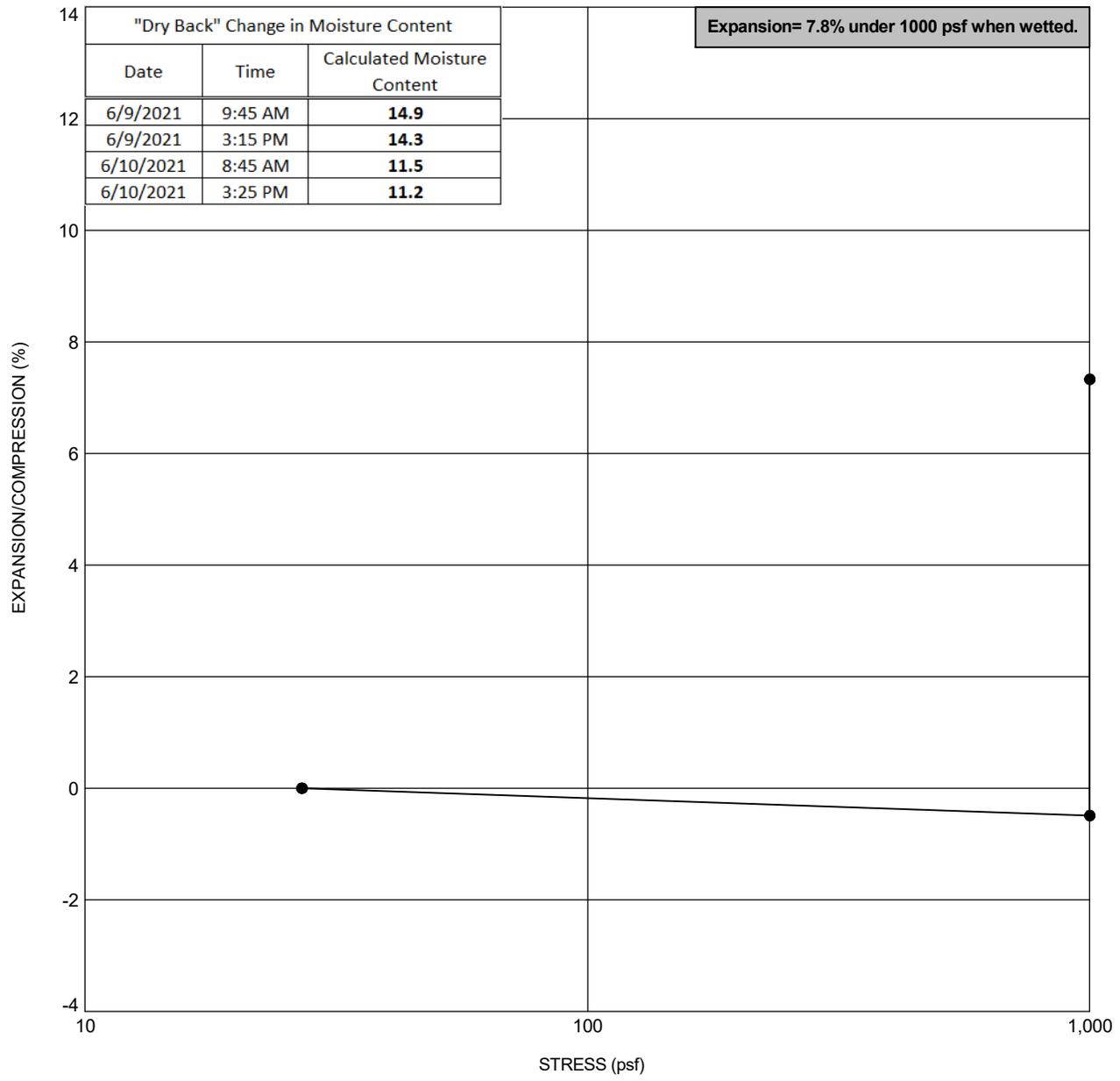


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-09	4	FAT CLAY WITH SAND (CH)	10.9	125.0	20.5	124.1

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE 23
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		

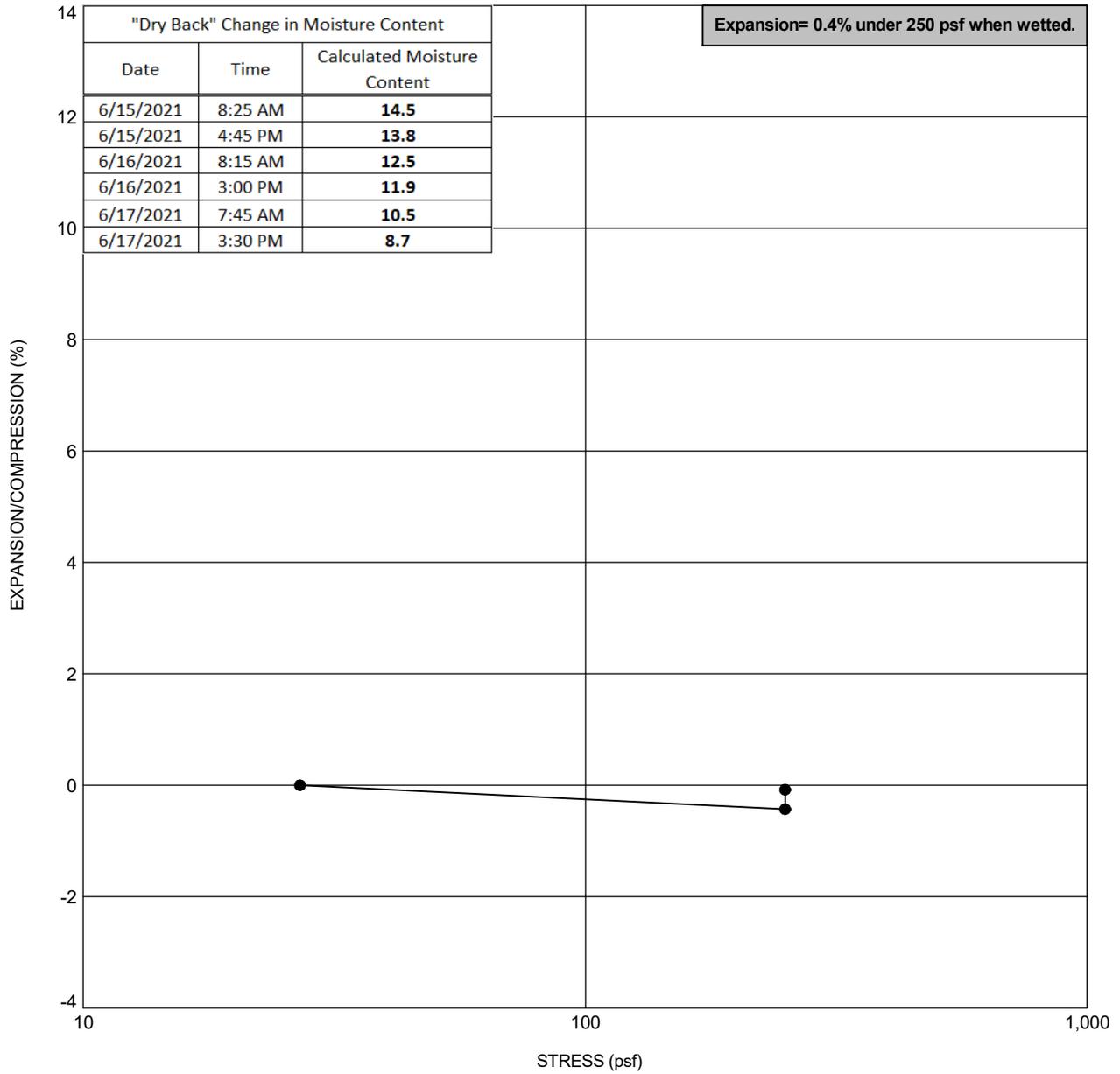


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-09	8	FAT CLAY WITH SAND (CH)	11.2	124.5	20.3	115.5

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	24



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-12	2	CLAYEY SAND (SC)	8.7	124.8	15.2	124.3

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.



PROJECT NO.:
20214410.001A

DRAWN BY: DBJ

CHECKED BY: GRA

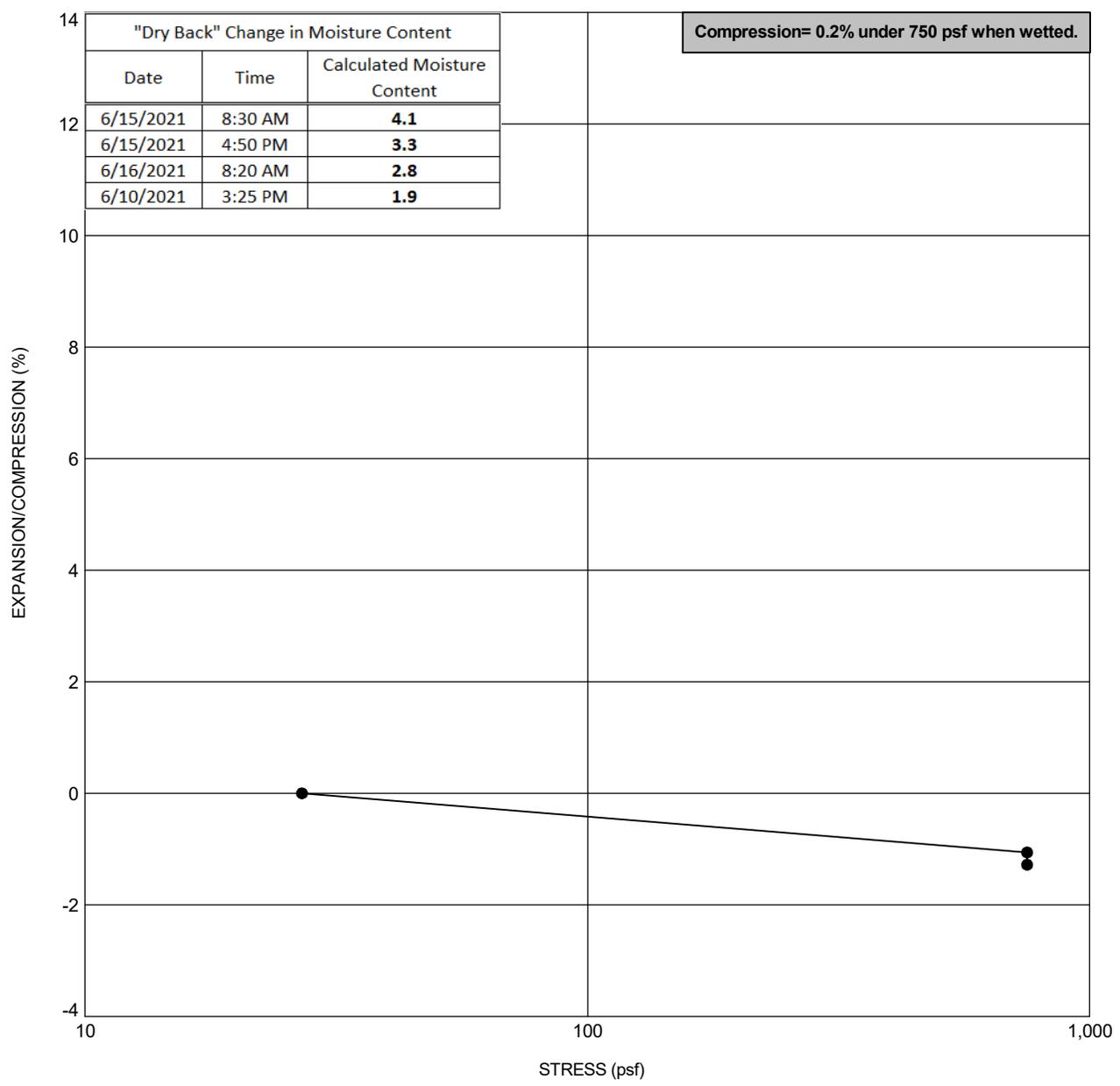
DATE: 6/21/2021

ONE-DIMENSIONAL EXPANSION OR
COMPRESSION OF COHESIVE SOILS
"DRY BACK"

KHA: Westside Trail - Phase I
Farmers Branch, Texas

FIGURE

25

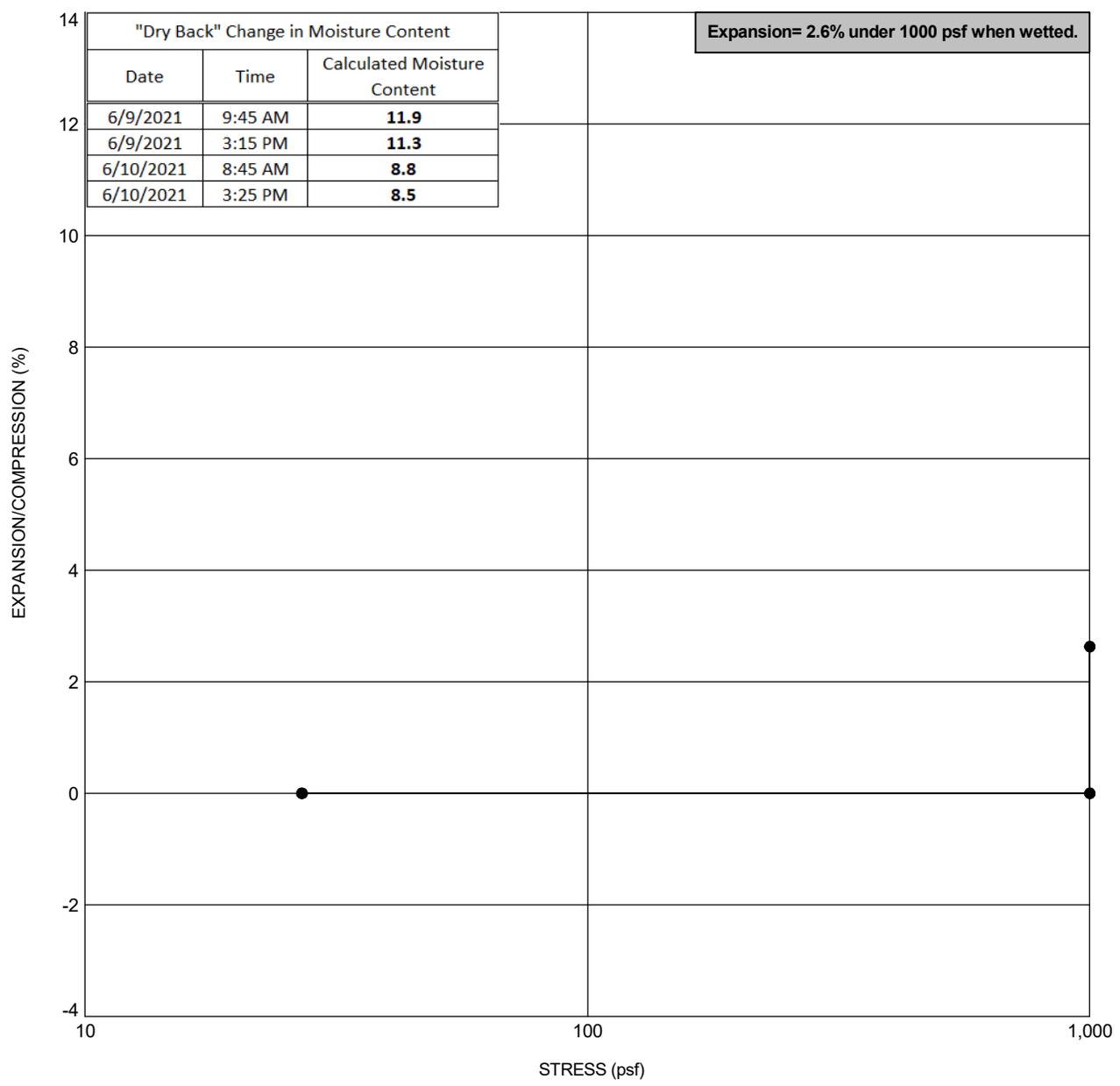


Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-12	6	CLAYEY SAND (SC)	1.9	138.7	5.7	139.0

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE 26
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
Trail-12	8	SANDY FAT CLAY (CH)	8.5	128.8	12.8	125.5

NOTE: Sample's moisture was reduced from the insitu one, before performing the test

Testing performed in general accordance with ASTM D4546 C.

	PROJECT NO.: 20214410.001A	ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS "DRY BACK"	FIGURE
	DRAWN BY: DBJ CHECKED BY: GRA DATE: 6/21/2021	KHA: Westside Trail - Phase I Farmers Branch, Texas	27

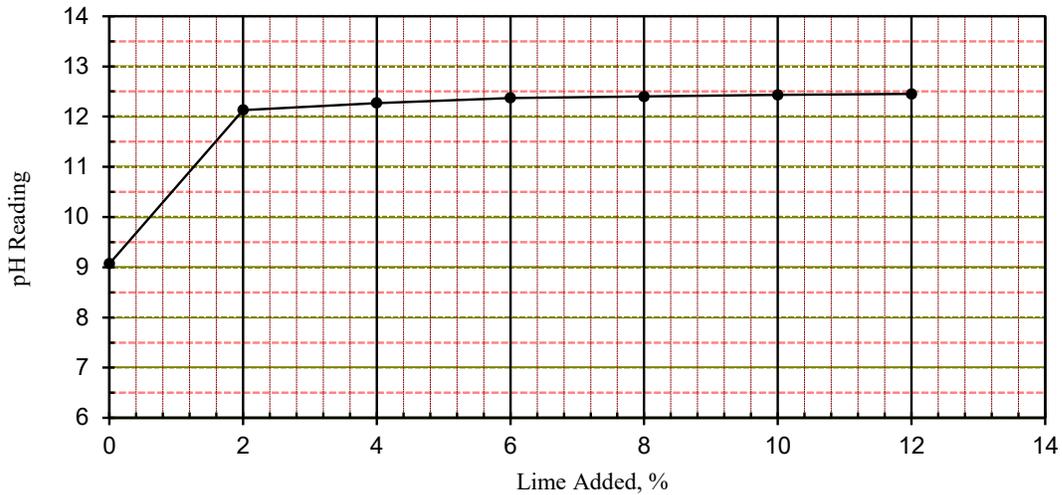
pH Lime Series Test Results

Project Name: KHA: Westside Trail Phase - I
Project No.: 20214410.001A

Sample Location: 2.0' - 4.0'
Sample Description: Lean CLAY with Sand

Sample No.: Trail-3 **Tested By:** B. Cartledge
Liquid Limit: NA **Date Tested:** 6/11/21
Plasticity Index: NA **pH Meter ID:** AB92356137
Minus #200: NA

<u>% Lime Added</u>	<u>pH Reading</u>
0	9.07
2	12.13
4	12.27
6	12.37
8	12.40
10	12.43
12	12.45



KLEINFELDER, INC.
 Texas Registered Engineering Firm F-16438

Ron Brewer

Ron Brewer, Lab Manager

The results shown on this report are for the exclusive use of the client for whom they were obtained and apply only to the samples tested and/or inspected. They are not intended to be indicative of the qualities of apparently identical products. The use of our name must receive prior written approval. Reports must be reproduced in their entirety. Test method based on ASTM C 977 (Eades and Grim).

pH Lime Series Test Results

Project Name: KHA: Westside Trail Phase - I

Project No.: 20214410.001A

Sample Location: 2.0' - 4.0'

Sample Description: Sandy Lean CLAY

Sample No.: Trail-11

Tested By: B. Cartlidge

Liquid Limit: NA

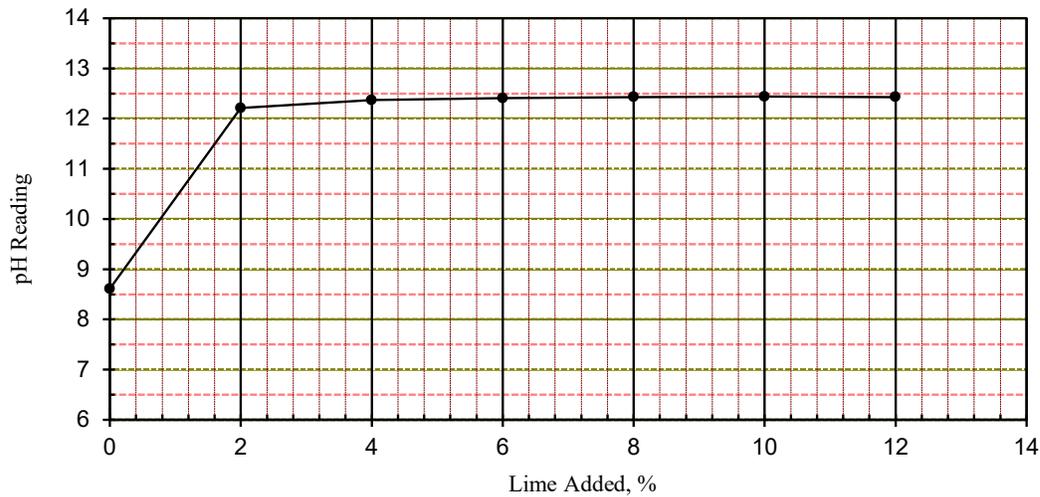
Date Tested: 6/11/21

Plasticity Index: NA

pH Meter ID: AB92356137

Minus #200: NA

<u>% Lime Added</u>	<u>pH Reading</u>
0	8.61
2	12.21
4	12.37
6	12.41
8	12.43
10	12.44
12	12.43



KLEINFELDER, INC.

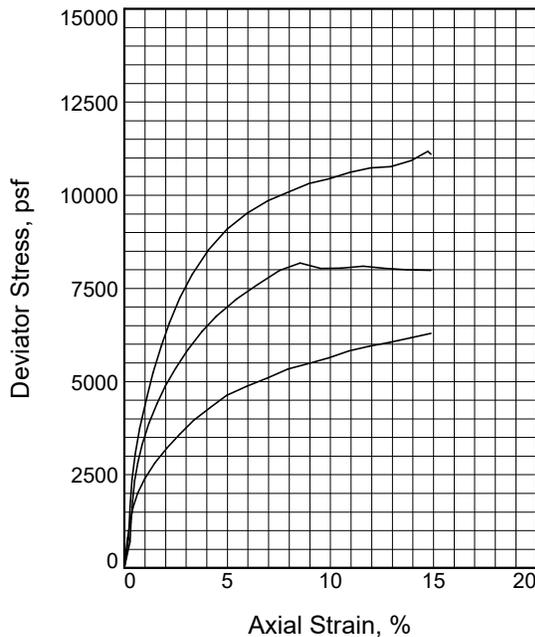
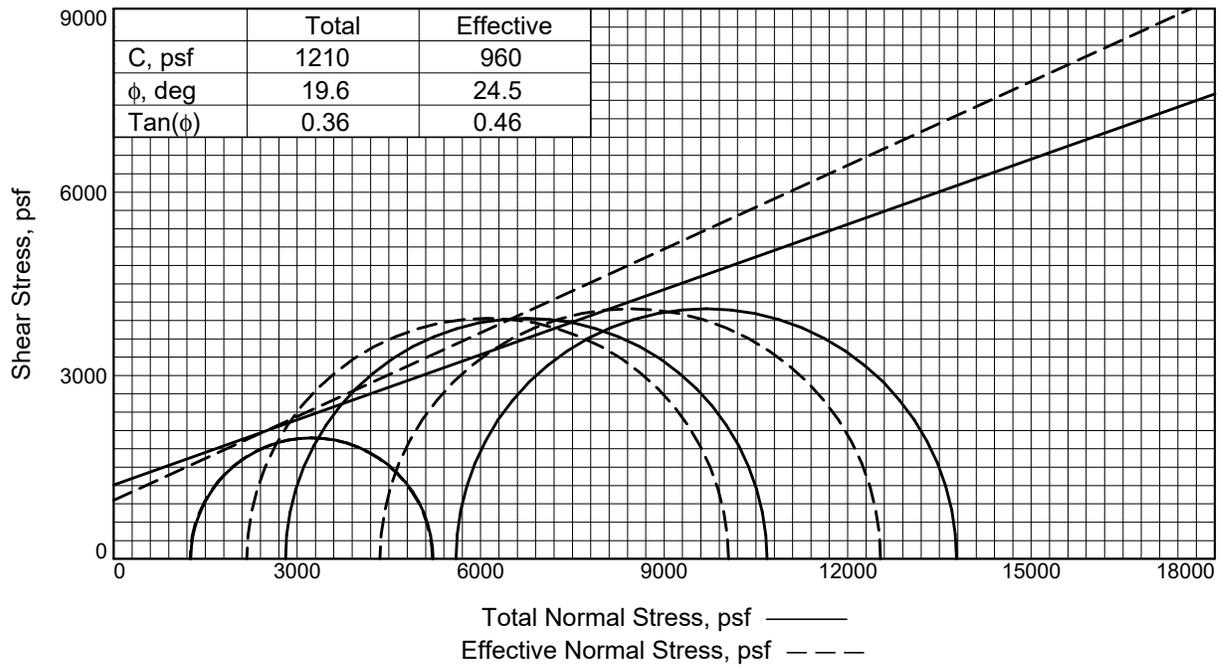
Texas Registered Engineering Firm F-16438

Ron Brewer

Ron Brewer, Lab Manager

The results shown on this report are for the exclusive use of the client for whom they were obtained and apply only to the samples tested and/or inspected. They are not intended to be indicative of the qualities of apparently identical products. The use of our name must receive prior written approval. Reports must be reproduced in their entirety. Test method based on ASTM C 977 (Eades and Grim).

Consolidation Pressures and/or Normal Loads were applied per Project and/or Client Request
Soil Classification is based on Visual Classification Method when the Classification Test Results are not available



Sample No.	1	2	3	
Initial	Water Content, %	12.9	12.4	14.7
	Dry Density, pcf	120.7	122.5	119.3
	Saturation, %	88.0	89.0	96.5
	Void Ratio	0.3968	0.3756	0.4124
	Diameter, in.	2.748	2.770	2.757
	Height, in.	5.770	5.760	5.740
At Test	Water Content, %	16.2	14.5	16.8
	Dry Density, pcf	117.1	119.4	115.5
	Saturation, %	99.9	95.1	98.7
	Void Ratio	0.4392	0.4113	0.4594
	Diameter, in.	2.777	2.794	2.790
	Height, in.	5.820	5.806	5.790
Strain rate, %/min.	0.0015	0.0055	0.0070	
Eff. Cell Pressure, psi	8.75	19.51	38.86	
Fail. Stress, psf	3960	7873	8183	
Excess Pore Pr., psf	11	631	1241	
Strain, %	3.4	3.3	8.5	
Ult. Stress, psf				
Excess Pore Pr., psf				
Strain, %				
$\bar{\sigma}_1$ Failure, psf	5209	10051	12538	
$\bar{\sigma}_3$ Failure, psf	1249	2179	4355	

Type of Test:
CU with Pore Pressures

Sample Type: Undisturbed

Description: Lean Clay to Fat Clay, brown

LL= 48 PL= 15 PI= 33

Assumed Specific Gravity= 2.7

Remarks: Passing #200 Sieve = 77%

Client: Kimley-Horn & Associates

Project: KHA: Westside Trail, Phase I - Farmers Branch, Texas

Source of Sample: RW-2 **Depth:** 4.0' - 10.0'

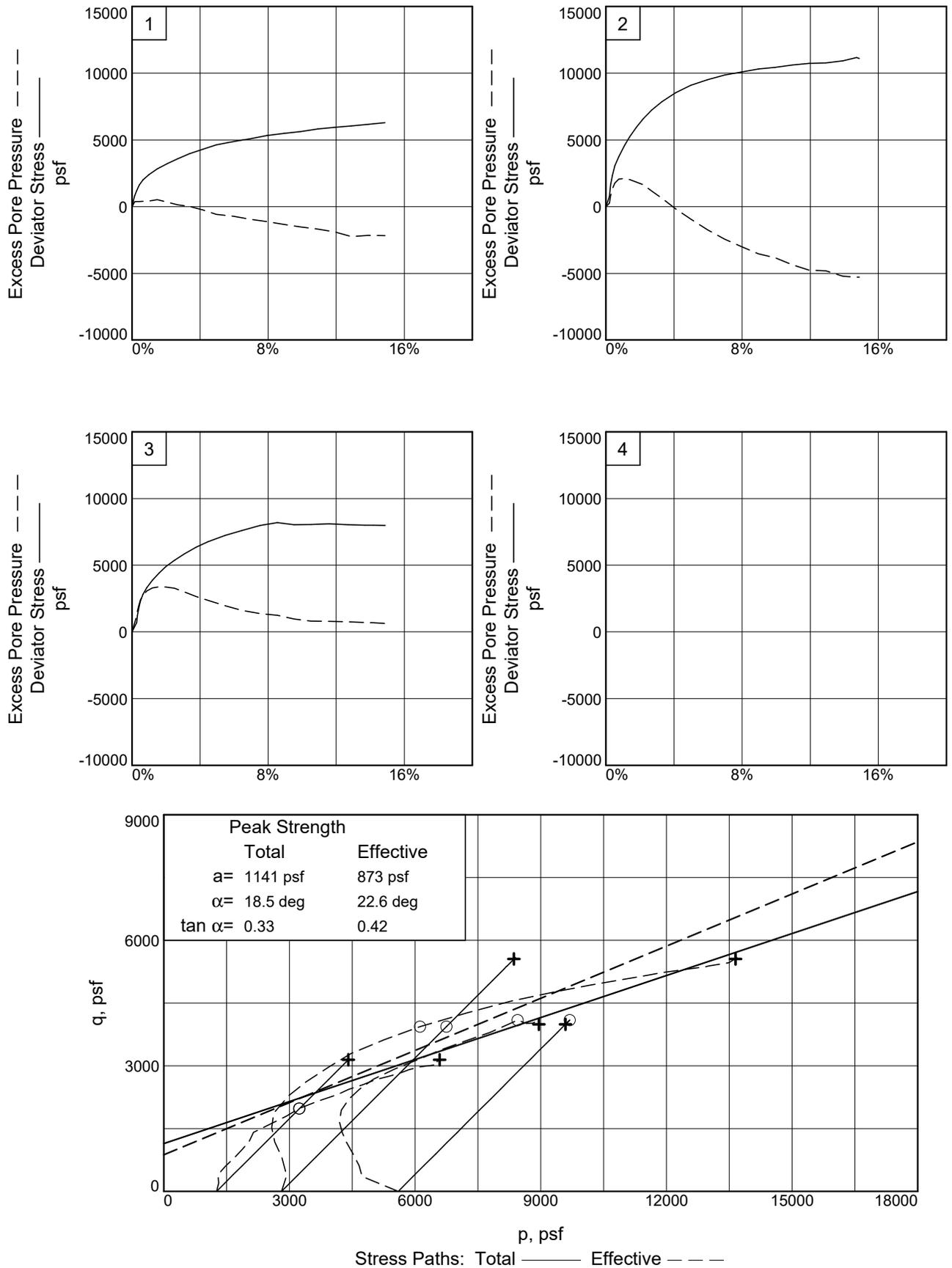
Sample Number: U3, U4, U5

Proj. No.: 20214410.001A **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT
Kleinfelder, Inc.
Irving, TX

Figure 1

Consolidation Pressures and/or Normal Loads were applied per Project and/or Client Request
 Soil Classification is based on Visual Classification Method when the Classification Test Results are not available



Client: Kimley-Horn & Associates

Project: KHA: Westside Trail, Phase I - Farmers Branch, Texas

Source of Sample: RW-2

Depth: 4.0' - 10.0'

Sample Number: U3, U4, U5

Project No.: 20214410.001A

Figure 2

Kleinfelder, Inc.

Tested By: E. Arapi / T. Reid

Checked By: N. Janacek

Figure 31

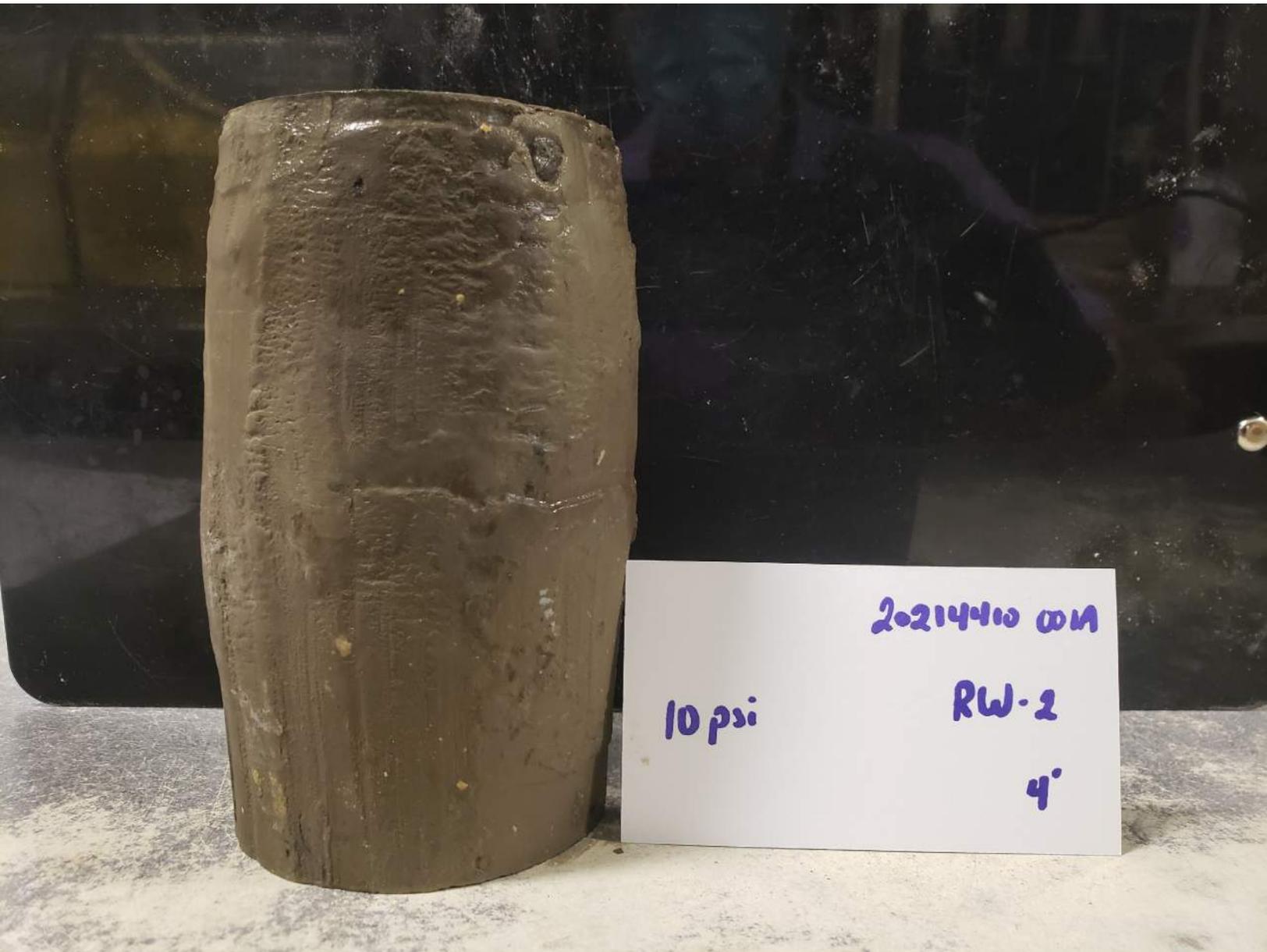
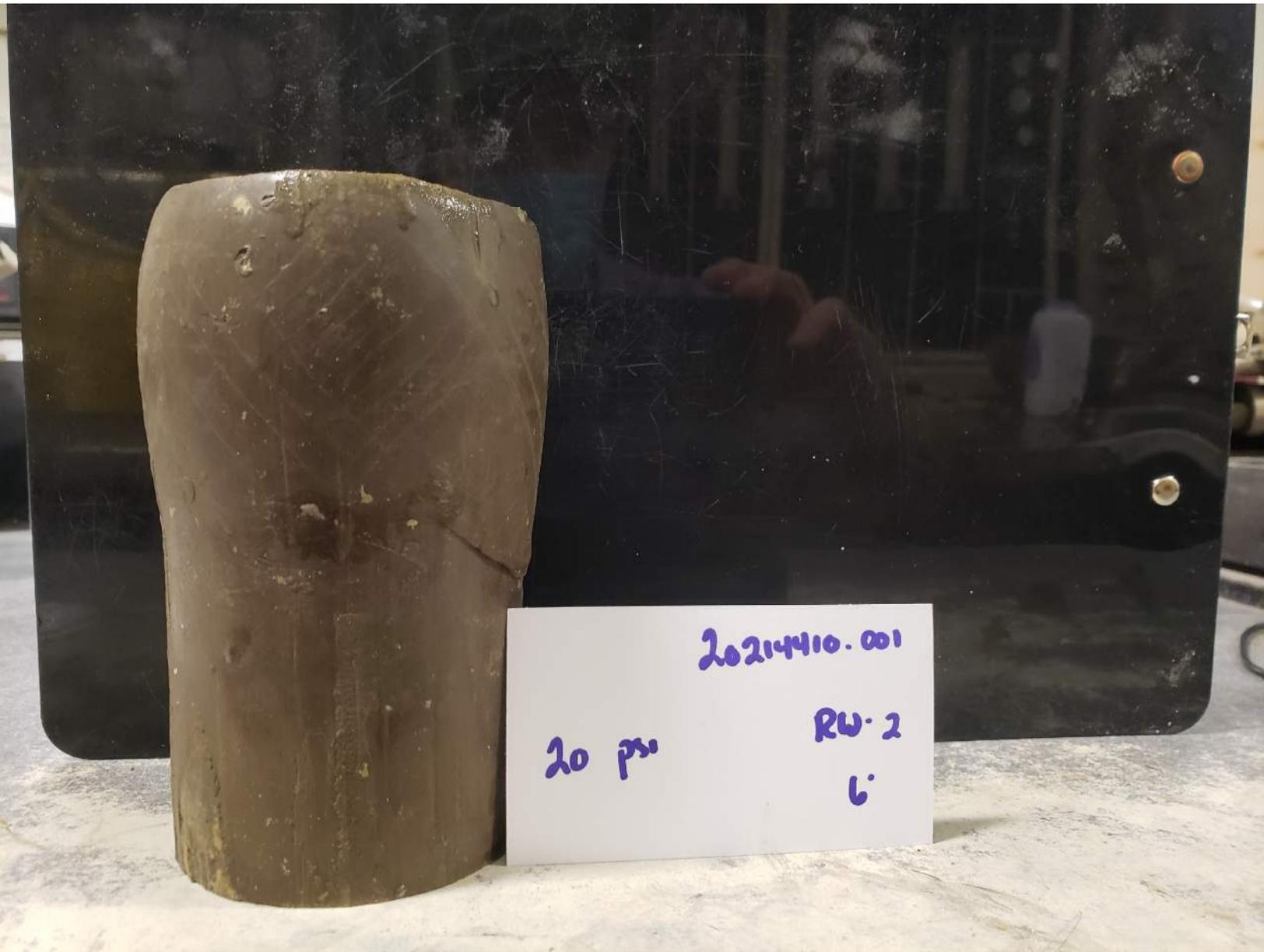


Figure 32



20 psi

20214410.001

RW-2

6'

Figure 33

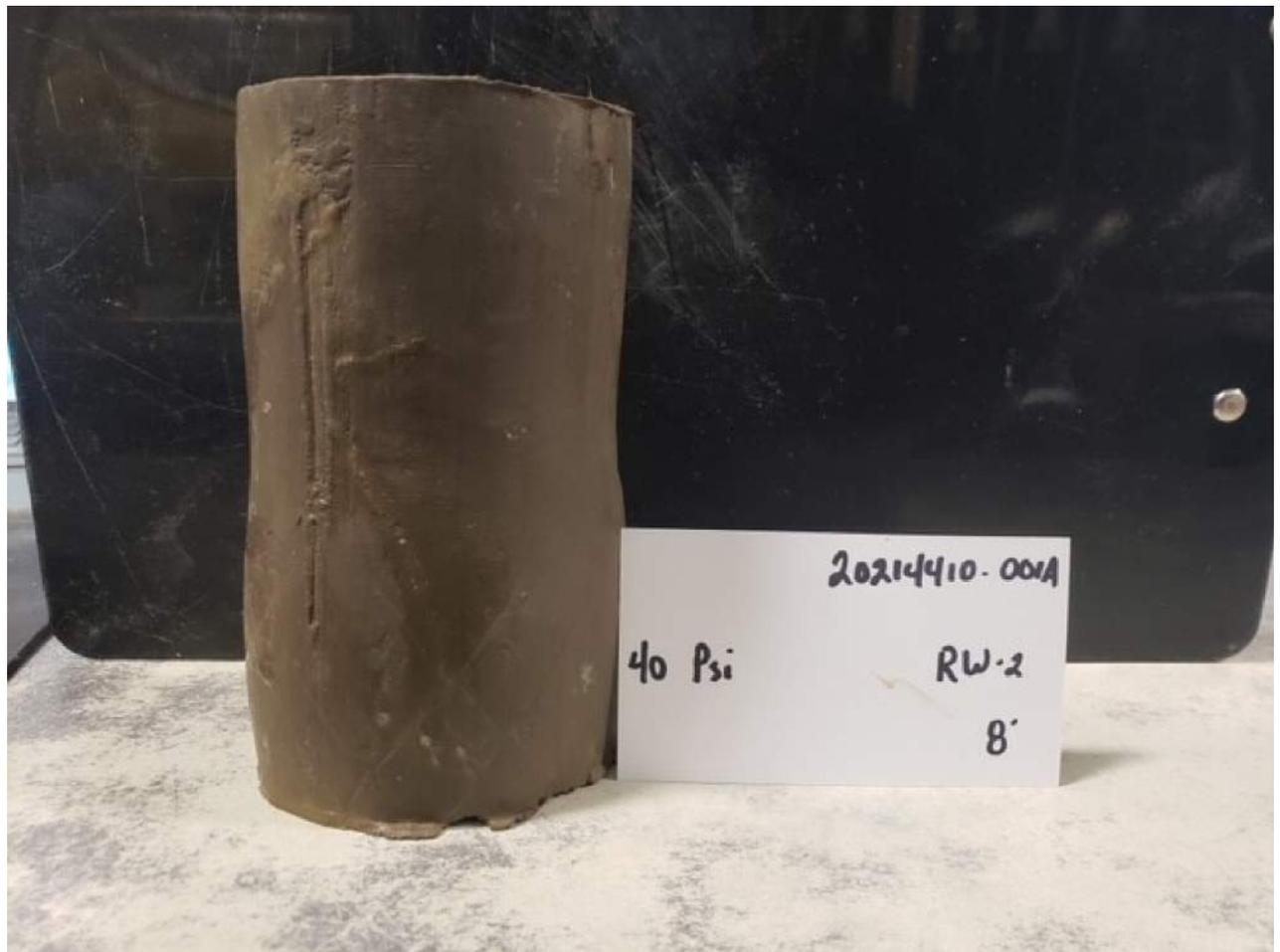
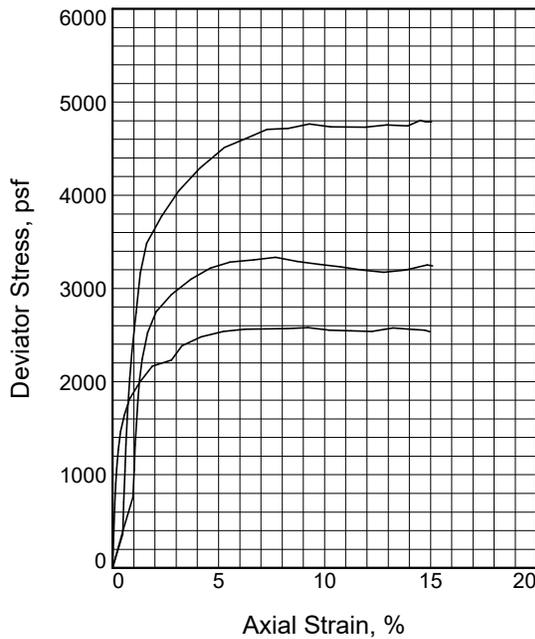
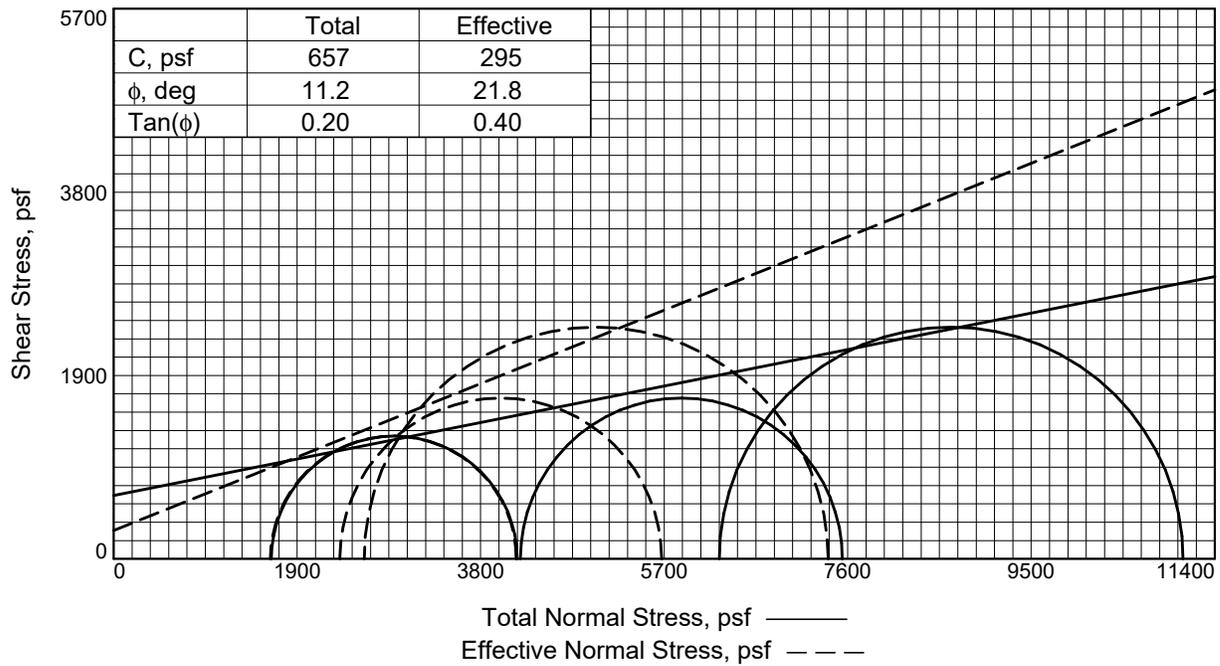


Figure 34

Consolidation Pressures and/or Normal Loads were applied per Project and/or Client Request
Soil Classification is based on Visual Classification Method when the Classification Test Results are not available



Sample No.	1	2	3	
Initial	Water Content, %	23.4	23.5	20.9
	Dry Density, pcf	99.7	100.2	106.3
	Saturation, %	91.3	93.0	96.6
	Void Ratio	0.6911	0.6826	0.5853
	Diameter, in.	2.763	2.717	2.752
	Height, in.	5.720	5.752	5.530
At Test	Water Content, %	24.6	24.3	20.0
	Dry Density, pcf	99.9	99.9	107.6
	Saturation, %	96.5	95.5	95.1
	Void Ratio	0.6867	0.6867	0.5665
	Diameter, in.	2.760	2.749	2.740
	Height, in.	5.717	5.632	5.511
Strain rate, %/min.	0.0017	0.0017	0.0016	
Eff. Cell Pressure, psi	11.34	29.25	43.54	
Fail. Stress, psf	2545	3332	4802	
Excess Pore Pr., psf	9	1871	3675	
Strain, %	11.2	7.7	14.5	
Ult. Stress, psf				
Excess Pore Pr., psf				
Strain, %				
$\bar{\sigma}_1$ Failure, psf	4169	5674	7397	
$\bar{\sigma}_3$ Failure, psf	1624	2341	2595	

Type of Test:
CU with Pore Pressures

Sample Type: Undisturbed

Description: Fat Clay with Sand, dark brown and brown with calcareous nodules

LL= 71 PL= 21 PI= 50

Assumed Specific Gravity= 2.7

Remarks: Passing #200 Sieve = 83%

Client: Kimley-Horn & Associates

Project: KHA: Westside Trail, Phase I - Farmers Branch, Texas

Source of Sample: RW-8 **Depth:** 4.0' - 10.0'

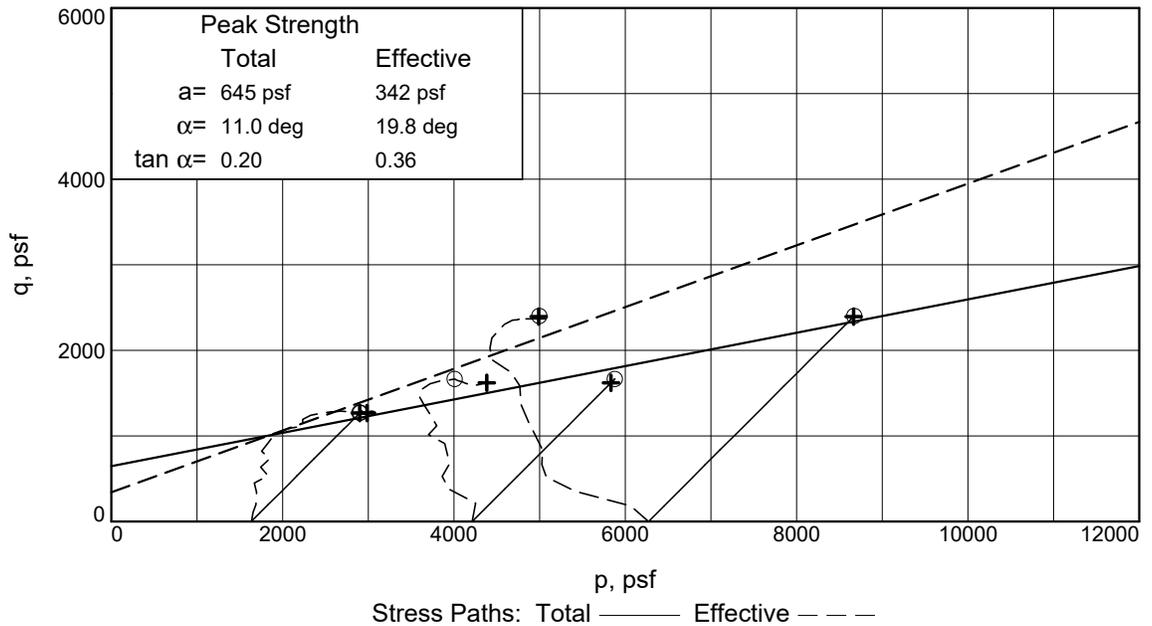
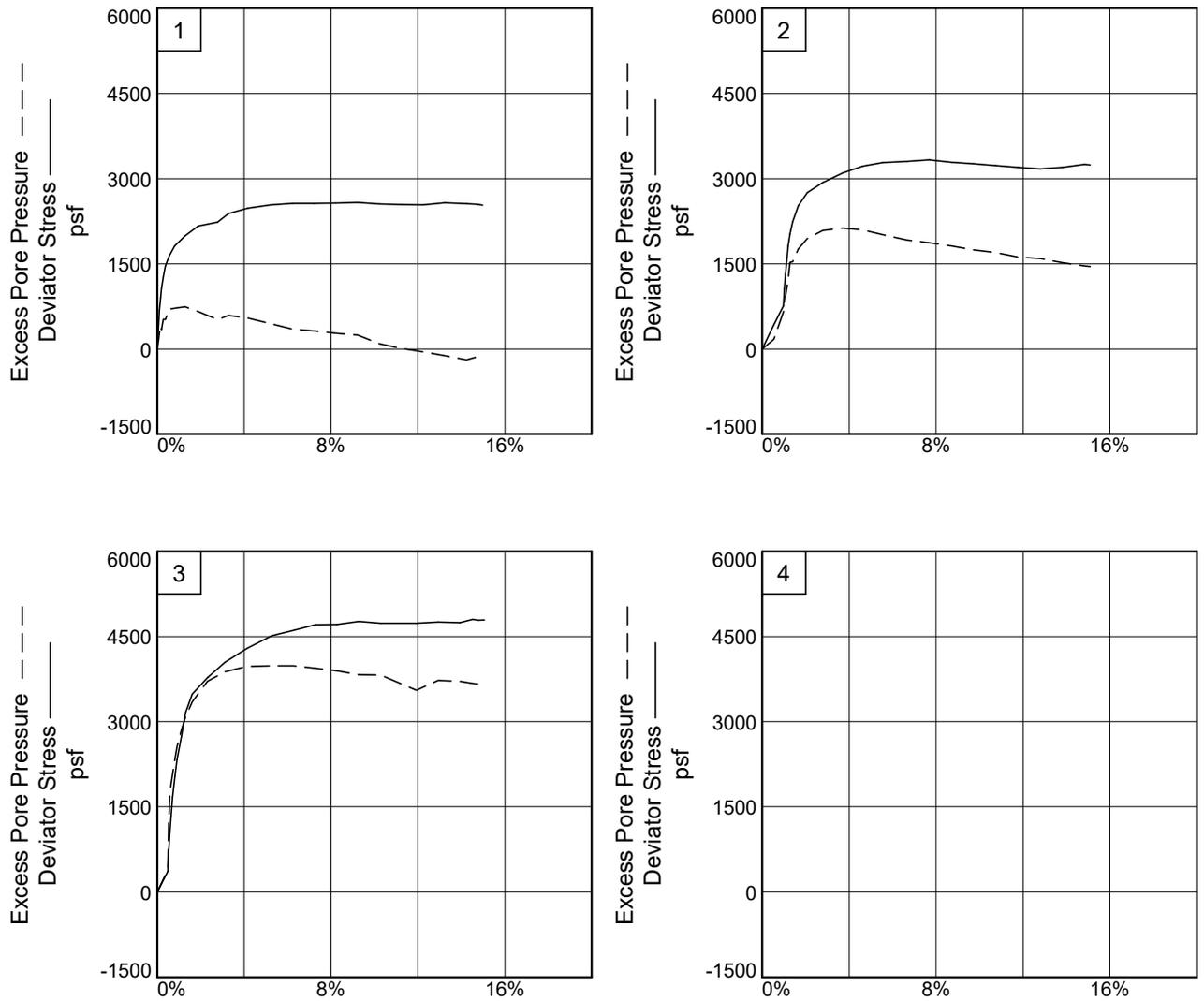
Sample Number: U3, U4, U5

Proj. No.: 20214410.001A **Date Sampled:** 05/25/21

TRIAXIAL SHEAR TEST REPORT
Kleinfelder, Inc.
Irving, TX

Figure 1

Consolidation Pressures and/or Normal Loads were applied per Project and/or Client Request
 Soil Classification is based on Visual Classification Method when the Classification Test Results are not available



Client: Kimley-Horn & Associates

Project: KHA: Westside Trail, Phase I - Farmers Branch, Texas

Source of Sample: RW-8

Depth: 4.0' - 10.0'

Sample Number: U3, U4, U5

Project No.: 20214410.001A

Figure 2

Kleinfelder, Inc.



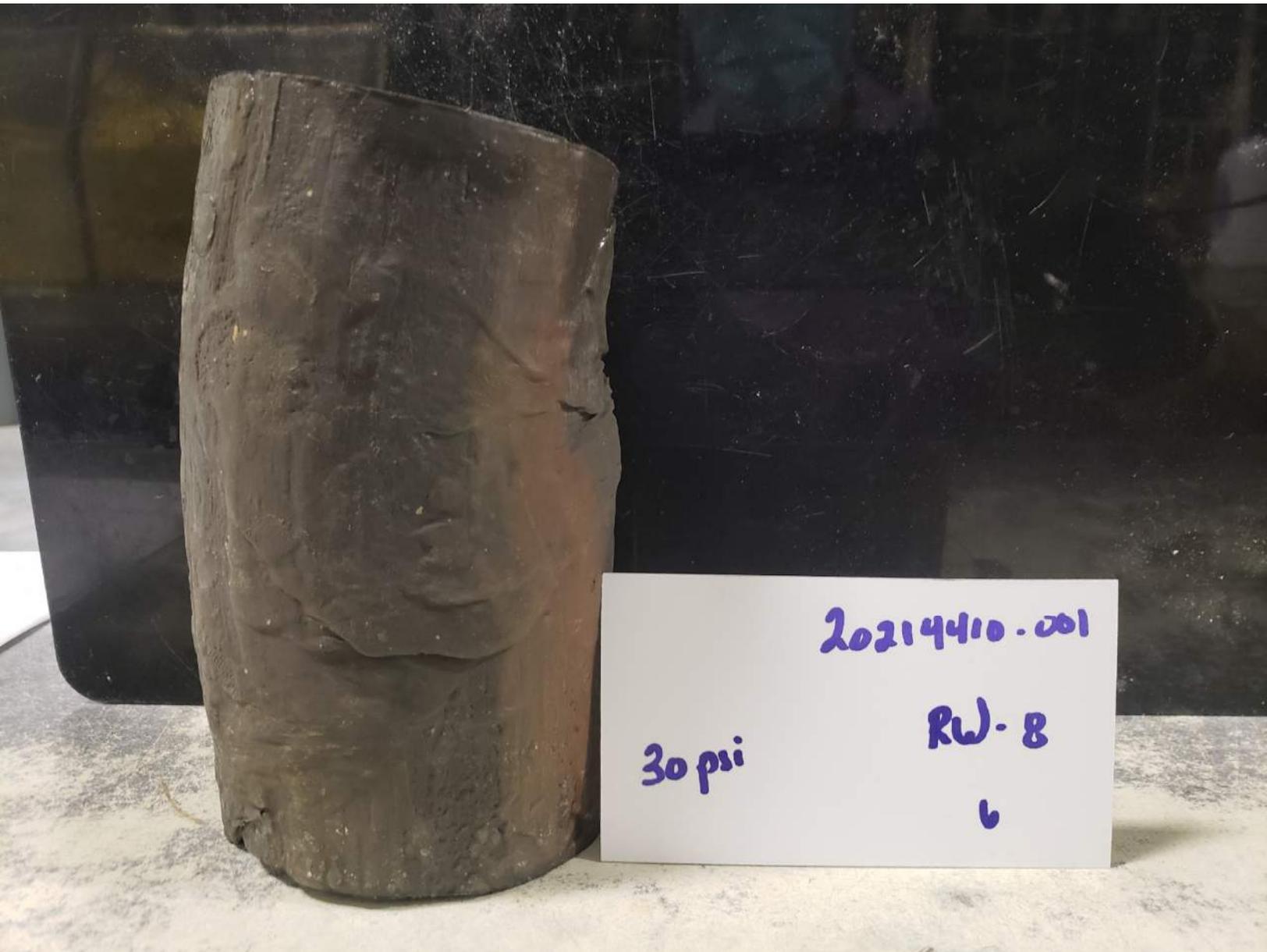
20214410.001

15. psi

RW-8

4'

Figure 37



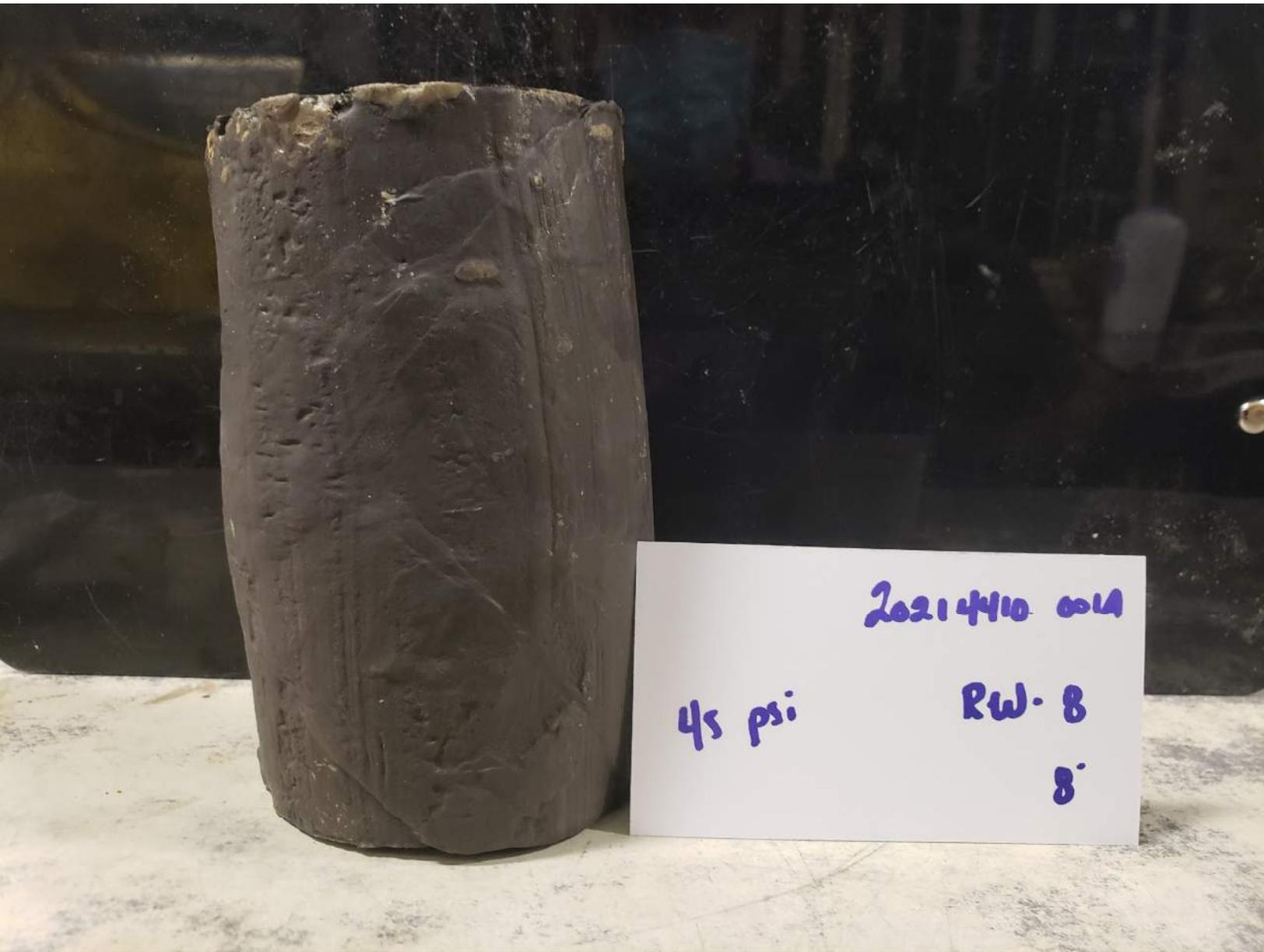
20214410.001

30 psi

RW-8

6

Figure 38



20214410 0014

45 psi

RW- 8

8'

Figure 39