



**Agenda for the Regular Meeting of Board of Commissioners
Monday, February 10, 2020 - 7:00 pm
Brentwood City Hall**

Call to Order by Mayor
Roll Call
Invocation by Vice Mayor Travis
Pledge of Allegiance to the Flag by Commissioner Andrews

Approval or Correction of Minutes

January 27, 2020

Comments from Citizens – *Individuals may comment on any item included in the Consent/Regular agenda or on any other matter regarding the City of Brentwood. All comments should be directed to the Board of Commissioners. Citizens who wish to request that an item be moved from the Consent Agenda to the Regular Agenda for discussion should make that known to the Board at this time.*

Report from City Manager
Report from the City Attorney
Reports and comments by Commissioners and Mayor

Note: All matters listed under the Consent Agenda are considered to be routine and will generally be enacted by one motion. Except for any items that are removed from the Consent Agenda, there will be no separate discussion of these items at this time.

Consent Agenda

1. Resolution 2020-08 - A RESOLUTION AUTHORIZING THE ACQUISITION OF RIGHT-OF-WAY AND EASEMENTS FOR FIBER EXTENSION AT THE NEW POLICE DEPARTMENT HEADQUARTERS LOCATED AT 910 HERITAGE WAY, for adoption
2. Resolution 2020-09 - A RESOLUTION AUTHORIZING AN AGREEMENT WITH SULLIVAN ENGINEERING FOR DESIGN SERVICES RELATED TO THE WITHERSPOON/RAINTREE FOREST TRAIL CONNECTOR, for adoption

3. Resolution 2020-10 - A RESOLUTION AUTHORIZING AN AGREEMENT WITH PROSHOT CONCRETE, INC. FOR STORM WATER PIPE REPAIRS, for adoption
4. Resolution 2020-11 - A RESOLUTION AUTHORIZING AN AGREEMENT WITH JDHQ HOTELS LLC D/B/A EMBASSY SUITES BY HILTON COOL SPRINGS FOR 2020 ANNUAL EMPLOYEE RECOGNITION DINNER, for adoption
5. Resolution 2020-13 - A RESOLUTION AUTHORIZING THE INSTALLATION OF SPEED HUMPS ON EASTWOOD DRIVE IN THE RESERVE AT RAINTREE FOREST SUBDIVISION, for adoption

Old Business

1. Other old business

New Business

1. Ordinance 2020-01 - AN ORDINANCE REZONING PROPERTY LOCATED AT 9520 SPLIT LOG ROAD FROM R-2 (SUBURBAN RESIDENTIAL) TO OSRD (Open Space Residential Development), for consideration on first reading
2. Resolution 2020-12 - A RESOLUTION ADOPTING THE UAS PROGRAM INTERDEPARTMENTAL ASSISTANCE POLICY, for adoption
3. Resolution 2020-14 - A RESOLUTION AUTHORIZING THE ACQUISITION OF LAND AND EASEMENTS FOR THE BRENTWOOD PUMP STATION STORAGE FACILITY PROJECT, for adoption
4. Appointment of four (4) members to the Historic Commission
5. Appointment of four (4) members to the Tree Board
6. Other new business



Kirk Bednar
City Manager

Anyone requesting accommodations due to disabilities should contact Mike Worsham, A.D.A. Coordinator, at 371-0060, before the meeting.

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Approval or correction of minutes from Regular Scheduled Commission meeting

Submitted by: Holly Earls, Administration

Department: Administration

Information

Subject

Approval or correction of minutes from the January 27, 2020 meeting

Background

Staff Recommendation

Fiscal Impact

Attachments

Draft Minutes

DRAFT

MINUTES OF REGULAR MEETING OF BOARD OF COMMISSIONERS

BRENTWOOD, TENNESSEE

The Brentwood Board of Commissioners met in regular session on Monday, January 27, 2020 at 7:00 pm at Brentwood City Hall.

Present: Mayor Rhea Little; Vice Mayor Ken Travis; Commissioner Nelson Andrews; Commissioner Mark Gorman; Commissioner Susannah Macmillan; Commissioner Regina Smithson

Absent: Commissioner Anne Dunn

Staff City Manager Kirk Bednar; Assistant City Manager Jay Evans; City Attorney Kristen

Present: Corn; City Recorder Holly Earls

Commissioner Smithson led the Invocation. The Pledge of Allegiance was led by Vice Mayor Travis.

Approval or Correction of Minutes

January 14, 2020

Moved by Vice Mayor Ken Travis for approval of the minutes as written, seconded by Commissioner Nelson Andrews

Vote: 6 - 0 Approved - Unanimously

Citizen Comments

Richard Hunter, 5215 Williamsburg Road

Consent Agenda

Resolution 2020-06 - A RESOLUTION AUTHORIZING AN ALTERATION TO THE OSRD DEVELOPMENT PLAN FOR THE BRENTWOOD COUNTRY CLUB SUBDIVISION, for adoption

Resolution 2020-07 - A RESOLUTION AUTHORIZING AN AGREEMENT WITH THE TENNESSEE DEPARTMENT OF HEALTH FOR FUNDING FOR THE WILLIAMSON COUNTY HEALTH DEPARTMENT, for adoption

Moved by Commissioner Nelson Andrews for approval of the items on the Consent Agenda, seconded by Commissioner Regina Smithson

Vote: 6 - 0 Approved - Unanimously

With no further business, the meeting adjourned at 7:28 pm.

APPROVED _____

A handwritten signature in cursive script, reading "Holly Earls", written over a horizontal line.

Holly Earls, City Recorder

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-08 - Approval to Acquire Utility Easement for City Fiber Extension to Connect Police Headquarters on Heritage Way

Submitted by: Todd Hoppenstedt, Public Works

Department: Public Works

Information

Subject

Resolution 2020-08 - Authorization to acquire needed utility easement with The Heritage of Brentwood, for fiber extension to connect the new Police Department Headquarters to the City's existing fiber network.

Background

One of the non-construction related components of the Police Department Headquarters project is the extension of the City's fiber optic network to the new facility on Heritage Way. The plan is to provide dual fiber feeds for redundancy. One feed will come north from Concord Road along Heritage Way and then through City parkland and enter the Police HQ site from the southeast corner. The second feed will originate from an existing city fiber line running along I-65 in TDOT right-of-way then cross the Heritage property for a short distance before continuing into City right-of-way before entering onto City property for the Police Headquarters (see attached aerial of route).

Staff has been working with our engineer, Greg Judy of Neel-Schaffer, to design the necessary fiber upgrades to connect and support the new Police Headquarters. We have worked hard to maximize our use of existing right-of-way and to minimize the potential impacts for bringing this buried fiber conduit across The Heritage at Brentwood's property. The final design limits our need for a utility easement to an approximate length of 100 feet and an access width of 20'. Preliminary discussions with The Heritage of Brentwood suggest that this process should be an amicable one. Although no additional expense is anticipated, we seek Commission approval to begin formalizing this easement with the property owner. The total area of the necessary easement is estimated to be 2,000 square feet.

With City Commission approval, staff will move forward with the easement acquisition.

Please contact the Public Works Director if you have any questions.

Staff Recommendation

Staff recommends approval of the attached resolution.

Previous Commission Action

The Commission approved an agreement with Neel-Schaffer to provide engineering design services for the fiber extension via Resolution 2019-49 at the May 13, 2019 meeting.

Fiscal Impact

Amount : N/A

Source of Funds: N/A

Account Number: N/A

Fiscal Impact:

N/A

Attachments

Resolution 2020-08

Exhibit of Proposed Fiber Easement Area

RESOLUTION 2020-08

**A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE AUTHORIZING THE
MAYOR, CITY MANAGER AND CITY ATTORNEY FOR THE CITY OF BRENTWOOD
TO NEGOTIATE FOR, OR TO INSTITUTE EMINENT DOMAIN PROCEEDINGS
AND/OR TO INSTITUTE OR INTERVENE IN ANY OTHER NECESSARY LEGAL
ACTIONS FOR THE ACQUISITION OF RIGHT-OF-WAY AND EASEMENTS
NECESSARY FOR FIBER EXTENSION AT THE NEW POLICE DEPARTMENT
HEADQUARTERS LOCATED AT 910 HERITAGE WAY**

WHEREAS, as part of the new Police Department Headquarters located at 910 Heritage Way necessary fiber upgrades are required; and

WHEREAS, such improvements are necessary to the health, safety and welfare of area residents; and

WHEREAS, the City of Brentwood, under its charter, has the legal authority to condemn property, real or personal, or any easement or interest therein, whether within or without the City, for present or future public use, and the conditions may require the City of Brentwood to exercise this legal right.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the Mayor, City Manager and City Attorney for the City of Brentwood be and they are hereby authorized to negotiate for, or to institute eminent domain proceedings and/or to institute or intervene in any other necessary legal actions for the acquisition of right-of-way and easements necessary for fiber extension at the new Police Department Headquarters located at 910 Heritage Way.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR

Rhea E. Little, III

ADOPTED: _____

Approved as to form:

RECORDER

Holly Earls

CITY ATTORNEY

Kristen L. Corn

Proposed Fiber
Easement Area

The Heritage at Brentwood
900 Heritage Way
Brentwood, TN 37027

EXISTING COB/TDOT F.O. PULLBOX
INTERCEPT & TERMINATE 48F SMFO
CABLE w/EXISTING COB F.O. CABLE
& F.O. PULLBOX.

TRENCH 3 - 1 1/4" SCH 80 CONDUIT
INSTALL 48F SMFO CABLE

3 - 1 1/4" SCH 80 CONDUIT AND
F.O. PULL BOX TO BE
PROVIDED BY OTHERS.
SEE BUILDING PLANS.

INSTALL TYPE 'A'
F.O. PULLBOX
(TYP.)

INSTALL 3 - 1 1/4" SCH 80 CONDUIT (BORED)
& 48F SMFO CABLE

PROPOSED SAFETY
BUILDING

TEMPORARY CONSTRUCTION PATH

ARCHITECTS NOTE:

11. PROVIDE A 3" I.D. UNDERGROUND CONDUIT FROM THE HANDHOLE
TO ROOM V/D DEMARK 119.

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-09 - An Agreement with Sullivan Engineering for Design Services Related to Witherspoon/Raintree Forest Trail Connector

- **Submitted by:** Mike Harris, Engineering

Department: Engineering

Information

Subject

Resolution 2020-09 - An Agreement with Sullivan Engineering for Design Services Related to the Witherspoon/Raintree Forest Trail Connector.

Background

- At its January 13, 2015 meeting, the Board of Commissioners approved a rezoning of the property for the Witherspoon Subdivision. The plan subsequently approved by the Planning Commission included construction of a network of multi-use trails within the development as well as connections to the existing public trail network in the area. One of the proposed connections on the east side of the development was a stub to the neighboring property owned by the Raintree Forest HOA near their amenity area.

The proposed new trail connection (map attached) would extend from the existing trail along Raintree Parkway, across the HOA property, and to the new trail in the Witherspoon subdivision. While other connections to the public system were paid for by the developer (see Witherspoon map attached) because they benefited the Witherspoon residents, this connection benefits the current residents of Raintree Forest and other users of the existing trail along Raintree Parkway, and will also serve as part of the long-term plan for bike and pedestrian facilities along the Crockett Road corridor between Wilson Pike and Concord Road. As a result, this segment is planned to be funded by the City. This proposed trail connection was discussed at the time of the initial approval of the subdivision and has been part of the plan since the approval of the subdivision development plan.

- The Witherspoon developer is currently working on construction plans for the section that will include the stub to this planned new connection. The next step in the project development process is to conduct a property survey and engineering design work. Staff is recommending utilizing the services of Sullivan Engineering, Inc. (SEI) for this work. SEI handles most of the City's roadway design work and is familiar with the City's project objectives related to construction cost and property impacts. SEI proposes a scope of work and fee totaling \$55,102.75 broken down as follows:

Property Survey (third-party)	\$24,027.75
Engineering Design and bidding	\$25,375.00
Miscellaneous	\$ 5,700.00
TOTAL	\$55,102.75

Staff has held discussions with representatives of the Raintree Forest HOA and met on-site and they appear supportive of the project and willing to dedicate the required easements. A pedestrian bridge will be required to cross a creek near the border between Witherspoon and Raintree Forest, and this engineering work will further explore this issue with the goal of determining a construction plan and design that results in construction of the trail in a cost effective manner. Therefore, staff requests approval of the attached agreement with SEI.

If you have any questions, please contact the Engineering Director.

Staff Recommendation

Staff recommends approval of agreement with SEI.

Previous Commission Action

The Commission approved rezoning of the property for the Witherspoon subdivision at the January 13, 2015 meeting. The approved plan included a stub for this proposed trail connection and the staff report for the rezoning included the following statement:

"If this trail improvement is constructed, staff would also recommend that the City eventually negotiate with the Raintree Forest HOA to undertake a project to connect the existing public trail along Raintree Parkway to the Holt Crest development across Raintree Forest open space to provide a complete public, off-road trail connection from Raintree Parkway to the nearby schools and Crockett Park."

Fiscal Impact

Amount : \$55,102.75

Source of Funds: Capital Projects Fund

Account Number: 311-43100-1001

Fiscal Impact:

Funding for these engineering design services has been allocated in the FY 2020 Capital Projects Fund budget. Any adjustments to the future CIP funding needs will be made during the upcoming budget cycle.

Attachments

Resolution 2020-09

Contract No, 2020-015

Connection to Raintree Forest

Witherspoon Trails

RESOLUTION 2020-09

A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE AUTHORIZING THE MAYOR TO EXECUTE AN AGREEMENT BY AND BETWEEN THE CITY OF BRENTWOOD AND SULLIVAN ENGINEERING, INC. FOR DESIGN SERVICES RELATED TO THE WITHERSPOON/RAINTREE FOREST TRAIL CONNECTOR, A COPY OF SAID AGREEMENT BEING ATTACHED HERETO AND MADE A PART OF THIS RESOLUTION BY REFERENCE

BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the Mayor is hereby authorized to execute an agreement by and between the City of Brentwood and Sullivan Engineering, Inc. for design services related to the Witherspoon/Raintree Forest Trail Connector, a copy of said agreement being attached hereto and made a part of this resolution by reference.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR

Rhea E. Little, III

ADOPTED: _____

Approved as to form:

RECORDER

Holly Earls

CITY ATTORNEY

Kristen L. Corn



SULLIVAN ENGINEERING, INC.

317 MAIN STREET, SUITE 201

FRANKLIN, TN 37064

TELEPHONE (615) 642-5822

December 12, 2019

(Rev 1-30-20)

Mr. Mike Harris
Director of Engineering
City of Brentwood
P.O. Box 788
Brentwood, TN 37024

RE: Raintree Trail
From: Raintree Parkway to Witherspoon Subdivision Eastern Property Line
City of Brentwood, Tennessee
Project length 650+/- L.F.

Dear Mike:

Sullivan Engineering, Inc. (SEI) is pleased to submit the following proposal for engineering design services necessary to produce final construction bid documents for the referenced project. To assist Brentwood's City Administrators in allocating funds for design and construction of the subject project, SEI has broken the proposal into various phases, Preliminary Engineering, Construction Design Engineering, and Construction Administration Services. A compensation summary has been prepared for each phase allowing City Administrators to authorize services as needed. The Engineering services shall be in accordance with design criteria set forth in this document:

Engineering Services

1) Phase One (Preliminary Engineering)

a) Topographic Survey

i) The topographic survey shall contain all information required by the TN. Department of Transportation (T.D.O.T.).

(1) Survey data shall be delivered in a format compatible with AutoCAD

(2) Survey data shall be compatible with Brentwood's GIS Data Base

b) Geotechnical Evaluation

c) Preliminary Design Documents

i) Coordinate Horizontal and Vertical Alignment with City,

ii) Initiate utility contact for relocation design efforts,

iii) Identify Land Parcels impacted by construction,

(1) Prepare Exhibits and meet with property owners if needed

iv) Identify and size storm water hydraulic crossings,

2) Phase Two (Engineering)

a) Construction Design Documents

- i) Typical Section
- ii) Hydraulic Analysis
- iii) Pedestrian Bridge Design
- iv) Traffic control Plan
- v) Erosion Control Plan
- vi) Engineer's Estimated Construction Cost Analysis
- vii) Alignment Geometrics (Hor/Ver)
 - (1) Cross-Sections (50ft. Interval)
 - (2) After design is underway a grading plan may be substituted if it better conveys the intent of grading operations
- viii) Issuance of Right-of-Way design documents
 - (1) Property Acquisition descriptions and exhibits
 - (a) Property Appraisal and Title Search by the City
- ix) Update utility relocation efforts,
- x) Prepare and submit TDEC Permits.
 - (1) TDEC submittal and review fees to be paid by City

3) Phase Three

a) Construction Bid Documents

- i) Construction Details
 - (1) Typical Section
 - (a) Paving requirements
 - (2) Drainage design
 - (3) Sink hole remediation
 - (4) Special Details, Notes and Standard Drawings
- ii) Distribute final design documents to utility companies for relocation efforts.
- iii) Unit Price Bid,
 - (1) TDOT Item Numbers and Descriptions
 - (a) Footnotes and TDOT Special Provisions reference as needed
 - (b) Specialty Items as needed
- iv) Construction Project Manual and Specifications Engineering Joint Council Document Committee (EJCDC) Format,
 - (1) Document shall include Supplemental Special Provisions as required from:
 - (a) City of Brentwood
 - (b) TN Dept of Transportation
 - (c) TN Dept of Environment and Conservation
 - (d) Various Utility's
- v) Attend Bid Opening
 - (1) Open bids
 - (2) Review Bids for completeness and accuracy
 - (3) Tabulate and issue bid summary
- vi) Attend pre-construction meeting.

3) Phase Four

- a) **Construction Contract Administration & Observation**
- i) Review and prepare Change Orders and Change Directives,
 - ii) Review and approve monthly pay request,
 - iii) Request and evaluate value engineering proposals,
 - iv) Issue Supplemental Drawings and Instructions,
 - v) Review and Approve Shop Drawings.
 - vi) Field visit and written reports as required
- b) **Construction Testing & Observation**
- i) Supplement City Staff as requested
 - (1) Observe roadway testing operations,
 - (2) Observe quality control and installation of materials,
 - (3) Field visit and written reports as required.

SUMMARY OF PROPOSED FEE

Task Required	Design Budget
Survey Task 1 (Topographic Data, Owners, Deed Research, Property Lines, Acquisition Table) Compatible with the GIS Coordinate System	\$11,690.00
Survey Task 2 (Stake centerline and easement breaks)	\$2,812.50
Geotechnical Evaluation	\$9,525.25
SUB-TOTAL SURVEY	\$24,027.75
Preliminary Design Documents (A determination will need to be made prior to initiating design on termini's)	\$10,000.00
Structure Abutment/Pier Design and Coordination	\$5,625.00
R-O-W Design Documents (No State Involvement)	\$4,000.00
Construction Documents (No State Involvement, One bid Package)	\$3,500.00
Final quantities, details, notes and standard drawings	\$1,000.00
Construction project manual (EJCDC Bid Documents, with TDOT Material Specifications)	\$1,000.00
Distribution of Design Documents to Existing Utilities', for relocation purposes. (Does not include design or survey services)	\$250.00
SUB-TOTAL ROADWAY	\$25,375.00
Reproduction (PDF's, & 7 copies of Bid Documents)	\$700.00
Preparation and Attendance at a Public Meeting (Public Meeting Display, 2 copies), (Court Reporter and additional Printing of Documents by the City)	\$2,500.00
Aquatic Resources Alteration Permit (Permit Fees to be paid by the City)	\$2,500.00
SUB-TOTAL MISCELLANEOUS	\$5,700.00
TOTAL	\$55,102.75

This project is to be developed in accordance with City of Brentwood Guidelines, with compensation determined on a Lump Sum basis. The fee for this project shall include all items listed in the Summary of Proposed Fee, inclusive of printing, and travel expenses. Plotting and printing will be the responsibility of Sullivan Engineering, Inc with additional printing if required invoiced as a reimbursable expense. All documents shall be computer generated (AutoCAD) and reproduced on a media suitable for printing.

Please find enclosed the following for your review and further explanation of the scope of services to be provided as part of this project:

- Scope of Services,
- Location Map,
- Schematic Layout,
- Design/Construction Schedule,
- Supplement to "Agreement between OWNER and ENGINEER for Professional Services" , and
- Exhibit "A" & "C" Work Order.

SEI's proposal is prepared with the understanding the project is fully funded by the City of Brentwood, and not utilizing Federal or State Funds on any aspect of the project. Although the project does not contain Federal or State Funding, our design efforts are based on standards and accepted practice set forth by these agencies in combination with City of Brentwood design standards. Although the aforementioned design criteria shall be utilized in development of the project, SEI's scope of work and fee does not include coordination or review by said agencies.

Although SEI's feels that all items have been adequately covered three areas of concern are sometimes hard to predict. Items of concern would be environmental issues, and geotechnical exploration. However, SEI feels what is proposed adequately covers the requirements of this project. Therefore, in keeping with typical projects of this nature, SEI does not foresee any reason for additional services over and above what is customary practice.

I hope this proposal meets with your approval. Please phone after you have had a chance to review this proposal or if there are any questions.

Sincerely,

Sullivan Engineering, Inc.

Paul Collins

Paul V. Collins, Jr.

Vice President

Cc: Mr. Richard Sullivan, PE, President Sullivan Engineering, Inc.

SCOPE OF SERVICES

Design Scope of Services:

Project Length: 650+/- L.F.

Design development of this project shall be based on conceptual layouts initiated by City Staff and Sullivan Engineering, Inc (SEI). SEI will utilize this initial data and propose modifications for acceptance by the City of Brentwood, prior to finalizing design efforts. Final Construction bid documents will be one set of plans and Bid Documents. Day to day construction oversight and Contract Administration shall be by City Staff, supplemented as needed by SEI Staff. Construction Bid Documents shall be based on standard Engineering Joint Council Document Committee (EJCDC), supplemented with City of Brentwood Special Provisions. To obtain competitive bidding a "Notice to Bidders" will be prepared for City Staff to place in the Local paper, SEI will also send notification to past and prospective bidders they have on file. Construction materials shall be in accordance with current TN Department of Transportation Specifications. All design drawings will be developed using AutoCAD 2004 or newer.

The trail survey/design will be from Witherspoon Subdivision eastern property and extend east to a point of intersection with the centerline of Raintree Parkway having a project length of 600+/- LF. Although a schematic layout has been generated, with the extensive amount of mature trees on the property the alignment will be tweaked to avoid removal of as many trees as possible. The trail's typical cross section template will be a 10-foot wide multiuse path with minimal grading and drainage requirements. The composition of the trail will more than likely be 2-inch asphaltic surface with a 6-inch mineral aggregate base. However, given potential construction issues other surface types may be given consideration. Based on a recent site visit, constructability concerns are apparent, which could potentially require undercut for stability or additional clearing for use of a crane.

Based on field observations a drainage swale flanked by a sanitary sewer trunk line will need to be crossed. The design scope of services would not be to size the crossings for a specific design storm event but to provide a hydraulic opening sufficient in size to not impact upstream or downstream flows. Given the constraints observed in the field at this time the most logical structure would be a pre-fab pedestrian bridge, similar to what the City has used on other trails. The controlling factor for cross drains will be to insure backwater does not pond on adjoining property owners. In some instances, multiple small diameter pipes could be utilized, or it could be more beneficial to allow runoff to flow across the top of the trail. Ideally, reinforced concrete pipe would be the most desirable for stability and long term low maintenance. However, given the location and intended use other materials may need to be considered with review and input from City Staff. It is not anticipated to provide concrete headwalls at any pipe installation, but if required they would be selected from various pre-cast options. In lieu of concrete headwalls, another option would be the use of a riprap end treatment. It is not anticipated at this time, for a need other than round, arch, or elliptical pipe in construction of the storm drainage system.

An environmental impact statement is not anticipated as a requirement for this project. However, permits will be required from the TN Department of Environment and Conservation (TDEC) for grading. To obtain the required TDEC permits a multi-stage erosion control plan and SWPPP will be required. Based on the estimated area of disturbance a Three Phase Erosion Control Plan will be prepared in order to obtain necessary permits. TDEC requires a fee be paid as part of the permit submittal. The TDEC permit submittal fee can be paid either by the City or by SEI. If, SEI makes the payment it will be noted on the invoice as a reimbursable expense.

This project, especially if a bridge is required multiple points of ingress/egress for construction equipment, may be required. Potential locations will be further investigated early in the design process, allowing arrangements to be made with property owners, to discuss feasibility of access and address concerns property owners may have. Any private or public area utilized for access during construction will typically require restoration to pre-existing conditions, which will be evaluated and so noted in the construction bid documents. Traffic Control design documents will be prepared in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The contractor will be required follow guidelines within the MUTCD, but has the option to develop an alternative plan of action, pending approval by the City.

All proposed improvements will be designed making every reasonable attempt to minimize impact on existing facilities, inclusive of utilities (water, sewer, gas, electric, communication), but at the same time taking full advantage of existing right-of-way and easements. SEI's design team will also make every effort to minimize the impact on vegetation and removal trees and other canopy. Therefore, once the centerline is finalized, and the centerline staked but prior to construction being initiated a walk through will be done with the general contractor to identify locations where minor adjustments could eliminate removal of vegetation.

Additional drainage, slope, and construction easements may be required throughout this project as the design procedures evolves. All front slopes shall be a 3:1 or flatter slope. All areas disturbed during the construction of this project shall receive topsoil and sod. If additional property acquisition documents are required SEI will prepare a display, inclusive of a meets and bounds description. Appraisals will be the responsibility of the City.

Proposed improvements may require the relocation of water, gas, sewer, telephone, and cable TV lines including customer service connections. All utility relocation design shall be the responsibility of the owner or their assigned representative and not within the scope of the proposal.

LOCATION MAP



SURVEY SCOPE OF SERVICES

The display attached below shows the general trail configuration (red) and the survey area (red). Prior to any fieldwork being initiated, SEI will provide the survey team a base line along with specific areas of concern.

Task One

In general, SEI estimates a 150-foot swath of coverage needs to be obtained, which may or may not be symmetrical around the centerline. The survey will identify all property lines and easements of any type. Some sewer lines are apparent in the area but other utilities either overhead or underground will need to be identified. All drainage swales along the corridor will need to be identified. The survey needs to be compatible with Brentwood's GIS database. At connections to existing streets and trails, we will need to know of any potential drainage or utility features to avoid or would require adjustments. These features would be items such as utility poles, catch basins, or pedestal boxes.

Task Two (Optional)

Once the initial survey data is completed, SEI will provide the survey team a centerline to be field located. Field stakes at 50-foot intervals are anticipated but may stretch to longer segments in open areas. Along with the 50-foot field, stakes all PC, PI and Pt's will be field located. Additional survey needs may also be identified at this time for construction ingress/egress locations. Flag and provide a wood stake beside existing property corners recovered and then provide a wood stake only at the approximate location of any adjoining corners we were unable to recover. These wooden stakes would be confidently within a positional tolerance of 1 foot.

Task Three (Optional)

At this time, SEI is not sure as to need for staking of easements that may be required for construction or property acquisition and can be addressed as a supplement to this agreement.

GEOTECHNICAL SCOPE OF SERVICES

The goals of this exploration are to generally characterize site geologic conditions, determine lithology, evaluate soil, and rock (if applicable) foundation conditions at the proposed structure locations, and develop earthwork and foundation recommendations for the proposed construction. The assessment of environmental concerns is beyond the scope of the geotechnical exploration.

After review of the aerial images, the plan of action is to utilize test pits to develop proposed structural data and potential karst activity locations. Our team will monitor the exploration and adjust the exploration program to address any specific needs dictated by the subsurface conditions encountered and coordinate any adjustments to the exploration program.

Following completion of the field exploration, laboratory index testing will be conducted to determine the natural moisture content, Atterberg limits, and grain size distribution of select soil samples. Additionally, select rock or soil specimens may be subjected to unconfined compressive strength testing to provide shear strength data to support design efforts.

A geotechnical report will be issued for the geotechnical exploration, outlining the scope of work performed as well as the results of the exploration and lab testing program. The report will address geotechnical

aspects of project design and construction. The geotechnical reports will present our findings and will address, at a minimum, the following:

- General information regarding the site and subsurface conditions, including soil stratigraphy and bedrock occurrences (if applicable), as well as groundwater measurements.
- Results of laboratory tests performed on selected samples.
- General comments regarding geology and geologic hazards, such as karst conditions.
- Recommendations for site preparation, including criteria for stripping, excavation, reuse of on-site materials as structural fill, undercutting of suitable materials and subgrade remedial treatments, and criteria for compacted fill.
- Recommendations for structures foundation design and construction.
- Recommendations for pavement design and construction (if applicable).
- Recommendations for temporary and permanent groundwater control, if needed.
- We will measure from existing landmarks to establish the boring locations during field exploration. Determination of the exact boring locations and ground surface elevations is beyond this scope of services. This proposal does not include provisions for surveying efforts to establish the boring locations.
- The subsurface exploration will be planned and conducted in accordance with the Tennessee Department of Environment and Conservation General Permit for Surveying and Geotechnical Exploration. As such, installation and monitoring of erosion protection/siltation control measures by both subcontracted and CIA personnel may be required as part of the drilling program.
- We will retain the soil samples for 30 calendar days following the submittal of the geotechnical engineering report. After this time, the soil samples may be discarded unless directed otherwise.

Topographic map showing contour lines, buildings, and a red dashed line. The map includes labels for MH 35-416, MH 35-415, MH 34-514, and MH 35-416. A red dashed line runs diagonally across the map, with a 100' and 50' distance marker. Green lines connect the MH labels to specific points on the map.

DESIGN DOCUMENTS

(All documents are to be developed in accordance with current City of Brentwood Design criteria. Standard T.D.O.T. (English) design guidelines and standard drawings shall be used in the development of this project.)

The following list of sheets will be required for all sites:

- 1) **Title Sheet**
 - a) Right-of-Way/Construction
 - c) Existing utilities
 - d) Drainage tabulation tables
- 2) **Typical Sections**
 - a) Trail
 - b) Paving Schedule
 - i) Construction Documents Only
- 3) **Details**
 - a) Special details and notes
 - b) Scope of Work
 - c) General Notes
 - d) T.D.O.T. Standard Drawings List
 - e) Engineer's Estimate of Construction Cost
 - i) At completion of Right-of-Way Documents
 - ii) At completion of Construction Documents
- 4) **Estimated and Tabulated Data**
 - a) Erosion Control
 - b) Traffic Control
 - c) Storm and Cross Drainage
 - d) Paving Quantities
 - e) Earthwork Quantities
- 5) **Present Layout**
 - a) Scale 1" = 50'
 - b) Property Acquisition
 - i) Right-of-Way
 - ii) Permanent and Temporary Easement
- 6) **Proposed Layout/Drainage**
 - a) Scale 1"=50'
 - b) Details as required
 - c) Permanent Pavement Markings
 - d) Permanent Signing
 - e) Storm and Cross Drainage system
- 7) **Proposed Profiles/Drainage**
 - a) Scale (1"=50' Horiz. & 1"=5' Vert.)
 - b) Storm and Cross Drainage systems
- 8) **Culvert Sections**
 - a) As Required
- 9) **Cross-Sections or Grading Plan**
 - a) 50' Intervals (Cross Section minimum)
 - b) 2' Intervals (Grading Plan Minimum)
 - c) To be included in all Phases
- 10) **Utility Information Plan**
 - a) Schematic plan compiled by SEI.
 - i) Schematic plan shall be based on design data furnished to SEI by the various utility companies or their representative.
- 11) **Project Reviews**
 - a) As required with City and T.D.O.T. Officials
 - i) Preliminary
 - ii) Right-Of-Way
 - iii) Construction
- 12) **Public Meeting**
 - a) Prepare exhibits
 - b) Attend Public Meeting
 - i) Court Reporter/Transcript by City of Brentwood
- 13) **Adjoining Project Coordination**
 - a) By SEI & City of Brentwood
- 14) **Project Management**
 - a) Coordinate with City Officials
 - b) Coordinate with appropriate State agencies as required
- 15) **Traffic Control**
 - a) Maintain Traffic During Construction
 - b) Per T.D.O.T. Guidelines

- c) May require use of one lane Traffic during Daytime operations for a short duration of time
- d) Maintain two lane Traffic during Nighttime and peak demands
- e) Stage construction activity to as not impede peak hour demands

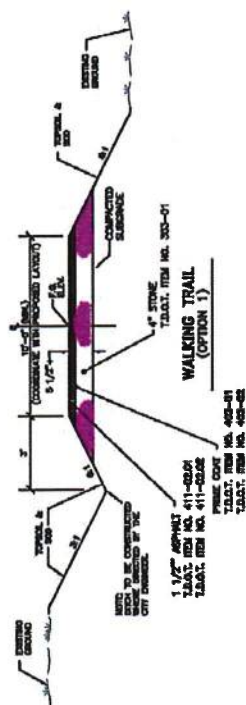
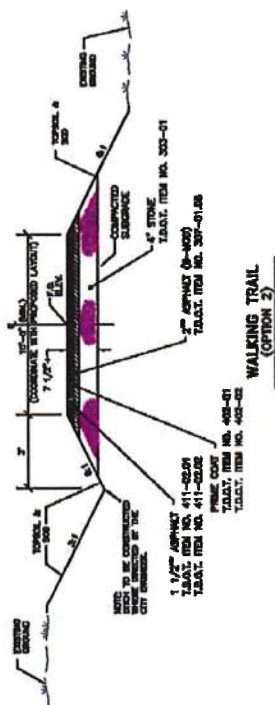
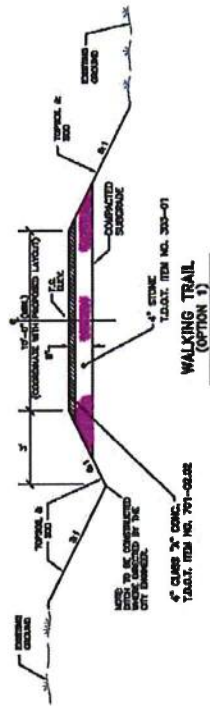
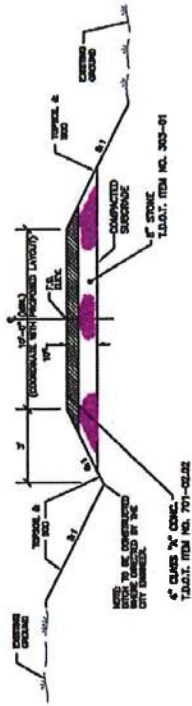
16) Erosion Control

- a) Per Current T.D.O.T. Guidelines
- b) Prepare necessary State and Federal Permits
 - i) Permit submittal and fees by City of Brentwood

Exclusions:

- Aerial survey
- Offsite drainage study
- Environmental/Archeological Investigations
- Flood Study
- All Utility relocation design
- Wetland mitigation
- Roadway Lighting
- Signalization Design
- Structural Design (Retaining walls)
- Geotechnical
 - ii) Slope Recommendations
 - iii) Paving Design (10 & 20 Year)
- NEPA Document

TYPICAL SECTION



DESIGN AND CONSTRUCTION SCHEDULE

<u>TASK</u>	DATE OF COMPLETION
Issues Notice to Proceed to Sullivan Engineering, Inc.	2/15/2020
Complete Survey	3/16/2020
Complete Preliminary Design	4/15/2020
Initiate Utility Project coordination Process	3/25/2020
Receive Utility Review Comments (Power, Tele, Gas, Water, Sewer, Cable)	4/8/2020
Finalize Right-of-Way Documents	5/8/2020
Initiates Right-of-Way Design & Property Acquisition Documents, Complete Geotechnical Exploration	4/24/2020
Submit Final Construction Plans to City for Review and Comment	6/8/2020
Advertise to Bid Contract	6/22/2020
Open Bid	7/20/2020
Issue Award of Bid to General Contractor, Schedule Preconstruction Meeting	8/10/2020
Complete Construction	11/8/2020

NOTES:

(1) Schedule to be adjusted based on issuance of a Notice to Proceed.

Supplement to
“Agreement between OWNER and ENGINEER for Professional
Services”

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion- Covered Transactions:

The Consultant 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 covered transactions by any Federal, State or local department or agency;
 - 2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement 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 agreement 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;
 - 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 this certification; and
 - 4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
 - 5) Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.
-

Equal Employment Opportunity:

- a) In connection with the performance of any work on this project, the Consultant shall not discriminate against any employee or applicant for employment because of race, age, religion, color, sex, national origin, disability or marital status. The Consultant will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, age, religion, color, gender, national origin, disability or marital status. Such action shall include, but not be limited to, the following: 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.
-

Title VI- Civil Rights Act of 1964:

- a) The Consultant shall comply with all the requirements imposed by the Title VI of the Civil Rights Act of 1964 (42 U.S.C 2000d), 49 C.F.R., Part 21, and related statutes and regulations. The Consultant shall include provisions in all agreements with third parties that ensure compliance with Title VI of the Civil Rights Act of 1964m 49 C.F.R., Part 21, and related statutes and regulations.
-

Conflicts of Interest:

No amount shall be paid directly or indirectly to an employee or official of the State of Tennessee as wages, compensation, or gifts in exchange for acting as an officer, employee, sub-contractor, or consultant to the City in connection with any work contemplated or performed relative to this Agreement.

D.20 Inspection:

- a) The Consultant shall permit, and shall require its sub-contractor(s) or materials vendor to permit, the TN Department of Transportation's authorized representatives and authorized agents of the Federal Highway Administration to inspect all work, workmanship, materials, payrolls, record and to audit the books, record and accounts pertaining to the financing and development of the Project.

Exhibit “A”

Exhibit A, C.O.B. work order_____, Raintree Parkway Trail

This is **EXHIBIT A**, consisting of 9 pages, referred to in and part of the **Agreement between OWNER and ENGINEER for Professional Services** dated October 27, 1998.

Initial:
OWNER _____
ENGINEER *PC*

ENGINEER's Services

Article 1 of the Agreement is amended and supplemented to include the following agreement of the parties.
ENGINEER shall provide Basic and Additional Services as set forth below.

PART 1 -- BASIC SERVICES

A1.01 Study and Report Phase

A. ENGINEER shall:

1. Consult with OWNER to define and clarify OWNER's requirements for the Project and available data.
2. Advise OWNER as to the necessity of OWNER's providing data or services of the types described in Exhibit B which are not part of ENGINEER's Basic Services, and assist OWNER in obtaining such data and services.
3. Identify, consult with, and analyze requirements of governmental authorities having jurisdiction to approve the portions of the Project designed or specified by ENGINEER, including but not limited to mitigating measures identified in the environmental assessment.
4. Identify and evaluate up to three alternate solutions available to OWNER and, after consultation with OWNER, recommend to OWNER those solutions which in ENGINEER's judgment meet OWNER's requirements for the Project.

B. ENGINEER's services under the Study and Report Phase will be considered complete on the date when the final copies of the revised Report have been delivered to OWNER.

A1.02 Preliminary Design Phase (includes Right-of-Way Phase)

A. After acceptance by OWNER of the Report, selection by OWNER of a recommended solution and indication of any specific modifications or changes in the scope, extent, character, or design requirements of the Project desired by OWNER, and upon written authorization from OWNER, ENGINEER shall:

1. On the basis of the above acceptance, selection, and authorization, prepares Preliminary Design Phase documents consisting of final design criteria, preliminary drawings, outline specifications, and written

(Exhibit A - ENGINEER's Services)

descriptions of the Project.

2. Provide the following services:
 - Preliminary Design and Right-of-Way Design in accordance with City of Brentwood Design Guidelines.
 - Presentation Drawings for a Public Meeting.
 - Issue Utility Design Informational Documents
 - Prepare Water Quality Permit
 - Property Acquisition Descriptions
 2. Advise OWNER if additional reports, data, information, or services of the types described in Exhibit B are necessary and assist OWNER in obtaining such reports, data, information, or services. The following will be included in the Engineer's Basic Services:
 - Topographic Survey – per T.D.O.T. guidelines.
 - Utility mapping will be based upon information obtained from utility owners.
 - Computer plots and Reproduction cost
 - Geotechnical Report
 4. Based on the information contained in the Preliminary Design Phase documents, submit a revised opinion of probable Construction Cost and any adjustments to Total Project Costs known to ENGINEER, which will be itemized as provided in paragraph A1.01.A.5.
 5. Perform or provide the following additional Preliminary Design Phase tasks or deliverables:
 6. Furnish the Preliminary Design Phase documents to and review them with OWNER.
 7. Submit to OWNER 3 final copies of the Preliminary Design Phase documents and revised opinion of probable Construction Cost in accordance with the attached schedule after authorization to proceed with this phase.
- B. ENGINEER's services under the Preliminary Design Phase will be considered complete on the date when final copies of the Preliminary Design Phase documents have been delivered to OWNER.

A1.03 *Final Design Phase (Construction Design Phase)*

A. After acceptance by OWNER of the Preliminary Design Phase documents and revised opinion of probable Construction Cost as determined in the Preliminary Design Phase, but subject to any OWNER-directed modifications or changes in the scope, extent, character, or design requirements of or for the Project, and upon written authorization from OWNER, ENGINEER shall:

1. On the basis of the above acceptance, direction, and authorization, prepare final Drawings indicating the scope, extent, and character of the Work to be performed and furnished by Contractor. Specifications will be prepared, where appropriate, in general conformance with the 16-division format of the Construction Specifications Institute and T.D.O.T. Standard Drawings and Specifications.

(Exhibit A - ENGINEER's Services)

2. Provide technical criteria, written descriptions, and design data for OWNER's use in filing applications for permits from or approvals of governmental authorities having jurisdiction to review or approve the final design of the Project and assist OWNER in consultations with appropriate authorities.

3. Advise OWNER of any adjustments to the opinion of probable Construction Cost and any adjustments to Total Project Costs known to ENGINEER, itemized as provided in paragraph A1.01.A.5.

4. In accordance to T.D.O.T. Guidelines, perform or provide the following additional Final Design Phase tasks or deliverables:

5. Prepare and furnish Bidding Documents for review and approval by OWNER, its legal counsel, and other advisors, as appropriate, and assist OWNER in the preparation of other related documents.

6. Submit two final copies of the Bidding Documents and a revised opinion of probable Construction Cost to OWNER in accordance with the attached schedule after authorization to proceed with this phase.

B. In the event that the Work designed or specified by ENGINEER is to be performed or furnished under more than one prime contract, or if ENGINEER's services are to be separately sequenced with the work of one or more prime Contractors (such as in the case of fast-tracking), OWNER and ENGINEER shall, prior to commencement of the Final Design Phase, develop a schedule for performance of ENGINEER's services during the Final Design, Bidding or Negotiating, Construction, and Post-Construction Phases in order to sequence and coordinate properly such services as are applicable to the work under such separate prime contracts. This schedule is to be prepared and included in or become an amendment to Exhibit A whether or not the work under such contracts is to proceed concurrently.

C. The number of prime contracts for Work designed or specified by ENGINEER upon which the ENGINEER's compensation has been established under this Agreement is one.

D. ENGINEER's services under the Final Design Phase will be considered complete on the date when the submittals required by paragraph A1.03.A.6 have been delivered to OWNER.

A1.04 Bidding or Negotiating Phase

A. After acceptance by OWNER of the Bidding Documents and the most recent opinion of probable Construction Cost as determined in the Final Design Phase, and upon written authorization by OWNER to proceed, ENGINEER shall:

1. Assist OWNER in advertising for and obtaining bids for the Work and, where applicable, maintain a record of prospective bidders to whom Bidding Documents have been issued, attend pre-Bid conferences, if any, and receive and process Contractor deposits or charges for the Bidding Documents.

2. Issue Addenda as appropriate to clarify, correct, or change the Bidding Documents.

3. Consult with OWNER as to the acceptability of subcontractors, suppliers, and other individuals and entities proposed by Contractor for those portions of the Work as to which such acceptability is required by the Bidding Documents.

4. Perform or provide the following additional Bidding or Negotiating Phase tasks or deliverables:
5. Attend the Bid opening, prepare Bid tabulation sheets, and assist OWNER in evaluating Bids or proposals and in assembling and awarding contracts for the Work.

B. The Bidding or Negotiating Phase will be considered complete upon commencement of the Construction Phase or upon cessation of negotiations with prospective Contractors (except as may be required if Exhibit F is a part of this Agreement).

A1.05 *Construction Phase*

A. Upon successful completion of the Bidding and Negotiating Phase, and upon written authorization from OWNER, ENGINEER shall:

1. *General Administration of Construction Contract.* Consult with OWNER and act as OWNER's representative as provided in the General Conditions. The extent and limitations of the duties, responsibilities and authority of ENGINEER as assigned in said General Conditions shall not be modified, except as ENGINEER may otherwise agree in writing. All of OWNER's instructions to Contractor will be issued through ENGINEER, who shall have authority to act on behalf of OWNER in dealings with Contractor to the extent provided in this Agreement and said General Conditions except as otherwise provided in writing.
2. *Resident Project Representative (RPR).* Provide the services of an RPR at the Site to assist the ENGINEER and to provide more extensive observation of Contractor's work. Duties, responsibilities, and authority of the RPR are as set forth in Exhibit D. The furnishing of such RPR's services will not extend ENGINEER's responsibilities or authority beyond the specific limits set forth elsewhere in this Agreement.
3. *Selecting Independent Testing Laboratory.* Assist OWNER in the selection of an independent testing laboratory to perform the services identified in paragraph B2.01.0.
4. *Pre-Construction Conference.* Participate in a Pre-Construction Conference prior to commencement of Work at the Site.
5. *Baselines and Benchmarks.* As appropriate, establish baselines and benchmarks for locating the Work which in ENGINEER's judgment are necessary to enable Contractor to proceed.
6. *Visits to Site and Observation of Construction.* In connection with observations of Contractor's work in progress while it is in progress:
 - a. Make visits to the Site at intervals appropriate to the various stages of construction, as ENGINEER deems necessary, in order to observe as an experienced and qualified design professional the progress and quality of the Work. Such visits and observations by ENGINEER, and the Resident Project Representative, if any, are not intended to be exhaustive or to extend to every aspect of Contractor's work in progress or to involve detailed inspections of Contractor's work in progress beyond the responsibilities specifically assigned to ENGINEER in this Agreement and the Contract Documents, but rather are to be limited to spot checking,

(Exhibit A - ENGINEER's Services)

selective sampling, and similar methods of general observation of the Work based on ENGINEER's exercise of professional judgment as assisted by the Resident Project Representative, if any. Based on information obtained during such visits and such observations, ENGINEER will determine in general if Contractor's work is proceeding in accordance with the Contract Documents, and ENGINEER shall keep OWNER informed of the progress of the Work.

b. The purpose of ENGINEER's visits to, and representation by the Resident Project Representative, if any, at the Site, will be to enable ENGINEER to better carry out the duties and responsibilities assigned to and undertaken by ENGINEER during the Construction Phase, and, in addition, by the exercise of ENGINEER's efforts as an experienced and qualified design professional, to provide for OWNER a greater degree of confidence that the completed Work will conform in general to the Contract Documents and that the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents has been implemented and preserved by Contractor. ENGINEER shall not, during such visits or as a result of such observations of Contractor's work in progress, supervise, direct, or have control over Contractor's work, nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by Contractor, for safety precautions and programs incident to Contractor's work, or for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's furnishing and performing the Work. Accordingly, ENGINEER neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform its work in accordance with the Contract Documents.

7. *Defective Work.* Recommend to OWNER that Contractor's work be disapproved and rejected while it is in progress if, on the basis of such observations, ENGINEER believes that such work will not produce a completed Project that conforms generally to the Contract Documents or that it will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents.

8. *Clarifications and Interpretations; Field Orders.* Issue necessary clarifications and interpretations of the Contract Documents as appropriate to the orderly completion of Contractor's work. Such clarifications and interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents. ENGINEER may issue Field Orders authorizing minor variations from the requirements of the Contract Documents.

9. *Change Orders and Work Change Directives.* Recommend Change Orders and Work Change Directives to OWNER, as appropriate, and prepare Change Orders and Work Change Directives as required.

10. *Shop Drawings and Samples.* Review and approve or take other appropriate action in respect to Shop Drawings and Samples and other data which Contractor is required to submit, but only for conformance with the information given in the Contract Documents and compatibility with the design concept of the completed Project as a functioning whole as indicated in the Contract Documents. Such reviews and approvals or other action will not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions and programs incident thereto. ENGINEER has an obligation to meet any Contractor's submittal schedule that has earlier been acceptable to ENGINEER.

11. *Substitutes and "or-equal."* Evaluate and determine the acceptability of substitute or "or-equal" materials and equipment proposed by Contractor, but subject to the provisions of paragraph A2.02.A.2 of this Exhibit A.

12. *Inspections and Tests.* Require such special inspections or tests of Contractor's work as deemed reasonably necessary, and receive and review all certificates of inspections, tests, and approvals required by Laws and Regulations or the Contract Documents. ENGINEER's review of such certificates will be for the purpose of determining that the results certified indicate compliance with the Contract Documents and will not constitute an independent evaluation that the content or procedures of such inspections, tests, or approvals comply with the requirements of the Contract Documents. ENGINEER shall be entitled to rely on the results of such tests.

13. *Disagreements between OWNER and Contractor.* Render formal written decisions on all claims of OWNER and Contractor relating to the acceptability of Contractor's work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of Contractor's work. In rendering such decisions, ENGINEER shall be fair and not show partiality to OWNER or Contractor and shall not be liable in connection with any decision rendered in good faith in such capacity.

14. *Applications for Payment.* Based on ENGINEER's observations as an experienced and qualified design professional and on review of Applications for Payment and accompanying supporting documentation:

a. Determine the amounts that ENGINEER recommends Contractor be paid. Such recommendations of payment will be in writing and will constitute ENGINEER's representation to OWNER, based on such observations and review, that, to the best of ENGINEER's knowledge, information and belief, Contractor's work has progressed to the point indicated, the quality of such work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents and to any other qualifications stated in the recommendation), and the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe Contractor's work. In the case of unit price work, ENGINEER's recommendations of payment will include final determinations of quantities and classifications of Contractor's work (subject to any subsequent adjustments allowed by the Contract Documents). The responsibilities of ENGINEER contained in paragraph A1.05.A.6.a are expressly subject to the limitations set forth in paragraph A1.05.A.6.b and other express or general limitations in this Agreement and elsewhere.

b. By recommending any payment, ENGINEER shall not thereby be deemed to have represented that observations made by ENGINEER to check the quality or quantity of Contractor's work as it is performed and furnished have been exhaustive, extended to every aspect of Contractor's work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in this Agreement and the Contract Documents. Neither ENGINEER's review of Contractor's work for the purposes of recommending payments nor ENGINEER's recommendation of any payment including final payment will impose on ENGINEER responsibility to supervise, direct, or control Contractor's work in progress or for the means, methods, techniques, sequences, or procedures of construction or safety precautions or programs incident thereto, or Contractor's compliance with Laws and Regulations applicable to Contractor's furnishing and performing the Work. It will also not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or to determine that title to any portion of the work in progress, materials, or equipment has passed to OWNER free and clear of any liens, claims, security interests, or encumbrances, or that there may not be other matters at issue between OWNER and Contractor that might affect the amount that should be paid.

15. *Contractor's Completion Documents.*

- a. Receive and review maintenance and operating instructions, schedules, and guarantees.
- b. Receive bonds, certificates, or other evidence of insurance not previously submitted and required by the Contract Documents, certificates of inspection, tests and approvals, Shop Drawings, Samples and other data approved as provided under paragraph A1.05.A.10, and the annotated record documents which are to be assembled by Contractor in accordance with the Contract Documents to obtain final payment. The extent of such ENGINEER's review will be limited as provided in paragraph A1.05.A.10.
- c. ENGINEER shall transmit these documents to OWNER.

16. *Substantial Completion.* Promptly after notice from Contractor that Contractor considers the entire Work ready for its intended use, in company with OWNER and Contractor, conduct an inspection to determine if the Work is Substantially Complete. If after considering any objections of OWNER, ENGINEER considers the Work Substantially Complete, ENGINEER shall deliver a certificate of Substantial Completion to OWNER and Contractor.

17. *Additional Tasks.* Perform or provide the following additional Construction Phase tasks or deliverables:

18. *Final Notice of Acceptability of the Work.* Conduct a final inspection to determine if the completed Work of Contractor is acceptable so that ENGINEER may recommend, in writing, final payment to Contractor. Accompanying the recommendation for final payment, ENGINEER shall also provide a notice in the form attached hereto as Exhibit E (the "Notice of Acceptability of Work") that the Work is acceptable (subject to the provisions of paragraph A1.05.A.14.b) to the best of ENGINEER's knowledge, information, and belief and based on the extent of the services provided by ENGINEER under this Agreement.

B. *Duration of Construction Phase.* The Construction Phase will commence with the execution of the first Construction Agreement for the Project or any part thereof and will terminate upon written recommendation by ENGINEER for final payment to Contractors. If the Project involves more than one prime contract as indicated in paragraph A1.03.C, Construction Phase services may be rendered at different times in respect to the separate contracts.

C. *Limitation of Responsibilities.* ENGINEER shall not be responsible for the acts or omissions of any Contractor, or of any of their subcontractors, suppliers, or of any other individual or entity performing or furnishing any of the Work. ENGINEER shall not be responsible for failure of any Contractor to perform or furnish the Work in accordance with the Contract Documents.

A1.06 *Post-Construction Phase*

A. Upon written authorization from OWNER, ENGINEER, during the Post-Construction Phase, shall:

- 1. Together with Owner, visit the project to observe any apparent defects in the work, assist OWNER in consultations and discussions with Contractor concerning corrections of any such defects, and make recommendations as to replacement or corrections of Defective Work, if present

(Exhibit A - ENGINEER's Services)

2. Perform or provide the following additional Post-Construction Phase tasks or deliverables:
3. In company with OWNER or OWNER's representative, provide an inspection of the Project within one month before the end of the Correction Period to ascertain whether any portion of the Work is subject to correction.

B. The Post-Construction Phase services may commence during the Construction Phase and, if not otherwise modified in this Exhibit A, will terminate at the end of the Correction Period.

PART 2 -- ADDITIONAL SERVICES

A2.01 Additional Services Requiring OWNER's Authorization in Advance

A. If authorized in writing by OWNER, ENGINEER shall furnish or obtain from others Additional Services of the types listed below. These services will be paid for by OWNER as indicated in Article 4 of the Agreement.

1. Preparation of applications and supporting documents (in addition to those furnished under Basic Services) for private or governmental grants, loans or advances in connection with the Project; preparation or review of environmental assessments and impact statements; review and evaluation of the effects on the design requirements for the Project of any such statements and documents prepared by others; and assistance in obtaining approvals of authorities having jurisdiction over the anticipated environmental impact of the Project.
2. Services to make measured drawings of or to investigate existing conditions or facilities, or to verify the accuracy of drawings or other information furnished by OWNER.
3. Services resulting from significant changes in the scope, extent, or character of the portions of the Project designed or specified by ENGINEER or its design requirements including, but not limited to, changes in size, complexity, OWNER's schedule, character of construction, or method of financing; and revising previously accepted studies, reports, Drawings, Specifications, or Contract Documents when such revisions are required by changes in Laws and Regulations enacted subsequent to the Effective Date of this Agreement or are due to any other causes beyond ENGINEER's control.
4. Services resulting from OWNER's request to evaluate additional Study and Report Phase alternative solutions beyond those identified in paragraph A1.01.A.4.
5. Services required as a result of OWNER's providing incomplete or incorrect Project information with respect to Exhibit B.
6. Providing renderings or models for OWNER's use.
7. Undertaking investigations and studies including, but not limited to, detailed consideration of operations, maintenance, and overhead expenses; the preparation of feasibility studies, cash flow and economic evaluations, rate schedules, and appraisals; assistance in obtaining financing for the Project; evaluating processes available for licensing, and assisting OWNER in obtaining process licensing; detailed quantity surveys of

(Exhibit A - ENGINEER's Services)

materials, equipment, and labor; and audits or inventories required in connection with construction performed by OWNER.

8. Furnishing services of ENGINEER's Consultants for other than Basic Services.
9. Services attributable to more prime construction contracts than specified in paragraph A1.03.C.
10. Services during out-of-town travel required of ENGINEER other than for visits to the Site or OWNER's office.
11. Preparing for, coordinating with, participating in and responding to structured independent review processes, including, but not limited to, construction management, cost estimating, project peer review, value engineering, and constructability review requested by OWNER; and performing or furnishing services required to revise studies, reports, Drawings, Specifications, or other Bidding Documents as a result of such review processes.
12. Preparing additional Bidding Documents or Contract Documents for alternate bids or prices requested by OWNER for the Work or a portion thereof.
13. Determining the acceptability of substitute materials and equipment proposed during the Bidding or Negotiating Phase when substitution prior to the award of contracts is allowed by the Bidding Documents.
14. Assistance in connection with Bid protests, rebidding, or renegotiating contracts for construction, materials, equipment, or services, except when such assistance is required by Exhibit F.
15. Providing construction surveys and staking to enable Contractor to perform its work other than as required under paragraph A1.05.A.5, and any type of property surveys or related engineering services needed for the transfer of interests in real property; and providing other special field surveys.
16. Providing Construction Phase services beyond the Contract Times set forth in Exhibit C.
17. Providing assistance in resolving any Hazardous Environmental Condition in compliance with current Laws and Regulations.
18. Preparing and furnishing to OWNER Record Drawings showing appropriate record information based on Project annotated record documents received from Contractor.
19. Preparation to serve or serving as a consultant or witness for OWNER in any litigation, arbitration or other dispute resolution process related to the Project.
21. Providing more extensive services required to enable ENGINEER to issue notices or certifications requested by OWNER under paragraph 6.01.G of the Agreement.
22. Other services performed or furnished by ENGINEER not otherwise provided for in this Agreement.

A2.02 *Required Additional Services*

(Exhibit A - ENGINEER's Services)

A. ENGINEER shall perform or furnish, without requesting or receiving specific advance authorization from OWNER, the Additional Services of the types listed below. ENGINEER shall advise OWNER in writing promptly after starting any such Additional Services.

1. Services in connection with Work Change Directives and Change Orders to reflect changes requested by OWNER so as to make the compensation commensurate with the extent of the Additional Services rendered.

2. Services in making revisions to Drawings and Specifications occasioned by the acceptance of substitute materials or equipment other than "or-equal" items; and services after the award of the Construction Agreement in evaluating and determining the acceptability of a substitution which is found to be inappropriate for the Project or an excessive number of substitutions.

3. Services resulting from significant delays, changes, or price increases occurring as a direct or indirect result of materials, equipment, or energy shortages.

4. Additional or extended services during construction made necessary by (1) emergencies or acts of God endangering the Work, (2) an occurrence of a Hazardous Environmental Condition, (3) Work damaged by fire or other cause during construction, (4) a significant amount of defective, neglected, or delayed work by Contractor, (5) acceleration of the progress schedule involving services beyond normal working hours, or (6) default by Contractor.

5. Services (other than Basic Services during the Post-Construction Phase) in connection with any partial utilization of any part of the Work by OWNER prior to Substantial Completion.

6. Evaluating an unreasonable claim or an excessive number of claims submitted by Contractor or others in connection with the Work.

Exhibit “C”

Exhibit C, C.O.B. work order _____, Raintree Parkway Trail

This is **EXHIBIT C**, consisting of 1page, referred to in and part of the **Agreement between OWNER and ENGINEER for Professional Services** dated October 27, 1998.

Initial:
OWNER _____
ENGINEER *PC*

Payments to ENGINEER for Services and Reimbursable Expenses

Article 4 of the Agreement is amended and supplemented to include the following agreement of the parties:

ARTICLE 4 -- PAYMENTS TO THE ENGINEER

**C4.01 For Basic Services Having A Determined
Scope --Lump Sum Method of Payment**

A. OWNER shall pay ENGINEER for Basic Services set forth in Exhibit A, except for services of ENGINEER's Resident Project Representative and Post-Construction Phase services, if any, as follows:

1. A Lump Sum (Budgeted/Authorized) amount of \$89,263.50 based on the following assumed distribution of compensation:

Task Required	Design Budget
Survey Task 1 (Topographic Data, Owners, Deed Research, Property Lines, Acquisition Table) Compatible with the GIS Coordinate System	\$11,690.00
Survey Task 2 (Stake centerline and easement breaks)	\$2,812.50
Geotechnical Evaluation	\$9,525.25
SUB-TOTAL SURVEY	\$24,027.75
Preliminary Design Documents (A determination will need to be made prior to initiating design on termini's)	\$10,000.00
Structure Abutment/Pier Design and Coordination	\$5,625.00
R-O-W Design Documents (No State Involvement)	\$4,000.00
Construction Documents (No State Involvement, One bid Package)	\$3,500.00
Final quantities, details, notes and standard drawings	\$1,000.00
Construction project manual (EJCDC Bid Documents, with TDOT Material Specifications)	\$1,000.00
Distribution of Design Documents to Existing Utilities', for relocation purposes. (Does not include design or survey services)	\$250.00
SUB-TOTAL ROADWAY	\$25,375.00
Reproduction (PDF's, & 7 copies of Bid Documents)	\$700.00
Preparation and Attendance at a Public Meeting (Public Meeting Display, 2 copies), (Court Reporter and additional Printing of Documents by the City)	\$2,500.00
Aquatic Resources Alteration Permit (Permit Fees to be paid by the City)	\$2,500.00
SUB-TOTAL MISCELLANEOUS	\$5,700.00
TOTAL	\$55,102.75

Authorized Budget

Total Budgeted/Authorized \$55,102.75

2. ENGINEER may alter the distribution of compensation between individual phases noted herein to be consistent with services actually rendered, but shall not exceed the total Lump Sum amount unless approved in writing by the OWNER.

3. The Lump Sum includes compensation for ENGINEER's services and services of ENGINEER's Consultants, if any. Appropriate amounts have been incorporated in the Lump Sum to account for labor, overhead, profit, and Reimbursable Expenses.

4. The portion of the Lump Sum amount billed for ENGINEER's services will be based upon ENGINEER's estimate of the proportion of the total services actually completed during the billing period to the Lump Sum.

5. The Lump Sum is conditioned on Contract Times to complete the Work not exceeding 6 months. Should the Contract Times to complete the Work be extended beyond this period, the total compensation to ENGINEER shall be appropriately adjusted.

6. This Exhibit C may be replaced or supplemented for future projects authorized by OWNER.

This is **Appendix 1 to EXHIBIT C**, consisting of 1 page, referred to in and part of the **Agreement between OWNER and ENGINEER for Professional Services** dated October 27, 1998

Initial:
OWNER _____
ENGINEER *PC*

Reimbursable Expenses Schedule

Current agreements for engineering services stipulate that the Reimbursable Expenses are subject to review and adjustment per Exhibit C. Reimbursable expenses for services performed on the date of the Agreement are:

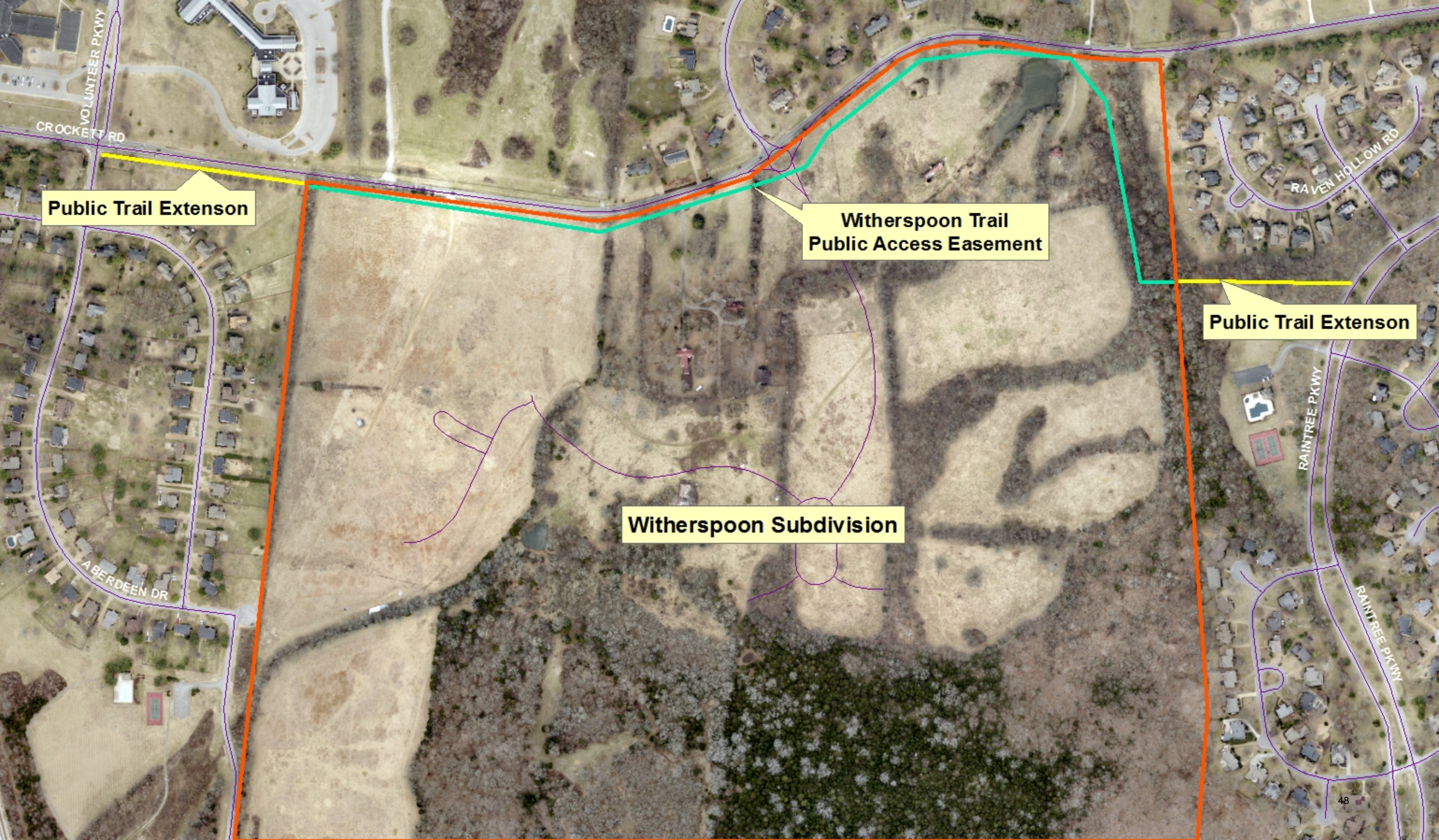
Fax	\$0.25	Page
8" x 11" Copies/Impressions	\$0.25	Page
11"x17" Copies/Impression	\$0.50	Page
24" x 36" Prints	\$0.50	Sq. Ft.
Minimum setup time	\$10.00	Per Plot
Reproducible Copies (Mylar)	\$5.00	Sq. Ft.
Reproducible B/W Copies (Paper)	\$3.00	Sq. Ft.
Reproducible Color Copies Paper)	\$4.00	Sq. Ft.
Mileage (auto)	\$0.54	Mile

Standard Hourly Rates Schedule

Current agreements for engineering services stipulate that the standard hourly rates are subject to review and adjustment per Exhibit C. Hourly rates for services performed on the date of the Agreement are:

Billing Class 9	Professional Engineer II	\$171.40
Billing Class 8	Professional Engineer I	\$158.36
Billing Class 7	Staff Associate/Project Coordinator	\$127.07
Billing Class 6	Project Manager	\$115.30
Billing Class 5	Roadway Designer II	\$108.68
Billing Class 4	Roadway Designer I	\$102.79
Billing Class 3	CADD Technician	\$96.99
Billing Class 2	Secretary	\$96.39
Billing Class 1	Office Helper	\$62.52





Public Trail Extension

**Witherspoon Trail
Public Access Easement**

Public Trail Extension

Witherspoon Subdivision

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-10 - Approval of a Pipe Repair Contract with Proshot Concrete, Inc.

Submitted by: Todd Hoppenstedt, Public Works

Department: Public Works

Information

Subject

Resolution 2020-10 - Approval of 2020 Pipe Repair Contract

Background

As the City's vast network of storm water culverts and pipes continue to age, the Public Works Department is responsible for maintaining, replacing, or rebuilding these conveyance systems to ensure proper operation for many years to come. As the need for repair is identified, each pipe section is evaluated independently to calculate costs and impacts related to various methods of maintenance or replacement.

One available option is to line an existing pipe segment with a reinforced concrete liner. This process allows us to construct a reinforced concrete pipe (RCP) within the existing host pipe. Once in place, the new RCP becomes the asset pipe as the existing pipe can continue to deteriorate in place without concern. While lining the existing pipe reduces the overall pipe diameter, there are engineering calculations (called the Manning Coefficient) which demonstrate that the volume of water conveyed by a smaller diameter smooth walled pipe remains the same or in some cases increases when compared to the larger diameter corrugated or ridged wall pipe.

While the cost difference between pipe lining and pipe replacement isn't always substantial, pipe lining is often far less impactful as it doesn't require the same extent of excavation and restoration (road cuts, traffic detours, or removal and replacement of landscape/trees), which at times can exceed the limits of our right-of-way or easement and require additional agreements with private property owners.

On January 24, 2020, staff opened bids for a Pipe Repair Contract on a unit-price basis. An example project was provided for quantities and comparative bidding purposes, but all bidders understand that actual quantities may differ and no minimum amount of work is guaranteed. The intent is to use the prices quoted for projects on an as-needed basis.

ProShot Concrete, Inc was one of three bids received. Their overall aggregate cost was 22% lower than the next bidder, whose bid was incomplete, and 24% lower than the third bid received. Additionally, ProShot Concrete, Inc used an engineered process that gives

staff the most confidence.

Staff recommends award of the 2020 Pipe Repair Contract to ProShot Concrete, Inc. The contract provides for a one-year term with two optional one-year extensions if the City is pleased with the work and if ProShot agrees to the extension(s).

Please contact the Public Works Director with questions.

Staff Recommendation

Staff recommends award of the 2020 Pipe Repair Contract to ProShot Concrete, Inc.

Previous Commission Action

No previous Commission action on this item.

Fiscal Impact

Amount :

Source of Funds:

Account Number:

Fiscal Impact:

Pricing in this contract will be used for drainage projects as the need arises. It is anticipated this contract will be used to award two projects in FY 2021, the Derby Glen Pipe Repair project and Subdivision Drainage project, which are expected to total approximately \$250,000.

Attachments

Resolution 2020-10

Bid Documents, Contract, Bonds

Final Specs

Prebid Agenda and Addendum 1

Addendum 2

Addendum 3

RESOLUTION 2020-10

**A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE TO AUTHORIZE THE
MAYOR TO EXECUTE AN AGREEMENT BY AND BETWEEN THE CITY OF
BRENTWOOD AND PROSHOT CONCRETE, INC. FOR STORM WATER PIPE
REPAIRS, A COPY OF SAID AGREEMENT BEING ATTACHED HERETO AND MADE
A PART OF THIS RESOLUTION BY REFERENCE**

BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the Mayor is hereby authorized to execute an agreement by and between the City of Brentwood and Proshot Concrete, Inc. for storm water pipe repairs, a copy of said agreement being attached hereto and made a part of this resolution by reference.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR

Rhea E. Little, III

ADOPTED: _____

Approved as to form:

RECORDER

Holly Earls

CITY ATTORNEY

Kristen L. Corn

**STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF STIPULATED PRICE**

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

And

SULLIVAN ENGINEERING, INC.

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

This Standard Form of Agreement has been prepared for use with the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition). Their provisions are interrelated, and a change in one may necessitate a change in the others. The suggested language for instructions of bidders contained in the Guide to the Preparation of Instructions to Bidders (No. 1910-12, 1996 Edition) is also carefully interrelated with the language of this Agreement. Comments concerning their usage are contained in the EJCDC Users Guide (No. 1910-50). See also Guide to the Preparation of Supplementary Conditions (No. 1910-17, 1996 Edition).

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National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2715

American Consulting Engineers Council
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
345 East 47th Street, New York, NY 10017

EJCDC No. 1910-8-A-2 (1996 Edition)

**EJCDC
STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR**

Article I.

ON THE BASIS OF STIPULATED PRICE

THIS AGREEMENT is by and between **The City of Brentwood,** (hereinafter called OWNER) and **Proshot Concrete, Inc.**, (hereinafter called CONTRACTOR). OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK

Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

1. The contractor shall provide all labor, materials and equipment necessary for the 2020 Pipe Repair Contract, within the City of Brentwood.
2. This project is to be constructed under the Standard Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.
3. The cost of this project shall be based on a unit price bid for various items required on each work order issued by the City.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

General Construction – 2020 Pipe Repair Contract, in the City of Brentwood

Sullivan Engineering Project No. 19-014

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by Mr. Richard Sullivan, PE, Sullivan Engineering, Inc. who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Dates for Substantial Completion and Final Payment*

- A. The Roadway Work will be substantially complete as indicated in section 6.01; and 6.02 of the "BID FORM".

4.03 *Liquidated Damages*

- A. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty),

CONTRACTOR shall pay OWNER \$500.00 for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER \$500.00 for each day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

- B. The contractor understands that any penalty, fine, enforcement or other type of monetary judgment levied on any and all firms, agencies or individuals while under contract with the City of Brentwood is the responsibility of the contractor and will not be paid or reimbursed by the City of Brentwood.

ARTICLE 5 - CONTRACT PRICE

5.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraph 5.01.A below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the agreed upon estimated quantity of that item as indicated and attached hereto as an exhibit.
- B. As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINEER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.
- C. C. For all Work, at the prices stated in CONTRACTOR's Bid, attached hereto as an exhibit.

CONSTRUCTION ESTIMATE

This project is to be constructed under the Standard and Supplemental Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.

ESTIMATED QUANTITIES						
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		ROUND PIPE LINER				
6	1	18-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$292.00	\$292.00
6	2	24-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$310.00	\$310.00
6	3	30-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$345.00	\$345.00
6	4	36-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$188.00	\$188.00
6	5	42-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$169.00	\$169.00
6	6	48-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$187.00	\$187.00
6	7	54-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$264.00	\$264.00
6	8	60-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$270.00	\$270.00
6	9	66-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$276.00	\$276.00
6	10	72-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$296.00	\$296.00
6	11	78-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$316.00	\$316.00
6	12	84-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDE WIRE MESH REINFORCEMENT	L.F.	1	\$330.00	\$330.00

ESTIMATED QUANTITIES						
FOOTNOTE S	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
6	13	90-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$340.00	\$340.00
6	14	96-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$350.00	\$350.00
		ARCH PIPE LINER				
6	100	21" X 15" PIPE ARCH (18-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$292.00	\$292.00
6	101	28" X 20" PIPE ARCH (24-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$310.00	\$310.00
6	102	35" X 24" PIPE ARCH (30-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$345.00	\$345.00
6	103	42" X 31" PIPE ARCH (36-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$188.00	\$188.00
6	104	49" X 38" PIPE ARCH (42-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$169.00	\$169.00
6	105	53" X 41" PIPE ARCH (48-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$187.00	\$187.00
6	106	60" X 46" PIPE ARCH (54-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$252.00	\$252.00
6	107	66" X 51" PIPE ARCH (60-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$250.00	\$250.00
6	108	73" X 55" PIPE ARCH (66-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$260.00	\$260.00

00500-5

ESTIMATED QUANTITIES						
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
6	109	81" X 59" PIPE ARCH (72-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$270.00	\$270.00
6	110	87" X 63" PIPE ARCH (78-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$280.00	\$280.00
6	111	95" X 67" PIPE ARCH (84-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$300.00	\$300.00
6	112	103" X 71" PIPE ARCH (90-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$310.00	\$310.00
6	113	112" X 75" PIPE ARCH (96-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$320.00	\$320.00
6	114	117" X 79" PIPE ARCH (102-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$330.00	\$330.00
6	115	128" X 83" PIPE ARCH (108-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$340.00	\$340.00
6	116	137" X 87" PIPE ARCH (114-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$350.00	\$350.00
6	117	142" X 91" PIPE ARCH (120-INCH ROUND EQUIVALENT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1	\$370.00	\$370.00
		MISCELLANEOUS ITEMS				
	200	PRESSURE GROUT VOIDS	S.F.	1	\$20.00	\$20.00
	201	SEAL END AND WINGWALL, 2-INCH THICK 5,000 PSI MIX. INCLUDES COVERAGE WITH WIRE MESH	S.F.	1	\$50.00	\$50.00

00500-6

ESTIMATED QUANTITIES						
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
	202	CLEAN ALL PIPES AND STRUCTURES (SOLID DEBRIS REMOVAL)	C.Y.	1	\$100.00	\$100.00
	203	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/WIRE MESH	S.F.	1	\$35.00	\$35.00
	204	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/#4 RE-BAR	S.F.	1	\$55.00	\$55.00
	205	MODIFICATION TO DELETE WIRE MESH AND REPLACE WITH #4 RE-BAR	S.F.	1	\$45.00	\$45.00
7	206	ADDITIONAL WOVEN WIRE MESH, AS DIRECTED BY THE ENGINEER	L.F.	1	\$160.00	\$160.00
		TN DEPT OF TRANSPORTATION ITEMS				
	203-07	FURNISHING AND SPREADING TOPSOIL	CY	1	\$75.00	\$75.00
1 & 3	204-07	BEDDING MATERIAL (PIPE) CLASS B	CY	1	\$75.00	\$75.00
2	209-05.01	SEDIMENT REMOVAL (CULVERTS, THE CITY WILL HAVE THE CULVERTS CLEANED PRIOR TO SCHEDULING AN ON SITE MEETING. AND ISSUANCE OF A WORK ORDER. THIS SHOULD LEAVE THE CULVERT IN A CONDITION THAT NORMALLY REQUIRED PREP WORK WOULD BE INCLUDED IN YOUR UNIT COST PER LINEAR FOOT. IN THE EVENT THE PIPE HAS EXCESSIVE SEDIMENT BUILD-UP PRIOR TO WORK BEGINNING THE CITY WILL EITHER HAVE IT REMOVED OR AUTHORIZED YOU TO PERFORM THE SERVICE.)	C.Y.	1	\$100.00	\$100.00
	615-04.10	NON-SHRINK GROUT	CF	1	\$60.00	\$60.00
5	712-08.06	UNIFORMED POLICE OFFICER	HR	1	\$50.00	\$50.00
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH". AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE)	L.F.	1	\$50.00	\$50.00

ESTIMATED QUANTITIES						
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1	\$50.00	\$50.00
TOTAL BASE BID						\$9,981.00

FOOTNOTE

S

- (1) BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH TDOT STANDARD DRAWING D-PB-1 AND D-PB-2.
- (2) INCLUDES REMOVAL AND DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL GUIDELINES. NECESSARY PERMITS WILL BE OBTAINED BY THE CITY OF BRENTWOOD.
- (3) TO BE USED FOR ADDITIONAL PIPE BEDDING MATERIAL AS DIRECTED BY THE PUBLIC WORKS DIRECTOR OR AUTHORIZED REPRESENTATIVE.
- (4) AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)
- (5) PRIOR APPROVAL MUST BE OBTAINED FROM THE PUBLIC WORKS DIRECTOR TO SCHEDULE THIS WORK.
- (6) COORDINATE WITH ITEM #206.
- (7) THE CITY INTENDS TO UTILIZE WIRE MESH REINFORCEMENT IMBEDDED IN THE 2-INCH (MIN) CEMENTITIOUS LINER ON A CASE BY CASE BASIS. THIS WORK WILL BE AS DIRECTED BY THE ENGINEER OR AUTHORIZED CITY REPRESENTATIVE.

GENERAL NOTES (ALL ITEMS)

- (1) WORKING HOURS WILL BE FROM 7:00 AM UNTIL DARK MONDAY THROUGH SATURDAY. NO WORK WILL BE ALLOWED ON SUNDAY UNLESS IT HAS BEEN CLASSIFIED AS AN EMERGENCY AND APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

- (2) BONDS WILL BE REQUIRED AS NOTED IN THE CONTRACT DOCUMENTS. HOWEVER, BONDS WILL NOT BE REQUIRED FOR INDIVIDUAL WORK ORDERS ISSUED. A RETAINER WILL NOT BE WITHHELD FROM EACH WORK ORDER ISSUED.
- (3) UNIT PRICE BID FOR ALL ITEMS SHALL INCLUDE ALL MOBILIZATION AND LAYOUT FOR A COMPLETE SYSTEM. SPECIALTY PERMITS SUCH AS CORP OF ENGINEERS, TN DEPT OF ENV, RAILROAD, ASBESTOS, ETC. SHALL BE OBTAINED BY THE CITY OF BRENTWOOD. PERMITS SUCH AS ELECTRICAL OR REVIEW FEES SHALL BE PAID BY THE CONTRACTOR AND REIMBURSED BY THE CITY OF BRENTWOOD.
- (4) MEASUREMENT AND PAYMENT OF QUANTITIES SHALL BE IN ACCORDANCE WITH THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED: JANUARY 1, 2015 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE CONSTRUCTION DOCUMENTS.
- (5) ALL ITEMS WITHIN THIS CONTRACT INCLUDE INSTALLATION OF NECESSARY TRAFFIC AND EROSION CONTROL IN THE UNIT PRICE BID, IN ACCORDANCE WITH FEDERAL, STATE AND CITY OF BRENTWOOD REQUIREMENTS. TEMPORARY LANE LINE AND SPECIALTY MARKINGS WILL NOT BE REQUIRED AND SHALL BE THE RESPONSIBILITY OF THE CITY OF BRENTWOOD.
- (6) TDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 104 SCOPE OF WORK, ARTICLE 104.02 CHANGES IN PLANS OR IN CHARACTER OF CONSTRUCTION, SUB-SECTION C AND 604.31 UNIT COST PRICE ADJUSTMENT, HAVE BEEN DELETED AND NOT APPLICABLE TO THIS CONTRACT.

TOTAL OF ALL UNIT PRICES:

<u>Nine Thousand Nine Hundred Eighty One Dollars and 00/100</u>	<u>Dollars and</u>	<u>Cents,</u>	<u>(\$9,981.00)</u>
(use words)			(figure)

ARTICLE 6 – N/A

ARTICLE 7 – N/A

ARTICLE 8 – N/A

ARTICLE 9 – N/A

ARTICLE 10 - PAYMENT PROCEDURES

10.01 *Submittal and Processing of Payments*

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will indicate the amount of the CONTRACTOR's fee then payable. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

10.02 *Progress Payments; Retainage*

A. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER on or about the 25th day of each month during construction as provided in paragraphs 10.02.A.1 and 10.02.A.2 below. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. *For Cost of Work:* Progress payments on account of the Cost of the Work will be made:

a. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as ENGINEER may determine or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions:

(1) 100% Cost of Work completed (with the balance being retainage). If the Work has been 50% completed as determined by ENGINEER, and if the character and progress of the Work have been satisfactory to OWNER and ENGINEER, OWNER, on recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of Work subsequently completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed less the aggregate of payments previously made; and

(2) 100% of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

b. Upon Substantial Completion of each work order, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 100% of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 100% of ENGINEER's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

10.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 11 - INTEREST

11.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of prime plus 1% per annum.

ARTICLE 12 - CONTRACTOR'S REPRESENTATIONS

12.01 In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. CONTRACTOR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. CONTRACTOR has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto.

F. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.

H. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 13 - ACCOUNTING RECORDS

13.01 CONTRACTOR shall check all materials, equipment, and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the accounting methods shall be satisfactory to OWNER. OWNER shall be afforded access to all CONTRACTOR's records, books, correspondence,

instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and CONTRACTOR's fee. CONTRACTOR shall preserve all such documents for a period of three years after the final payment by OWNER.

ARTICLE 14 - CONTRACT DOCUMENTS

14.01 *Contents*

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages 1 to 14, inclusive).
 - 2. Performance Bond (pages 1 to 2, inclusive).
 - 3. Payment Bond (pages 1 to 2, inclusive).
 - 4. Bid Bonds
 - a. Penal Sum Form (pages 1 to 3, inclusive).
 - 5. General Conditions (pages 1 to 43, inclusive).
 - 6. Supplementary Conditions (pages 1 to 6, inclusive).
 - a. Exhibit I "Indemnification Agreement" (pages 1 to 7, inclusive).
 - b. Drug-Free Workplace: Contractor's Affidavit. (pages 1 to 3, inclusive).
 - c. Equal Opportunity "Title VI Policy Statements ".(pages 1 to 1, inclusive).
 - 7. Specifications as listed in the table of contents of the Project Manual.
 - 8. Addenda (numbers -0- to -3-, inclusive).
 - 10. Exhibits to this Agreement (enumerated as follows):
 - a. Notice to Award (pages -0- to -6-, inclusive);
 - b. CONTRACTOR's Bid (pages -1- to 61 -, inclusive);
 - c. Documentation submitted by CONTRACTOR prior to Notice of Award in accordance with "INSTRUCTIONS TO BIDDERS";
 - d. Certificate of Insurance
 - e. Notice to Proceed (pages -0- to -1- inclusive)
 - f. Contractor's Bid Package.
 - 11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Written Amendments;
 - b. Work Change Directives;
 - c. Change Order(s);

d. Proposal Request.

B. The documents listed in paragraph 14.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 14.

D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.05 of the General Conditions.

ARTICLE 15 - MISCELLANEOUS

15.01 *Terms*

A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

15.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

15.03 *Successors and Assigns*

A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

15.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in duplicate. One counterpart each has been delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or on their behalf.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Agreement).

OWNER:

By: _____

[CORPORATE SEAL]

Attest _____

Address for giving notices:

(If OWNER is a corporation, attach evidence of authority to sign. If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of OWNER-CONTRACTOR Agreement.)

Designated Representative:

Name: _____

Title: _____

Address: _____

Phone: _____

Facsimile: _____

CONTRACTOR:

Proshot Concrete, Inc

By: Anthony McDougale

Anthony McDougale, President

[CORPORATE SEAL]

Attest Connie Dill

Connie Dill, Office Manager

Address for giving notices:

4158 Musgrove Drive

Florence, AL 35630

License No. 58959

(Where applicable)

Agent for service of process: _____

(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

Designated Representative:

Name: _____

Title: _____

Address: _____

Phone: _____

Facsimile: _____





UNANIMOUS CONSENT
OF THE DIRECTOR
OF PROSHOT CONCRETE, INC.

The sole director of Proshot Concrete, Inc., an Alabama corporation ("Company"), hereby confirms the following facts:

1. Anthony L. McDougle is the sole shareholder and director of the Company.
2. Anthony L. McDougle is the president of the Company.

The sole director hereby consents to the following resolutions:

RESOLVED THAT Anthony L. McDougle, as president of the Company, is authorized to sign contracts binding the corporation and to establish bank accounts on behalf of the Company and to be the sole signatory on such accounts.

Dated April 14, 2010



Anthony L. McDougle, president and director



Performance Bond

#9334709

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

Proshot concrete, Inc
C/o Mr. Tony McDougle
4158 Musgrove Drive
Florence, AL 35630

SURETY (Name and Address of Principal Place of Business):

Fidelity and Deposit Company of Maryland
1299 Zurich Way, 5th Floor
Schaumburg, IL 60196-1056

OWNER (Name and Address):

City of Brentwood

ATTN. Mr. Todd Hoppenstedt, Director of Public Works
P.O. Box 788
1750 General George Patton Drive
Brentwood, TN 37027

CONTRACT

Date: _____

Amount: \$9,981.00

Description (Name and Location):

Contract: General Construction

Project: Pipe Repair Control

OWNER's Contract No.

ENGINEER's Contract No. 19-014

ENGINEER: Mr. Richard Sullivan, PE, Sullivan Engineering, Inc.

317 Main Street, Suite 201, Franklin, TN 37064

BOND

Date (Not earlier than Contract Date): _____

Amount: \$9,981.00

Modifications to this Bond Form:

N/A

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

CONTRACTOR AS PRINCIPAL

Company: Proshot Concrete, Inc.

Signature: Anthony M. McDougle
Name and Title: Anthony McDougle, President

SURETY

Company: Fidelity and Deposit Company of Maryland (Corp. Seal)

Signature: Thomas J. Bole
Name and Title: Thomas J. Bole, Attorney-in-Fact
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corp. Seal)

Signature: _____
Name and Title: _____

SURETY

Company: _____ (Corp. Seal)

Signature: _____
Name and Title: _____

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, which is incorporated herein by reference.

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract;

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

OWNER'S REPRESENTATIVE:

Mr. Richard Sullivan, PE
Sullivan Engineering, Inc.
317 Main Street
Suite 201
Franklin, TN 37064

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **ROBERT D. MURRAY, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Bruce S. DENSON, Grantland RICE, III, Gregg A. TATUM, Thomas J. BOLE and Sharon E. GRIFFITH, all of Birmingham, Alabama, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 23rd day of August, A.D. 2019.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: _____

*Assistant Secretary
Dawn E. Brown*

*Vice President
Robert D. Murray*

**State of Maryland
County of Baltimore**

On this 23rd day of August, A.D. 2019, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **ROBERT D. MURRAY, Vice President, and DAWN E. BROWN, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Constance A. Dunn

Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2023



EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 28th day of January, 2020.



Brian M. Hodges

Brian M. Hodges, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.
Attn: Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056

Payment Bond

#9334709

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

Proshot Concrete, Inc
C/o Mr. Tony McDougle
4158 Musgrove Drive
Florence, AL 35630

SURETY (Name and Address of Principal Place of Business):

Fidelity and Deposit Company of Maryland
1299 Zurich Way, 5th Floor
Schaumburg, IL 60196-1056

OWNER (Name and Address):

City of Brentwood

ATTN. Mr. Todd Hoppenstedt, Director of Public Works
P.O. Box 788
1750 General George Patton Drive
Brentwood, TN 37027

CONTRACT

Date: _____

Amount: \$9,981.00

Description (Name and Location):

Contract: General Construction

Project: Pipe Repair Control

OWNER's Contract No.

ENGINEER's Contract No. 19-014

ENGINEER: Mr. Richard Sullivan, PE, Sullivan Engineering, Inc.

317 Main Street, Suite 201, Franklin, TN 37064

BOND

Date (Not earlier than Contract Date): _____

Amount: \$9,981.00

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company: Proshot Concrete, Inc.

Signature: _____

Name and Title: Anthony McDougle, President

SURETY

Company: _____

Fidelity and Deposit Company of Maryland

Signature: _____

Name and Title: Thomas J. Bole, Attorney-in-Fact
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL

Company: _____

(Corp. Seal)

Signature: _____

Name and Title: _____

SURETY

Company: _____

(Corp. Seal)

Signature: _____

Name and Title: _____

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default.

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

15.3. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

OWNER'S REPRESENTATIVE:

Mr. Richard Sullivan, PE
Sullivan Engineering, Inc.
317 Main Street
Suite 201
Franklin, TN 37064

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **ROBERT D. MURRAY, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Bruce S. DENSON, Grantland RICE, III, Gregg A. TATUM, Thomas J. BOLE and Sharon E. GRIFFITH, all of Birmingham, Alabama, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereto subscribed his/her names and affixed the Corporate Seals of the said ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 23rd day of August, A.D. 2019.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By:

*Assistant Secretary
Dawn E. Brown*

*Vice President
Robert D. Murray*

State of Maryland
County of Baltimore

On this 23rd day of August, A.D. 2019, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **ROBERT D. MURRAY, Vice President, and DAWN E. BROWN, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

*Constance A. Dunn, Notary Public
My Commission Expires: July 9, 2023*



EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 28th day of January, 20 26.



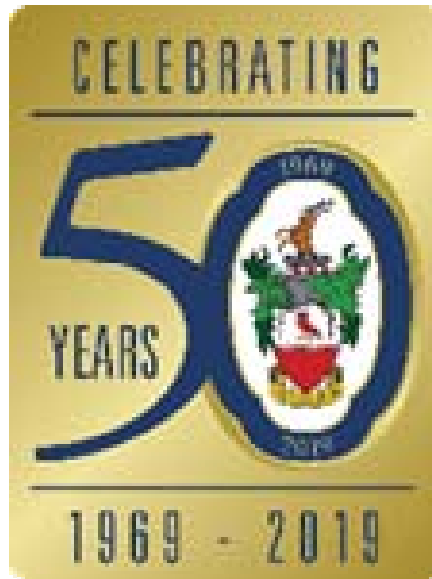
Brian M. Hodges

Brian M. Hodges, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.
Attn: Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056

SPECIAL PROVISIONS
AND
REFERENCE DOC'S



PROJECT MANUAL

For The Project Titled

**2020 PIPE REPAIR CONTRACT
BRENTWOOD, TENNESSEE
SEI PROJECT NO. 19-014**

JANUARY 14, 2020

OWNER

**CITY OF BRENTWOOD
BRENTWOOD, TENNESSEE**

DESIGNER

**SULLIVAN ENGINEERING, INC.
317 MAIN STREET, SUITE 201
FRANKLIN, TN 37064
(615) 642-5822**



S T A T E

(Rev. 3-30-15)
(Rev. 11-16-15)
(Rev. 6-27-16)
(Rev. 12-2-16)
(Rev. 5-15-17)
(Rev. 11-6-17)
(Rev. 5-14-18)
(Rev. 7-2-18)
(Rev. 10-8-18)

O F**T E N N E S S E E**

January 1, 2015

Supplemental Specifications - Section 100**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 101.03 (pg. 10) 5-15-17; Terms - Add the following definition for Specialty Items:

“Specialty Item. Work items identified in the contract which are not bid normally associated with highway construction and require highly specialized knowledge, abilities, craftsmanship, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract in general, these items are to be limited to minor components of the overall contract.”

Subsection 102.11 (pg. 18), 3-30-15; Licensing of Bidders Add the following to the second paragraph:

“The Department may retain the Proposal Guaranty, not as a penalty, but as liquidated damages in the event a bidder does not have a license at the time of award.”

Subsection 104.04 (pg. 27), 3-30-15; Maintenance of Traffic - Add the following as the first full paragraph on page 27:

“If a holiday falls on Saturday or Sunday, do not close lanes or restrict traffic from the preceding Friday at 6 am to the following Monday at 6 am.”

Subsection 105.03 (pg. 38), 12-2-16; Conformity with Plans and Specifications - Add the following to the end of the section:

“Products listed on the QPL which fail to comply with Departmental performance expectations shall be removed from the QPL. Products removed from the QPL shall be replaced with an equivalent product from the QPL. At the Departments discretion, an equitable adjustment may be made to the contract for invoice price deviations.”

Subsection 105.03 (pg. 38), 6-27-16; Conformity with Plans and Specifications - Add the following to the end of the section:

“All products must be listed on the Qualified Products List (QPL) and perform as specified at the time of use regardless of Letting date. Any products removed from the QPL or that do not perform as specified, must be supplied or replaced at the Contractor’s expense.”

Subsection 105.06 (pg. 40), 3-30-15; Planning of the Operations-Preconstruction Conference - Replace 2nd sentence of 1st paragraph:

“The contractor must attend a preconstruction conference arranged by the Engineer.”

Subsection 105.10 (pg. 46), 5-15-17; Authority and Duties of Inspectors - Revise 2nd sentence of the first paragraph:

“Such inspection may extend to any part or to all of the Work and to the preparation, fabrication, or manufacture of materials to be used.”

Subsection 105.11 (pg. 46), 5-15-17; Inspection of Work - Revise the 1st sentence:

“The Engineer or its representative will inspect all materials and each part or detail of the Work .”

Subsection 105.13 (pg. 48), 5-15-17; Completion of Specific Sections of a Project - Remove the 2nd paragraph.

Subsection 105.15 (pg. 49), 5-15-17; Acceptance - Remove last paragraph:

Subsection 106.06 (pg. 61), 5-15-17; Field Laboratory - Revise the first paragraph of A. and subsection A.2:

“Provide a Type A Laboratory consisting of a building, room, or dedicated area having at least 120 square feet of floor area with a minimum width of 8 feet and a minimum height of 7 feet. Provide laboratory space that is floored, roofed, sealed inside, weather-tight,

and furnished with electricity. Furnish the space with adequate work benches, cabinets, and drawers. Provide suitable heat and air conditioning, and equip the laboratory with a laboratory oven capable of maintaining a temperature of $230^{\circ}\text{F} \pm 9^{\circ}\text{F}$. Stove tops and hot plates may be used to determine moisture conditions of aggregates. Provide lights, electrical outlets, and adequate ventilation for the tests being performed.

When the determination of aggregate gradation is required, furnish the following equipment:

1. Scales of appropriate capacity and design to weigh the required samples. Scales are to be sensitive to within 0.2% of the sample to be weighed. Provide standard weights for scale calibration.
2. Screens of appropriate size and mesh to separate the samples into the required series of sizes. Woven wire cloth shall conform to AASHTO M 92. Screens for running gradations of coarse aggregates shall meet AASHTO T27.
3. A mechanical shaker approved by the Engineer and suitable for running both coarse and fine aggregate.
4. Facilities to perform wash tests according to AASHTO T 11 that include an adequate and suitable water supply.”

Subsection 107.08 (pg. 69), 5-15-17; Protection of Streams, Lakes, and Reservoirs - Add the following to the end of the third paragraph:

“All costs associated with any support activities including obtaining permission from landowners, permits, and compliance are to be included in the bid cost for the project.”

Subsection 107.08 (pg. 71), 11-6-17; Migratory Birds - Add the following as section E:

“E. Migratory Birds

The following procedure will be automatically implemented by TDOT, unless FWS approves in writing deviations due to special circumstances, or for a specific variance.

Cliff swallow and barn swallow nests, eggs, or birds (young and adults) will not be disturbed between April 15 and July 31. From August 1 to April 14, nests can be removed or destroyed, and measures implemented to prevent future nest building at the site (i.e., closing off area using netting).

Exceptions:

- (1) If there are no eggs in the nests prior to April 15, TDOT will be allowed to destroy the nests and prevent further nest building at the site, by installing netting. Net openings shall be ½ inch or smaller after installation, and shall be installed securely and in such a manner that it will not pose a safety hazard. Absence of eggs prior to net

installation must be documented by using appropriate means for determination, such as, but not limited to, site visits and photographs.

(2) If there are no birds (young or adult) left in any of the nests at a specific site prior to July 31, the nests can be removed or destroyed. Absence of birds must be documented by using appropriate means for determination, such as, but not limited to, site visits, photographs, and observations of no birds using the nests.

Osprey, Double Crested Cormorants, Great Horned Owls, Barn Owls, Black Vulture, and Eastern Phoebe:

If these avian species are encountered on a bridge project, TDOT Ecology should be contacted immediately for further assistance.

The Contractor will be assessed the amount of any and all fines and penalties assessed against and cost incurred by TDOT which are the result of the Contractor's failure to comply with this specification. TDOT will not be responsible for any delays or costs due to the Contractor's failure to comply. Additional compensation or contract time due to noncompliance will not be granted.

All costs incurred with this specification will not be measured or paid for separately, but will be considered included in the contract unit prices bid for other items of the contract."

Subsection 108.01 (pg. 78) 5-15-17; Subletting of Contract - Add the following list of specialty items:

"Do not sublet, allow second tier sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof or a right, title, or interest in the Contract without the Engineer's written consent. If the Engineer consents to subletting or second tier subletting a portion of the Contract, the Contractor shall self-perform work amounting to not less than 30% of the total original Contract cost. For items designated in the Contract as "specialty items," the Contractor may sublet or second tier sublet this work and deduct the cost of such specialty items from the total original cost before computing the amount of the Work required to be self-performed by the Contractor with its own organization.

As stated above, unless there is a Special Provision 108A in the proposal, the following items are designated as Specialty Items:

Item 105-01 - Construction Stakes, Lines and Grades

Item 202-01.02 – Removal of Asbestos

Item 209 - EPSC Item 411-12.**Shoulder Scoring

Item 501-03.12 – Concrete Shoulder Rumble Strip

Item 602-03 - Steel Structures

Item 602-04 - Steel Structures

Item 602-10.13 / .14 - Navigational Lighting Item 602-10.81 – Heat Straightening

Item 603-02 - Repainting Steel Structures

Item 603-05 - Containment and Disposal of Waste

Item 604-04.01 - Applied Texture Finish (New Structures),
Item 604-04.02 - Applied Texture Finish (Existing Structures)
Item 604-04.62 - Clean and Texture Finish Median Barrier
Item 604-05.31 - Bridge Deck Grooving (Mechanical)
Item 604.07 – Retaining Wall
Item 604-42.01 – Underwater Divers
Item 606-26.05 – Core Drilling for Piles (Abandoned)Item 617 - Bridge Deck
Sealant
Item 624 – Retaining Wall Items
Item 625-01.08,10,11 – Inclinator, Drilled Shaft Inspections
Item 640 - Weigh Station Items
Item 705 - Guardrail, Anchors, etc.
Item 706 - Guardrail Items
Item 707 - Fencing ItemsItem 712 - Traffic Control Items
Item 713 - Signing Items
Item 714 - Lighting Items
Item 716 - Pavement Marking Items
Item 720-03, 720-04, 720-05, 720-06, 720-07, 720-08, 720-09 – Railroad
Highway Crossing
Item 721-01.06 – Irrigation System Repair
Item 721-10, 721-11.20, 721-11.30, 721-12 – Landscape and Irrigation
Item 725 – ITS items
Item 730 - Traffic Signal Items
Item 7** - Utility Items
Item 750.01 – Mitigation Site
Item 801 - Seeding
Item 802 - Landscaping Items
Item 803-01 - Sodding
Item 805 - Erosion Control
Item 806 - Project Mowing”

Subsection 108.09 (pg. 90) 5-14-18; Failure to Complete the Work on Time - Table 108.09-1:
Modify the Daily Charge (\$/Day) as shown below:

Table 108.09-1: Liquidated Damages for Failure to Complete the Work on Time

Original Contract Amount (\$)			Daily Charge (\$/day)
0	to	500,000	400.00
> 500,000	to	1,000,000	580.00
> 1,000,000	to	2,000,000	800.00
> 2,000,000	to	10,000,000	1,000.00
>10,000,000	to	20,000,000	1,600.00
>20,000,000			2,500.00

Subsection 109.01 (pg. 98-100) 11-16-15; Measurement of Quantities, E. Weight; Remove the 12th paragraph and replace with the following:

“The scales shall be checked by an independent certified scale company. The check shall be performed on a semiannual basis; January through June and July through December. The results shall be maintained onsite and made available for review to Departmental personnel. If deficiencies are reported, all corrections shall be performed, documented, and verified prior to supplying material for TDOT projects.”

Subsection 109.01 (pg. 98-99) 5-15-17; Measurement of Quantities, E. Weight, Modify the 6th paragraph to the following:

“Employ a Certified Public Weigher as defined in the Certified Public Weigher Law of 1981, Tennessee Code Annotated, Section 47-26-801, et seq., as amended. The Engineer will measure all applicable materials in accordance with the Certified Public Weigher Law and Department policy on scales approved by the Engineer. Provide weight (haul) tickets in accordance with Department policy and as directed by the Engineer. These requirements apply to entities located both inside and outside the state of Tennessee”

Subsection 109.01 (pg. 98-100) 5-15-17; Measurement of Quantities, E. Weight, Modify the 12th paragraph to the following:

“The scales shall be calibrated and certified by an independent certified scale company. The calibration and certification shall be performed on a semiannual basis; January

through June and July through December. Scales shall be validated on a quarterly basis to ensure their continued accuracy. Validation shall be made by a verified known weight, or other scales that are approved by the Department or other State agency. A verified known weight shall be checked for continued accuracy each time the scales are calibrated. The results shall be maintained onsite and made available for review to Departmental personnel. If deficiencies are reported, all corrections shall be performed, documented, and verified prior to supplying material for TDOT projects.”

Subsection 109.01 (pg. 98-100), 11-9-17; Measurement of Quantities E. Weight, Revise subsection to the following:

“E. Weight

The term “ton” will mean the short ton consisting of 2,000 pounds avoirdupois.

Unless otherwise specified, the Engineer will accept certified weights for materials measured or proportioned by weight that are shipped by rail or truck transport, provided that only the actual weight of the material used is paid for.

For bituminous materials, net certified scale weights or weights based on certified volumes in the case of rail or truck transport shipments, unless otherwise specified, will be used as a basis of measurement, subject to correction when bituminous material has been lost, wasted, or otherwise not incorporated in the Work.

In all cases where measurement of materials is based on certified weights, provide the Engineer with certified weigh bills showing the net tons of materials received in each shipment. The Engineer will not pay for materials in excess of the amounts represented by the certified weigh bills.

Certified Weigh Tickets for Asphalt Mixtures and Aggregate Materials shall list on the ticket:

1. Date
2. Time
3. The ticket number
4. Gross weight of the loaded truck
5. Tare weight of the truck
6. Net weight of the material to be paid
7. Running Daily Total for the particular material
8. Truck number

9. Truck Legal limit

Employ a Certified Public Weigher as defined in the Certified Public Weigher Law of 1981, Tennessee Code Annotated, Section 47-26-801, et seq., as amended. The Engineer will measure all applicable materials in accordance with the Certified Public Weigher Law and Department policy on scales approved by the Engineer. Certified Weigher licenses shall be posted near the scale beam or weight indicator in full view at all times. Certified Weigher shall be the only person allowed to operate the scale or weigh recording equipment. Provide weight (haul) tickets in accordance with Department policy and as directed by the Engineer. These requirements apply to entities located both inside and outside the state of Tennessee.

Certified Weigher shall weigh each load with the maximum load not to exceed the legal limit established by law. The proposed haul route shall be known prior to deployment.

Provide a standard brand of platform truck scales with a sufficient rated capacity to weigh the maximum gross load to which they will be subjected. Do not use truck scales to measure weights in excess of the manufacturer's rated capacity. Clearly post the manufacturer's rated capacity on the scale manufacturer's plate and in the shelter provided for the weigher.

At the time of installation or modification of existing scales, test the scales before using to ensure they are within the allowable tolerances. Use a qualified scale technician to perform any alteration (e.g., electrical readout) or change in the rated capacity. Document all changes or alterations made by the scale technician and furnish a copy of the documentation to the Department.

House the recording mechanism of the scale in a suitable shelter furnished with adequate light, heat, chairs, tables, and storage drawers as needed for the convenience of the weigher. In addition, keep the scale platform and scale pit free of debris that could affect the accuracy of the scales.

Provide digital readout and scale printers as the primary weight indicator or as accessory equipment. The Department will inspect and approve all scale control and recording equipment.

Ensure the scale's accuracy within a tolerance of 0.5%. Provide a straight approach at each end of the platform scale in the same plane as the platform and of sufficient length and width to ensure the level positioning of vehicles longer than the scale platform during weight determinations. Weigh each truck and trailer with no brakes set on any wheel. Locate the scale platform so that surface water will drain away from it and to allow for an adequate foundation of concrete or other approved materials. Construct the foundation of

sufficient strength and durability to withstand repeated capacity loading without affecting the accuracy of the scales.

The scales shall be calibrated and certified by an independent certified scale company. The calibration and certification shall be performed on a semiannual basis; January through June and July through December. Scales shall be validated on a quarterly basis to ensure their continued accuracy. Validation shall be made by a verified known weight, or other scales that are approved by the Department or other State agency. A verified known weight shall be checked for continued accuracy each time the scales are calibrated. The results shall be maintained onsite and made available for review to Departmental personnel. If deficiencies are reported, all corrections shall be performed, documented, and verified prior to supplying material for TDOT projects.

Weigh tickets shall be certified either manually or electronically. If certified manually, the Certified Weigher shall sign his official registered signature and place his seal on the original ticket. The ticket shall be filled out in ink and delivered to the project site with the material.

For materials directly paid for by the ton, the Engineer will be furnished a daily recap of all materials delivered to the project. The daily recap sheet must list the ticket number, type of material by item number, and a quantity of materials for each load hauled. Any discrepancy between the certified weigh bills and the daily recap will be reviewed along with the contractor's initialed copy of weigh bills.

Due to possible variations in the specific gravity of aggregates, the tonnage used may vary from the proposal quantities and the Department will not make adjustments in the Contract unit price because of such variations.

The truck tare to be used in the weighing operation shall be the weight of the empty truck determined with full tank(s) of fuel and the operator seated in the cab. A daily weight shall be recorded at the beginning of each work day prior to use of truck. If preferred, a new tare may be determined for each load. When a new tare is obtained for each load, the requirement for full tank(s) of fuel shall be waived.

All weight of trucks shall be recorded to the nearest 20 pounds. The cost of providing facilities and equipment for the accurate weighing, proportioning, or measuring of materials is incidental to the associated pay items in the Contract.”

Subsection 109.01 (pg. 98-100), 10-8-18; Measurement of Quantities, E. Weight - Replace the last sentence to the previously modified 6th paragraph with the following:

“Loads in excess of the Legal Weight limit shall be rejected and no payment will be issued.”

Subsection 109.02 (pg. 100-101), 11-9-17; Replace the last paragraph:

“Document on the Prompt Payment Certification Form the actual amount paid to all subcontractors, during the estimate period for which the certification is being made. Ensure all Disadvantaged Business Enterprise (DBE) or certified Small Business Enterprise (SBE) are listed and classified on the form, including DBE or SBE off-site haulers and DBE or SBE material suppliers”

Subsection 109.02 (pg. 100-101), 7-2-18; Scope of Payment - Remove paragraphs 5, 6 and 7, beginning with, “Provide a monthly payment certification....” and replace with the following:

“Scope of Payment

The Department will pay, and the Contractor agrees to accept, the compensation provided in the Contract for the work acceptably completed and measured for payment under each Contract item. Payment of a Contract item is full compensation for furnishing all materials, equipment, tools, labor, and incidentals required to complete the item; and for all risk, loss, damage, or expense arising out of the nature or the performance of the work, subject to **107.19** and **109.11**.

If the "Basis of Payment" clause in the Specifications relating to a unit price in the bid schedule requires that the price of the Contract item cover and be considered compensation for certain work or material essential to the item, the Department will not measure or pay for this same work or material under any other pay item that may appear elsewhere in the Specifications.

When two or more projects are included in the same Contract, the Contractor will be required to furnish any item listed in the Contract to any or all of the projects at the Contract unit price.

The Department requires that the Contractor pay subcontractors, material suppliers, and haulers promptly for their work after receipt of payment for the associated work from the Department. The Contractor shall pay each subcontractor, material supplier, and hauler for work performed or materials supplied under its subcontract no later than thirty (30) calendar days from the date the Contractor receives payment for the work from the Department. Any payment to the Contractor from which any amount has been withheld in accordance with **107.19** or **109.11** shall constitute full payment for the associated work, and the Contractor shall remain obligated to pay all subcontractors, material suppliers,

and haulers fully and promptly for all associated work. The same prompt payment requirements apply to subcontractors at all tiers.

Ensure each subcontractor, including all Disadvantaged Business Enterprises (DBE), certified Small Business Enterprises (SBE), and DBE or SBE haulers or material suppliers, has registered for AASHTOWare Project Civil Rights & Labor (CRL) prior to commencing Work.

Document within CRL the actual amount paid to all subcontractors, material suppliers, and haulers during the monthly estimate period for which the certification is being made. The Department will withhold estimate payments if the required information is not submitted or if subcontractors, at any tier, material suppliers, or haulers are not paid after the thirty (30) calendar day time period. Any delay or postponement of payment beyond the thirty (30) calendar day time frame will be subject to terms listed in TCA §12-4-707(b). The Contractor shall remain obligated to pay all subcontractors, material suppliers, and haulers fully and promptly for all work associated with a pay estimate from the Department, notwithstanding any withholding of payment from the Contractor for failure to pay a subcontractor, material supplier, or hauler within thirty (30) calendar days.

The prime contractor, subcontractors, at any tier, material suppliers, or haulers shall not withhold any retainage from progress payments made to their subcontractors.

Subsection 109.04 (pg. 106), 3-30-15; Replace C. Force Account, 4. Equipment, c. with:

“Idle or standby cost will not be paid for more than 8 hours in a day or 40 hours in a week”.

S T A T E**O F****T E N N E S S E E**

(Rev. 5-18-15)
(Rev. 11-16-15)
(Rev. 12-2-16)
(Rev. 5-15-17)
(Rev. 5-14-18)
(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 200**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 201.03 Clearing and Grubbing, A. General (pg. 118-119), 5-15-17; remove the third paragraph:

Subsection 201.03 Clearing and Grubbing, C. Clearing and Grubbing Activities, 5. Borrow Pit Areas (pg. 120), 5-15-17; remove the last sentence in the last paragraph:

“In areas approved as borrow pits by the Engineer, clear and grub all trees, stumps, brush, and heavy vegetation.

In areas designated for obtaining construction material other than borrow, clear and grub trees, stumps, brush, and vegetation, and strip overburden lying above the material to be obtained.

Complete this work prior to removing borrow or construction materials.”

Subsection 202.03 General (pg. 125), 5-15-17; remove the last sentence of the 2nd paragraph:

“Remove materials designated for salvage in readily transportable pieces, and store the removed pieces at specified locations within the Project limits. Replace with new material, at no additional cost to the Department, those materials designated for salvage that are damaged during removal, transport, or storage operations. Take ownership of material not designated for the Department’s use, and dispose of such material beyond view from the Project limits.”

Subsection 203.02 B. Borrow Excavation (pg. 134), 5-15-17; remove the last sentence of the 1st paragraph:

“Borrow Excavation consists of material required for the construction of embankments or other portions of the work.”

Subsection 203.04 (pg. 139), 5-15-17; add 5. to the list of provisions:

- “1. The cost of this material is more economical than borrow excavation.
2. The material is available within the adjusted balance where the shortage exists or the material may be hauled outside the limits of adjusted balance if the cost of the material is more economical than borrow after considering the additional cost of overhaul.
3. The material can be excavated without blasting.
4. There is a minimum of 20 feet between the top of the existing slope and the top of the new slope and a minimum of 5 feet between the top of the new slope and right-of-way line or Control Access fence. The 20-foot minimum will not apply when the existing slope is 4:1 or flatter or to overlapping or near overlapping slopes in medians or between parallel roads or ramps. The Engineer may reduce the 20-foot minimum at the Contractor’s written request.
5. The material has not been designated as potentially acid producing material.”

Subsection 203.04 (pg. 139-140), 5-15-17; add the 2nd paragraph as follows, revise the 5th paragraph to remove the reference to the *Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects*:

“E. Borrow Areas

Notify the Engineer before opening any borrow area to allow adequate time for the Engineer to take cross-section elevations and measurements of the ground surface after being stripped, and to test the borrow material before use. Obtain approval for the borrow area according to the *Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects*. Allow at least 14 days for testing borrow materials or other material from roadside pits proposed for construction purposes.

Borrow materials shall not contain acid producing materials. Representative samples of the proposed borrow material shall be tested for pH (EPA600/2-78-054 or ASTM D4239). Material with a pH less than 5 is considered acid producing and will not be accepted.

Unless otherwise allowed, do not place borrow material until after the roadway excavation material has been placed in the embankments. If the Contractor places more borrow than is required and thereby causes a waste of excavation, the Department will deduct the amount of such waste from the measured borrow volume. Do not excavate beyond the dimensions and elevations established.

The Contractor may remove highway fencing to obtain borrow materials. Replace the fencing removed with new fence at no cost to the Department, and assume responsibility for confining livestock, as necessary.

Excavate borrow pits to be self-draining where possible and practicable, and of a shape that can be easily cross-sectioned.

After completing excavation operations, provide the area with a neat appearance. Cover all self-draining borrow areas with topsoil and stabilize. Provide and place topsoil and seeding (with mulch) as specified in **203.06** and **801**, respectively.

For borrow pits 1 acre or larger in size that are not self-draining, refer to Sections 53-801 through 53-809 of the TCA. Full information regarding the requirements to be complied with and the necessary permits that the property owner must secure for the construction of a pond, lake, borrow pits, etc., 1 acre or larger that is not constructed to drain, will be supplied upon application to the TDEC.”

Subsection 203.07 (pg. 141-142), 5-15-17; replace the last paragraph:

“Ensure the offsite disposal grading plan is properly designed (including but not limited to slope stability and fill placement recommendations) regulated, and implemented.”

Subsection 204.06 – 2 (pg.152-154), 5-14-18; replace Table 204.06-3 with the following:

Table 204.06-3: Specification Limits for EFF

Property	Specification Limit
Air content (ASTM D6023)	Maximum 30% ⁽¹⁾
Load Application (ASTM D6024)	24 hours maximum in any condition
Consistency	15 inches minimum as tested per <u>204.06.B.1</u>
Compressive strength (ASTM D4832) ⁽²⁾	30 psi minimum at 28 days 100 psi maximum at 28 days
⁽¹⁾ When using air entrained mixture design	
⁽²⁾ ASTM D4832 4 x 8 inch cylinder molds may be used. The preferred capping method to be used is wetsuit neoprene restrained in rigid retainers.	

Subsection 204.06 – 2 (pg.152-154), 5-18-15; replace Tables 204.06 with the following:

1. General Use Flowable Fill

Table 204.06-2: Specification Limits for General Use Flowable Fill

Property	Specification Limit
Load Application (ASTM D6024)	24 hours maximum in any condition
Consistency	15 inches minimum tested as specified in this 204.06.B.1

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2. Excavatable Flowable Fill (EFF)

Table 204.06-3: Specification Limits for EFF

Property	Specification Limit
Air content (ASTM D6023)	Maximum 30% ⁽¹⁾
Load Application (ASTM D6024)	24 hours maximum in any condition
Consistency	15 inches minimum as tested per 204.06.B.1
Compressive strength (ASTM D4832) ⁽²⁾	30 psi minimum at 28 days

⁽¹⁾ When using air entrained mixture design

⁽²⁾ ASTM D4832 4 x 8 inch cylinder molds may be used. The preferred capping method to be used is wetsuit neoprene restrained in rigid retainers.

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3. Early Strength Flowable Fill (ESFF)

Table 204.06-4: Specification Limits for ESFF

Property	Specification Limit
Air content (ASTM D6023)	Maximum 30% ⁽¹⁾
Load Application (ASTM D6024)	6 hours maximum in any condition
Consistency	15 inches minimum as tested per 204.06.B.1
Compressive strength (ASTM D4832) ⁽²⁾	30 psi minimum at 24 hours

⁽¹⁾ When using air entrained mixture design

⁽²⁾ ASTM D4832 4 x 8 inch cylinder molds may be used. The preferred capping method to be used is wetsuit neoprene restrained in rigid retainers.

Subsection 204.06 (pages. 153-154) 11-16-15; Excavatable Flowable Fill - delete the first sentence of the first full paragraph after Table 204.06-3 on page 153, Early Strength Flowable Fill – delete the first sentence of the second paragraph below Table 204.06-4 on page 154

Subsection 204.11 (pg. 162), 12-2-16; Revise Section B. Pipe Culverts as follows:

“B. Pipe Culverts

1. Placing Backfill Material. After the bedding has been prepared and the pipe installed, backfill the trench with bedding material, fine compactable soil selected from excavation or borrow, or both, as shown on the Plans. Before backfilling concrete pipe, allow the joints to cure as specified in **607.07**. Place the material along each side of the pipe in layers not more than 8 inches in loose depth. Moisten or dry, if necessary, each layer to near optimum moisture content and thoroughly compact with mechanical tampers. Thoroughly compact the material under the haunches of the pipe and ensure that the backfill material is in intimate contact with the side of the pipe. Uniformly place and raise backfill on both sides of the pipe for the full required length. Except as may be required for the imperfect trench method, place backfill material for the full depth of the trench.

2. Placing Embankment Material. When the top of the pipe is above the top of the trench, place and compact embankment material in layers of not more than 8 inches in loose depth for a width on each side of the pipe equal to at least twice the horizontal inside diameter of the pipe or 12 feet, whichever is less. The embankment on each side of the pipe, for a distance equal to the horizontal inside diameter of the pipe, shall be of the same material and compacted in the same manner as specified for backfill in **204.11.B.1**. For the remainder of the fill material, use soil that can be readily compacted and that contains no frozen lumps, chunks, or plastic clay, stones that would be retained on a 3-inch sieve, or other objectionable material. Compact the material as required for backfill or by rolling as specified in the applicable requirements of **204**. Place the embankment

material evenly on both sides of the pipe for the full width of the roadbed up to an elevation a minimum of 1 foot above the top of the pipe. Above this elevation, and also above the top of a backfilled trench that is 1 foot or more above the top of the pipe, place embankment as specified in the applicable requirements of **205**, except for those requirements related to the imperfect trench method.

3. Plastic Pipe. For plastic pipe, work structural backfill into the haunch area and compact the materials by hand after placing the pipe. Special compaction means may be necessary in the haunch area. Place structural backfill in layers of not more than 8 inches in loose lift thickness and bring up evenly and simultaneously on both sides of the pipe to an elevation not less than 1 foot above the pipe. Use a vibratory plate to achieve a minimum compaction level of 90% Standard Proctor Density according to AASHTO T 99. Do not use hydrohammer type compactors over the pipe. Obtain the Engineer's approval of all compaction equipment."

Subsection 205.04 (pg. 175) 10-7-19, Formation of Embankments, add the following sentence to the 2nd paragraph on the original page:

"The Department inspector conducting the density tests shall be a certified Nuclear Gauge Technician."

Subsection 206.03 (pg. 180-181), 5-15-17; remove the reference to the *Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects* in the next to last sentence of the first paragraph:

"Perform final dressing by hand work and machines to produce a uniform satisfactory finish to all parts of the roadway and other components of the Project. Shape the roadbed, shoulders, ditches, and slopes to within reasonably close conformity to the specified lines, grades, and cross-sections. Dress spoil banks, borrow areas, waste areas, and similar areas. Clear rock cuts of all loose fragments, and leave in a neat, safe, and workmanlike condition."

Subsection 209.01 (pg.190), 5-15-17; revise the 1st sentence of the 2nd paragraph:

"Implement erosion prevention and sediment control (EPSC) measures during all phases of construction. Ensure that all EPSC measures shown on the Stormwater Pollution Prevention Plan (SWPPP) are in place before beginning soil disturbing activities."

STATE**OF****TENNESSEE**

(Rev. 11-16-15)

(Rev. 6-27-16)

(Rev. 12-2-16)

(Rev. 5-15-17)

(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 300**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 303 (pg. 220), 10-8-18; Mineral Aggregate Base, Remove 303.04 Sodium Chloride from Index.

Subsection 303.01 (pg. 220) 5-15-17; add the following sentence as the last sentence of the 2nd paragraph:

“Mineral aggregates base shall be Type A or Type B, whichever is shown on the Plans and called for in the bid schedule. Reclaimed Concrete Aggregate (RCA) may be used as an alternate for Type A or Type B base material.”

Subsection 303.02 (pg. 220-221) 5-15-17; add the following sentence to the last sentence of the 1st paragraph:

“Depending upon whether the Plans require Type A or Type B base, provide mineral aggregate meeting 903.05. For Type A base, use aggregate of Grading D. For Type B base, the Contractor may use aggregate of Grading C or D. For RCA, use grading specified in 903.05-C.”

Subsection 303.04 (pg. 221) 10-8-18; Sodium Chloride, remove all information pertaining to Sodium Chloride from subsection:

~~“303.04 Sodium Chloride
Provide sodium chloride meeting 921.03.”~~

Subsection 303.07 (pg. 222-223) 5-15-17; modify the 1st sentence of the 1st paragraph to the following:

“Construct Mineral Aggregate Base, Type A, Type B, or RCA in one or more layers, to the compacted thickness shown on the Plans.”

Subsection 303.08 (pg. 223-224) 5-15-17; add the last sentence to the last paragraph of subsection A:

“For Mineral Aggregate Base, Type A, use the stationary plant method. For Mineral Aggregate Base, Type B, requiring the blending of two or more materials, use either the stationary plant method or the road mix method (mechanical mixer), except as provided for in 903.05. For Mineral Aggregate Base, Type B, requiring additive, use either stationary plant mixing

or road mixing. When using RCA as a replacement for Mineral Aggregate Base, Type A or Type B, use the intended method of mixing for the material listed above.”

Subsection 303.08 (pg. 225) 10-8-18; Mixing, B. Use of Calcium Chloride and Sodium Chloride, Remove all information pertaining to Sodium Chloride:

“B. Use of Calcium Chloride ~~and Sodium Chloride~~

If using calcium chloride, incorporate it in either the solid or liquid form, at the approximate rate of 6 pounds per ton of aggregate, noting that:

- ☐ 6 pounds is equivalent to 1.29 gallons 60 °F 32% solution
- ☐ 6 pounds is equivalent to 1.02 gallons 60 °F 38% solution

~~If using sodium chloride, incorporate it at the approximate rate of 5 pounds per ton of aggregate.~~

For stationary plant mixing, proportion chloride material, in solid form, through a hopper equipped with an approved vibratory feeder and an adjustable opening capable of accurately controlling the flow of material. Proportion calcium chloride liquor using an approved calibrated meter that has a registering capacity capable of indicating the total amount of liquid used during any single day’s operation.

For road mixing, add the chloride material to the aggregate at the point in the mixing operation and in the manner directed by the Engineer.”

Subsection 303.10 (pg. 225-227) 5-15-17; add subsection c.:

“2. Density Requirements

- a. **Type A Base.** The average density of each lot of Type A base, unless otherwise specified, shall be within 100% of maximum density as determined according to AASHTO T 99, Method D, with no individual test less than 97% of maximum density.
- b. **Type B Base.** The average density of each lot of Type B base, unless otherwise specified, shall be not less than 97% of maximum density as determined according to AASHTO T 99, Method D, with no individual test being less than 95% of maximum density.
- c. **RCA Base.** The average density of each lot of RCA base, unless otherwise specified, shall be not less than 100% of maximum density as determined according to AASHTO T 99, Method D, with no individual test less than 97% of maximum density. The moisture content shall be within $\pm 3\%$ of the optimum moisture content as determined by an independent laboratory analysis. Mixing of the material with water shall be completed per Section 303.08.”

Subsection 303.14 (pg. 228) 5-15-17; revise the first sentence of A.:

“A. Mineral Aggregate for Mineral Aggregate Base, Type A or Type B, or RCA

The Department will measure Mineral Aggregate for Mineral Aggregate Base, Type A, Type B, or RCA, by the ton, in accordance with 109.”

Subsection 303.14 (pg. 228) 10-8-18, C. Sodium Chloride, remove part C. which covers Sodium Chloride:

~~“C. Sodium Chloride~~

~~The Department will measure sodium chloride by the ton in accordance with 109.”~~

Subsection 303.15 (pg 229) 10-8-18, Basis of Payment; remove item for Sodium Chloride:

303.15 Basis of Payment

The Department will pay for accepted quantities at the contract prices as follows:

<i>Item</i>	<i>Pay Unit</i>
Mineral Aggregate, Type _____ Base	Ton
Calcium Chloride	Ton
Sodium Chloride	Ton
Water	MG

The Department will pay for the work required to prepare the subgrade in accordance with 303.07 as provided for in the applicable Section or Subsection under which the work is performed.

Subsection 307.03 (pg. 246) 11-16-15; Modify Table 307.03-3:

B. Recycled Asphalt Pavement for Bituminous Plant Mix Base, Table 307.03-3

Table 307.03-3: Mixtures Using RAP

Mix Type	% RAP (Non-processed)⁽¹⁾	Maximum % RAP (Processed)⁽²⁾	Maximum % RAP Processed & Fractionated⁽³⁾	Maximum Particle Size (inches)
307-ACRL	0	00	-	-
307-AS	0	00	15	-
307-A	15	20	35	1-1/2
307-B	15	30	35	1-1/2
307-BM	15	30	35	3/4
307-BM2	15	30	35	3/4
307-C	15	30	35	3/8
307-CW	15	30	35	1/2
307-CS	0	15	25	5/16

⁽¹⁾ “Non-processed” refers to RAP that has not been crushed and screened or otherwise sized prior to its use.

⁽²⁾ “Processed” refers to RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed in Table 307.03-3 prior to entering the dryer drum.

⁽³⁾ “Fractionated” refers to RAP that has been processed over more than one screen, producing sources of various maximum particle sizes (e.g., 3/4 to 1/2 inch, 1/2 inch to #4, etc.). The Contractor may use the larger percentages of fractionated RAP specified only if individual fractions of two different maximum particle size are introduced into the plant as separate material sources for increased control.

⁽⁴⁾ RAP for 307-AS must be processed in a manner such that the minimum particle size is no smaller than 3/4” prior to solvent extraction. For RAP containing gravel as coarse aggregate, the maximum allowable RAP content shall be 10%.

2. Recycled Asphalt Shingles (RAS) RAS may be included to a maximum of 3% of the total weight of the mixture.

Subsection 307.03 (pg. 246) 5-15-17; Modify Table 307.03-3:

B. Recycled Asphalt Pavement for Bituminous Plant Mix Base, Table 307.03-3

Table 307.03-3: Mixtures Using RAP

Mix Type	% RAP (Non-processed) ⁽¹⁾	Maximum % RAP (Processed) ⁽²⁾	Maximum % RAP Processed & Fractionated ⁽³⁾	Maximum Particle Size (inches)
307-ACRL	0	00	-	-
307-AS	0	10	10	-
307-A	15	20	35	1-1/2
307-B	15	30	35	1-1/2
307-BM	15	30	35	3/4
307-BM2	15	30	35	3/4
307-C	15	30	35	3/8
307-CW	15	30	35	1/2
307-CS	0	15	25	5/16

⁽¹⁾ “Non-processed” refers to RAP that has not been crushed and screened or otherwise sized prior to its use.

⁽²⁾ “Processed” refers to RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed in Table 307.03-3 prior to entering the dryer drum.

⁽³⁾ “Fractionated” refers to RAP that has been processed over more than one screen, producing sources of various maximum particle sizes (e.g., 3/4 to 1/2 inch, 1/2 inch to #4, etc.). The Contractor may use the larger percentages of fractionated RAP specified only if individual fractions of two different maximum particle size are introduced into the plant as separate material sources for increased control.

Subsection 307.03 (pg. 250) 6-27-16; C. revise the last paragraph to the following:

“Mix an approved antistrip agent with the asphalt cement at the dosage as specified in **921.06.B.**”

Subsection 307.06 (pg. 250) 12-2-16; add the following as the second paragraph:

“Do not place AS/ACRL which cannot be covered by the next course of pavement within the same construction season.”

Subsection 310.02 (pg. 260) 10-8-18, Materials, Remove materials information for sodium chloride:

“310.02 Materials

Provide materials as specified in:

Aggregate for Conditioning Base **903.05**

Calcium Chloride, Type 1, Type 2 or Calcium Chloride Liquor **921.02**

~~Sodium Chloride **921.03**~~”

Subsection 310.04 (pg.261) 10-8-18, Conditioning, remove sodium chloride from the 3rd paragraph:

“310.04 Conditioning

Condition the existing base by applying water, blading, and compacting as directed by the Engineer. Scarify sections of existing base that are pot-holed to the full depth of the pot holes. Scarify and shape warped and distorted sections as directed by the Engineer. Moisten the material as necessary, and mix, shape, and roll until the base is uniformly and thoroughly compacted. Continue applying water, blading, and rolling until a smooth, dense, well-bonded surface is obtained that meets the Engineer’s approval.

The Department will divide the completed base into lots of approximately 10,000 square yards for density testing purposes, and will perform five density tests in each lot. The average dry density shall be not less than 100% of maximum density as determined according to AASHTO T 99 Method D, and no individual test shall be less than 97% of maximum density. Smaller lots may be considered when approved or directed by the Engineer.

Distribute calcium chloride ~~or sodium chloride~~, when specified, at the approximate rate of 1 pound per square yard and incorporate it in the base material during blading and rolling operations as directed by the Engineer.

If additional material is to be added to the existing base, lightly scarify the existing base, add the material, and condition the base as specified above.

Subsection 310.06 (pg. 262) 10-8-18, Method of Measurement, Remove 3. Sodium Chloride information from the subsection, renumber 4. to 3.:

“310.06 Method of Measurement

The Department will measure:

1. Conditioning Mineral Aggregate Base by the linear mile, based on a horizontal measurement made along the median centerline of the Project for divided sections and along the centerline of the pavement for two-lane sections, excluding bridges.

2. Calcium Chloride by the ton in accordance with 303.14.D.

~~Sodium Chloride by the ton in accordance with 109.~~

3. Water by M.G. (1,000 gallons) using calibrated tanks or distributors, or accurate water meters.

If the Contract requires the construction of a mineral aggregate base and a surface course, the Department will not directly measure or pay for conditioning of the base but will consider this work to be incidental to the unit price bid for the base material.

If the Contract requires the addition of base material to sections or the entire length of a previously constructed base, the Department will not directly measure or pay for conditioning of the base on the sections where base material is added. Sections where base material is not added will be measured for payment by the linear mile.

If the Contract requires a surface to be constructed on a previously constructed base and no additional material is added to the base, the Department will measure and pay for conditioning of the base by the linear mile."

Subsection 310.07(pg. 262) 10-8-18, Basis of Payment, Remove all information for sodium chloride:

"310.07 Basis of Payment

The Department will pay for accepted quantities at the contract prices as follows:

Item Pay Unit

Conditioning Mineral Aggregate Base	Linear Mile
Calcium Chloride	Ton
Sodium Chloride	Ton
Water	MG

Payment for Conditioning Mineral Aggregate Base is full compensation for conditioning all base on interchanges, approaches, service roads, ramps, frontage roads, roadside rest areas, and all other base within the limits of the Project that requires conditioning to receive a succeeding stage of construction under the Contract."

Subsection 313.03 (pg. 273) 11-16-15; B. Bituminous Treated Permeable Base, add the following sentence to the end of the paragraph:

"Recycled Asphalt Pavement (RAP) meeting the requirements of 307.03.B may be incorporated into asphalt treated permeable base up to 15% by weight of aggregate. RAP must be processed in a manner such that the minimum particle size is no smaller than $\frac{3}{4}$ " prior to solvent extraction. Treated permeable base mixtures containing RAP shall contain at least 65% virgin asphalt binder. For RAP containing gravel as a coarse aggregate, the maximum allowable RAP content shall be 10%"

Subsection 313.03 (pg. 273) 5-15-17; B. Bituminous Treated Permeable Base, revise the sentence added on 11-16-15 to the following sentence:

"Recycled Asphalt Pavement (RAP) meeting the requirements of 307.03.B may be incorporated into asphalt treated permeable base up to 10% by weight of aggregate. Treated permeable base

Sheet 8 of 8

mixtures containing RAP shall contain at least 65% virgin asphalt binder. For RAP containing gravel as a coarse aggregate, the maximum allowable RAP content shall be 10%.

Mix an approved antistrip agent with the asphalt cement at the dosage as specified in **921.06.B.**”

Subsection 313.10 (pg. 276) 5-15-17; Basis of Payment, add the sentence as the third paragraph:

“The cost of antistrip additive used in Bituminous Plant Mix (Hot Mix) will be included in the price of Treated Permeable Base.”

STATE**OF****TENNESSEE**

(Rev. 5-18-15)

(Rev. 7-13-15)

(Rev. 11-16-15)

(Rev. 6-27-16)

(Rev. 12-2-16)

(Rev. 1-6-17)

(Rev. 5-15-17)

(Rev. 11-6-17)

(Rev. 5-14-18)

(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 400**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 401.02(pg. 278) 10-8-18, Mineral Aggregate Surface – Materials, Remove Sodium Chloride from the materials list:

“401.02 Materials

Provide materials as specified in:

Aggregate, Class B **903.05.B**

Calcium Chloride, Type I, Type 2, or Calcium Chloride Liquor **921.02**

~~Sodium Chloride **921.03**~~

The Engineer will accept aggregate for gradation as specified in **303.02.**”

Subsection 401.06 (pg. 280) 10-8-18, Mineral Aggregate Surface – Method of Measurement, Remove 4. Sodium Chloride from the subsection:

” 401.06 Method of Measurement

The Department will measure:

1. Mineral Aggregate Surface by the ton in accordance with **109.**

2. Water added to the materials at the direction of the Engineer by the M.G. (1,000 gallons) using calibrated tanks or distributors, or accurate water meters.

3. Calcium Chloride by the ton in accordance with **303.14.D.**

~~4. Sodium Chloride by the ton in accordance with **109.**~~

When measuring Mineral Aggregate Surface, the Department will deduct the weight of all surface moisture on the aggregate at the time of weighing in excess of 8%.”

Subsection 401.07 (pg. 280) 10-8-18, Mineral Aggregate Surface – Basis of Payment, Remove Sodium Chloride from the basis of payment list:

“The Department will pay for accepted quantities of Mineral Aggregate Surface, complete in place, at the contract prices as follows:

Item Pay Unit

Mineral Aggregate Ton

Calcium Chloride Ton

~~Sodium Chloride~~ ~~Ton~~
Water MG”

Subsection 402.03 (pg. 282) 5-27-16; revise 0.2 to 0.05 in the range as shown in the 2nd paragraph:

“The distributor shall be designed, equipped, maintained, and operated so that bituminous material at even heat may be applied uniformly on variable surface widths at readily determined and controlled rates from 0.05 to 0.5 gallons per square yard, with uniform pressure, and with an allowable variation from any specified rate of plus or minus 0.02 gallons per square yard.”

Subsection 403.02 (pg. 285-286) 10-8-18; Bituminous Materials, add RS-1, CRS-1 and remove emulsified from “Approved Emulsified Trackless Track”, update Table 403.02-1 to adjust temperature range required and add approved trackless tack information:

Provide materials as specified in:

Emulsified Asphalt, SS-1, SS-1h, CSS-1, CSS-1h, TST-1P, CQS-1h, CQS-1hp, [RS-1](#), [CRS-1](#).....904.03 or Approved ~~Emulsified~~ Trackless Tack from the QPL.

Table 403.02-1: Tack Coat Application Temperatures

Material	Temperature Range
SS-1, SS-1h, CSS-1, TST-1P, CQS1h, CQS-1hp, CSS-1h,	60 to 140 °F 70 to 160 °F
Approved Trackless Tack from the QPL	Per Manufacturer’s Recommendation

Subsection 403.02 (pg. 285-286) 12-2-16; Bituminous Materials, remove trackless tack information from specifications and reference the QPL for approved Emulsified Trackless Tacks, remove trackless tacks from Table 403.02-1:

“Emulsified Asphalt, SS-1, SS-1h, CSS-1, CSS-1h, TST-1P, CQS-1h, CQS-1hp.....904.03 or Approved Emulsified Trackless Tack from the QPL.

Table 403.02-1: Tack Coat Application Temperatures

Material	Temperature Range
SS-1, SS-1h, CSS-1, TST-1P, CQS-1h, CQS-1hp and CSS-1h	60 to 140 °F

Subsection 403.02 (pg. 285-286) 11-16-15; Bituminous Materials, update the reference to 904.03, add TTT-3 to Table 403.02-1:

“Emulsified Asphalt, SS-1, SS-1h, CSS-1, CSS-1h, TST-1P, CQS-1h, CQS-1hp, TTT-1, TTT-2, TTT-3904.03”

Table 403.02-1: Tack Coat Application Temperatures

Material	Temperature Range
SS-1, SS-1h, CSS-1, TST-1P, CQS-1h, CQS-1hp and CSS-1h	60 to 140 °F
TTT-1	160 to 180 °F
TTT-2	120 to 160 °F
TTT-3	100 to 180 °F

Subsection 403.05 (pg. 286) 11-16-15; A. Emulsified Asphalt, Add the following paragraph at the end of the subsection:

“Take a minimum of 3 cores throughout the length of the project for informational tack coat shear testing. Include the underlying layer. Not required for mats less than one inch thick.”

Subsection 403.05 (pg. 287) 11-16-15;) B. Test Strip, modify the 2nd paragraph to update the rate as 0.08 and 0.12:

“If placing the bituminous material upon a milled surface, apply the tack material at a rate of between 0.08 and 0.12 gallons of applied emulsion per square yard.”

Subsection 403.05 (pg. 287) 6-27-16; revise the last sentence of the 2nd paragraph:

“If placing the bituminous material upon a milled surface, apply the tack material at a rate of between 0.08 and 0.12 gallons applied emulsion per square yard.”

Subsection 403.05 (pg. 287), 11-6-17; Revise the 1st sentence of the 1st paragraph:

“When the Contract requires bituminous material for fog sealing of shoulders, provide emulsified asphalt meeting **403.02** or an item from QPL 40A.”

Subsection 404 (pg. 289-293) 1-6-17; Remove the entire subsection. All specifications regarding Double Bituminous Surface Treatment has been incorporated into subsection 405. All references shall be updated to subsection 405.

Subsection 405 (pg. 294-298) 1-6-17; replace subsection 405 with the following:

“405.01 Description

This work consists of constructing a bituminous seal coat consisting of one or more applications each of bituminous material and cover aggregate.

MATERIALS

405.02 Materials

Provide materials as specified in:

Mineral Aggregate, Size Nos. 7, 8, 78, 89.....	903.13
Mineral Aggregate.....	903.14
Emulsified Asphalt, CRS-2p	904.03

Apply seal coat at a temperature range of 60 to 140 °F.

EQUIPMENT

405.03 Equipment

Provide a power broom or other mechanical sweeping equipment, equipment for heating bituminous material, a pressure distributor meeting the requirements of 402.03, pneumatic-tire and steel-wheel rollers, self-propelled mechanical aggregate spreading equipment that can be adjusted so as to spread accurately at the specified rate, and such other equipment and small tools as may be required to perform the work in a satisfactory manner.

CONSTRUCTION REQUIREMENTS

405.04 Limitations

Only apply bituminous material:

1. When the designated surface is dry, firm, and properly cured;
2. Between April 15 and October 1; and, unless otherwise directed,
3. When the ambient temperature in the shade and away from artificial heat is 70°F or more.

405.05 Preparing the Designated Surface

Before placing seal coat, clean all surfaces to be sealed by sweeping with a motorized broom to remove any loose material. Clean depressions and cracks not reached by the power broom using hand brooms or pressurized air.

Cover any utility installations to prevent adherence of the bituminous mixture. Suitable covering includes plywood disks, sand, craft paper, roofing felt or other approved methods. Remove the protective coverings before opening the road to traffic. The cost for these adjustments shall be included in the bid price for other items.

The Plans will indicate whether the surface is to be constructed on a treated or untreated subbase, a granular base, an asphalt base, or on an existing surface. The surface of the base or sub-base upon which the construction is to be placed shall meet the requirements of the applicable Section of Part 3, Bases and Subgrade Treatments, of these Specifications.

Condition existing surface, if called for on the Plans, as specified in 407.10. Condition existing mineral aggregate base as specified in 310.

Construct and maintain Prime Coat or Tack Coat, if shown on the Plans, as specified in 402 or 403, respectively.

405.06 Application

A. Applying Bituminous Material:

Have all equipment calibrated prior to starting work. The TDOT inspector shall be present during calibration to determine aggregate spread rate and distributor rates. Distributor trucks shall have proper calibration of spray equipment. Spray nozzles should be clean, properly angled, and appropriately sized for the desired application rate. Stop work if the distributor is not applying material properly, such as gaps in application or streaking.

Place a 500 ft. test strip for the bituminous seal coat at the beginning of the project to assure proper coverage and proper equipment calibration. The test section is to verify break time of emulsion and chip retention. The test strip shall be able to carry normal traffic within 3 hours. If normal traffic cannot be carried, the emulsion shall be adjusted and another test strip is required.

At least 14 working days before the scheduled start of construction of any bituminous seal coat, submit a sample of aggregate intended for use for the determination of the appropriate application rates of bituminous material and aggregate. Apply emulsified asphalt by pressure distributor at a uniform rate in accordance with Table 405.06-1 below. The exact rate will be established by the Engineer.

Table 405.06-1: Application Rates for Bituminous Material

Aggregate Size (per 903.22)	Aggregate Spread Rate (lb/yd ²)	Emulsion Shot Rate (gal/yd ²)
7	25 – 30	0.30 – 0.45
78	22 – 28	0.28 – 0.38
8	20 – 25	0.20 – 0.35
89	17 – 23	0.17 – 0.28

Before beginning each spread, place building paper across the roadway surface with the forward edge exactly coinciding with the end of the preceding covered spread. Start distributors on the paper, the width of which shall allow the full force of all nozzles to be in effect before the forward edge of the paper is reached. If required by the Engineer, also stop the spread on building paper. Remove the paper immediately after its use, and dispose of properly. Immediately correct all defects in application.

The length of spread of bituminous material shall not exceed that which trucks loaded with cover material can immediately cover.

The spread of bituminous material shall not extend more than 6 inches wider than the width covered by the cover material. Do not allow the bituminous material to chill or otherwise impair retention of the cover material.

Do not allow traffic on the bituminous material until it has been covered with mineral aggregate.

Treat areas that are inaccessible to the distributor with either hand sprays or pouring pots as directed by the Engineer.

B. Application of Double Bituminous Surface Treatment:**First Application**

Apply the first application of emulsified asphalt using pressure distributors at a uniform rate established by the Engineer within the range of 0.30 to 0.38 gallons per square yard. Apply each spread of bituminous material so as not to be more than 6 inches wider than the width covered by the immediate spread of cover aggregate. Each width of spread shall not be less than half the surface to be treated.

Before beginning each spread, place building paper across the roadway surface with the forward edge exactly coinciding with the end of the preceding covered spread. Start distributors on the paper, the width of which shall allow the full force of all nozzles to be in effect before the forward edge of the paper is reached. If required by the Engineer, also stop the spread on building paper. Remove the paper immediately after its use, and dispose of properly. Immediately correct all defects in application.

Treat areas that are inaccessible to the distributor with hand sprays or pouring pots as directed by the Engineer.

If treating less than the full width of the roadway, do not spread the aggregate on the inside 6 inches of either the first or second application until the adjacent lane has been treated. Immediately following each application, uniformly cover the applied bituminous material with Size No. 7 mineral aggregate that is reasonably free of surface moisture.

Spread the aggregate at a rate between 24 and 30 pounds per square yard, as established by the Engineer, using a self-propelled mechanical spreader; except on short projects of 1/2 mile in length or less, self-propelled mechanical spreading equipment will not be required. Back the truck on the aggregate being spread, without driving on or over uncovered bituminous material.

The length of bituminous material spread shall not exceed that which trucks loaded with cover material can immediately cover.

Second Application

Apply the second application of emulsified asphalt in the same manner as the first application, at a uniform rate established by the Engineer within the range of 0.20 and 0.35 gallons per square yard.

Spread mineral aggregate, Size No. 8, in the same manner as the first spread at a rate established by the Engineer within the range of 16 to 28 pounds per square yard.

Immediately after each spread of cover aggregate, broom to achieve uniform coverage. Use a power source, which is independent of the drive train that propels the equipment, to power the revolving brooms of mechanical sweeping equipment. Place additional aggregate by hand on thin or bare areas.

405.07 Spreading and Rolling Aggregate**A. Spreading**

Immediately after bituminous material has been applied, no more than two minutes, spread and embed the mineral aggregate cover in the bituminous material. Spread the aggregate as close to the application of bituminous material as is practicable, and cover each distributor load applied immediately. Aggregates shall be moistened and visually damp at the time of placement.

Spread the aggregate in accordance with the rates specified in Table 405.06-1. The exact rate will be established by the Engineer. Back the truck on the aggregate being spread, without driving on or over uncovered bituminous material. If treating less than the full width of roadway, do not spread the aggregate on the inside 6 inches of the bituminous spread until the adjacent lane is treated. Immediately after spreading the aggregate, perform hand-brooming to achieve uniform coverage. Place additional aggregate by hand on thin or bare areas.

The speed of the spreader shall be such that the aggregates are not rolling over, and starting and stopping of the spreader is minimized. Use of previously used (swept) aggregates is not permitted.

B. Rolling – Bituminous Seal Coat

Immediately after distributing the aggregate, roll the entire surface by moving in a longitudinal direction, beginning at the outer edges and progressing toward the center of the roadway, with each trip of the roller overlapping the previous trip by half the width of the rear wheel. Perform initial rolling with a self-propelled pneumatic tire roller, and follow with steel-wheel rolling. The amount and sequence of rolling shall be as directed by the Engineer. Complete the initial rolling of the aggregate within 1 hour after applying the bituminous material.

Use power brooms to correct irregularities by sweeping the aggregates from areas of thick or heavy distribution to areas of thin or light distribution. Then continue rolling using both steel-wheel and pneumatic rollers until the aggregate is thoroughly embedded in the bituminous material. The Engineer may require additional rolling at a later date. Redistribute excess or loose aggregate that was thrown out of place.

Slow moving traffic may use the section or roadway upon which the aggregate has been spread.

Rolling and Curing – Double Bituminous Seal Coat

Immediately after spreading and brooming the cover aggregate, roll the entire surface, beginning at the edges and progressing to the center. Begin rolling within 30 minutes after spreading the aggregate. Perform initial rolling with a self-propelled pneumatic tire roller, and follow with steel-wheel rolling. The amount and sequence of rolling shall be as directed by the Engineer.

Allow the first application of bituminous material and aggregate to cure for as long as deemed necessary by the Engineer before beginning the second application. Immediately before the second application of bituminous material, roll the surface with a steel-wheel roller.

For the second application of bituminous material and cover aggregate, repeat the same rolling and curing procedures as required for the first application.

The Contractor may allow slow-moving traffic to use sections of the roadway where the bituminous material has been covered with mineral aggregate.

405.08 Shoulders

Restore shoulders that have been disturbed by the Contractor's construction operations at no cost to the Department. Remove all objectionable material placed on the shoulders by the Contractor as directed by the Engineer.

Construct shoulders, when specified, as provided for under **208**.

405.09 Maintenance and Protection

Maintain in a satisfactory condition each completed section of seal coat until the entire Project is complete. Maintenance shall include making repairs where failures occur, and maintaining the seal coat in a smooth uniform condition; and brooming, dragging, and rolling when required.

After the final application, maintain the work in a satisfactory condition for at least 10 calendar days. If all other requirements of the Contract have been fulfilled, the Department will not charge working time during the 10-day maintenance period against the Contract time.

For final cleanup, sweep up all excessive quantities of loose, dislodged cover aggregate that may have collected along the edge of the completed seal coat, and dispose of this material as directed by the Engineer.

405.10 Method of Measurement

The Department will measure Mineral Aggregate and Bituminous Material by the ton in accordance with **109**. The Department may use net certified weights as a basis of measurement for mineral aggregate, subject to correction for aggregate that is lost, wasted, or otherwise not incorporated into the Work.

405.11 Basis of Payment

The Department will pay for accepted quantities of Bituminous Seal Coat, complete in place, at the contract prices as follows:

<i>Item</i>	<i>Pay Unit</i>
Bituminous Material	Ton
Mineral Aggregate	Ton

The Department will measure and pay for the work required to prepare the designated surface, as provided for under **405.05**, in accordance with the applicable Section or Subsection under which the work is performed."

Subsection 405.05 (pg. 295) 5-14-18; Add the following as the second paragraph:

"Before placing seal coat, clean all surfaces to be sealed by sweeping with a motorized broom to remove any loose material. Clean depressions and cracks not reached by the power broom using hand brooms or pressurized air.

Remove pavement markers and adhesives. Abrade all types of existing striping. Work shall be accomplished without the pavement being gouged or damaged and in a manner which ensures the bituminous treatment will adhere in all areas applied. Work shall be performed to the satisfaction of the Engineer.”

Subsection 407.02 (pg. 300-301) 12-2-16; Replace the 4th paragraph:

“If anti-stripping additive, other than hydrated lime, meeting 921.06.B.1 is required, use approved in-line blending equipment, as specified in 407.04.A.6, to add it at the mixing plant or inject it at the asphalt terminal. Manufacture’s documentation that asphalt binders will continue to meet requirements listed in subsection **904** after the anti-stripping additive is added shall be provided by the contractor with the mix design submittal. For mix designs submitted more than six months in advance, the documentation shall be resubmitted prior to use of the mix design with updated test results.”

Subsection 407.02 (pg. 300) 11-16-15; Materials, add the following at the end of the fourth paragraph:

“If anti-stripping additive, other than hydrated lime, meeting **921.06.B.1** is required, use approved in-line blending equipment, as specified in **407.04.A.6**, to add it at the mixing plant or inject it at the asphalt terminal. Provide manufacture’s documentation ensuring asphalt binders will continue to meet requirements listed in Subsection **904** after anti-stripping additives are added.”

Subsection 407.03 E. 1. (pg. 313) 10-8-18, Tensile Strength Ratio, modify the second paragraph:

“1. **Tensile Strength Ratio.** Perform testing for stripping and moisture susceptibility of the mixture according to ASTM D 4867, Standard Test Method for Effect of Moisture on Asphalt-Concrete

Paving Mixtures ~~(For all mixtures requiring design, except OGFC, follow Root-Tunnecliff Procedure~~ASTM D4867. For OGFC follow ASTM D4867 except as noted:

- Modify step 8.6.1 so that the three conditioned samples are subjected to a partial vacuum of 26 inches Hg for 10 minutes to whatever degree of saturation achieved
- Subject the 3 condition samples to one freeze thaw cycle per note 6 listed in ASTM D4867 8.7. except as noted:

After 15h in freezer, remove samples and immediately immerse the still wrapped specimen in 77°F water for 2 hours

After 2 hours remove specimen from water bath and remove wrapping from specimen then immerse sample in 140°F water bath for 24 hours.)

~~Specimen~~All specimens tested for stripping and moisture susceptibility ~~according to Root-Tunnecliff Procedures~~ shall meet the criteria specified in Table 407.03-4.”

Subsection 407.06 (pg. 327), 5-18-15; - A. Pavers. Replace the entire first paragraph with the following:

“Bituminous pavers shall be self-contained, power-propelled units provided with an activated screed, equipped to be heated, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the Plans. All screed extensions shall be full assembly extensions, including activated and heated screeds. Pavers shall include throw-back blades, reverse augers, or equivalent to place mix beneath the auger gearbox. Auger extensions shall be incorporated in a manner such that the

maximum distance from the augers to the end plate shall be 18 inches. Screed extensions may extend beyond the 18-inch maximum from auger extensions only when extending for short-term temporary deviations in pavement width such as driveways. Do not use strike-off boxes, with the exception of sections with continuously varying width.”

Subsection 407.09 (pg. 329-331), 5-14-18; Revise the following: 3. Add two sentences as the end of the paragraph, 4. Remove the first sentence, add two sentences as new first and second sentence, Add second paragraph as shown:

“3. Do not place bituminous plant mix, with a compacted thickness of 1.5 inches or less, between November 30 and April 1. Do not place bituminous plant mix, with a compacted thickness greater than 1.5 inches, between December 15 and March 16. Only place 411-TL, 411-TLD, and 411-OGFC mixtures when the pavement surface temperature and the ambient air temperature are a minimum of 55 °F and rising; limit placement to the period from April 1 to November 1. If the temperature meets the above requirements, outside of normal paving season, a request for a seasonal limitation waiver may be submitted for Departmental consideration. Requests shall be submitted in writing at least one week before the anticipated need.

4. If determined necessary by the Department, the Contractor may request a variance from the above required temperatures and seasonal limitations to pave at lower temperatures by submitting a Cold Weather Paving and Compaction Plan. All projects requiring a Cold Weather Paving and Compaction Plan shall utilize Intelligent Compaction to demonstrate proper coverage and compaction temperature at no additional cost to the Department; with the exception of small quantity projects, such as, but not limited to, bridge approaches, intersections, and temporary traffic shifts. Upon completion, the documentation showing appropriate coverage and compaction temperature shall be provided to the Department. Submit requests in writing at least one week before the anticipated need, and include a Paving and Compaction Plan for Cold Weather that meets the Department’s Procedure. The plan shall identify what practices and precautions the Contractor intends to use to ensure the mixture is placed and compacted to meet the specifications. The plan shall include compaction cooling curves estimating the time available for compaction, the intended production, haul, and compaction rates, with paver and roller speeds estimated. The Contractor may consider using such practices as the addition of rollers, reduced production and paving rates, insulated truck beds, and heating the existing surface.

In no cases will a cold weather paving and compaction plan or seasonal limitation waiver be approved for 411-OGFC, 411-TL, or 411-TLD.

If the specified densities are not obtained, stop all paving operations and develop a new plan. All mixture failing to meet specifications will be subject to price adjustments or removal and replacement at no cost to the Department.”

Subsection 407.11 (pg. 332) 12-2-16; Add the following to the paragraph below Table 407.11-1:

“Minimum temperature for OGFC mixes shall be 280°.”

Subsection 407.14 (pg. 335) 10-8-18; modify paragraph 3. 1st sentence by adding lift thickness:
 “establish lift thickness or line, grade, and elevation”

Subsection 407.15, C. Test Strips. (pg. 340-341) 11-16-15; Add the following paragraph after the 7th paragraph of the subsection:

“Take an additional 3 cores after placement of the surface layer on the tack coat test strip described in subsection **403.05.B**. Include the underlying pavement layer for shear testing. These cores will be for informational testing only. Not required for mats less than one inch thick”

Subsection 407.15 (pg. 341) 6-27-16; remove the 2nd sentence of the 8th paragraph:

“Take cores on the test strip at ten randomly selected locations as designated by the Engineer. Provide these cores to the Department for use in calibrating the nuclear gauge and to verify that the average density of the test strip meets the density requirements of the specifications. The Department will report all densities using the corrected nuclear gauge readings. Correction factors are specific to the nuclear gauges used during the test strip construction. If a different nuclear gauge needs to be used for acceptance, it will be necessary to cut new cores from the ongoing pavement construction to calibrate the new gauge.”

Subsection 407.15 (pg. 341) 12-2-16; remove “randomly selected” from 1st sentence of the 8th paragraph as follows:

“Take cores on the test strip at ten locations as designated by the Engineer.”

Subsection 407.15 A. 3. c. (pg. 337-338) 5-15-17; update 10,000 square yards to 1,000 tons:

“c. Projects containing less than 1,000 tons or bituminous pavement.”

Subsection 407.15 A. and B. (pg. 337-342) 10-8-18;A. Add Roller Requirements by Mix Type, modify 1., 2., and 4., B. Modify Tables to condense into Table 407.15 – 1 Density Requirements for Bituminous Pavements, modify 1st sentence of the 1st paragraph below Table 407.15:

407.15 Compaction

A. General

After spreading and striking-off the bituminous mixture and adjusting surface irregularities, thoroughly compact the mixture using methods approved by the Engineer and that are capable of achieving the specified density while the material is in a workable condition. When no density requirements are specified, use a system of compaction for roadway pavements that has previously produced the required bituminous pavement densities. The Engineer may require a control strip and random density samples to evaluate the system.

In general, accomplish compaction using a combination of the equipment specified in **407.07**. As a minimum, meet the following roller requirements, but increase the number of rollers if the required results are not being obtained.

Table 407.15 - Roller Requirements by Mix Type

<u>Mix Type</u>	<u>Roller Requirements</u>
<u>307-A, 307-B, 307-BM-2, 307-C, 307-CW (except surface)</u>	<u>3 Rollers (Intermediate Roller shall be Pneumatic)</u>
<u>307-AS, 307-ACRL, 411-D, 411-E, 307-CW</u>	<u>3 Rollers (unspecified)</u>

<u>(surface), 313-Asphalt Treated Permeable Base</u>	
<u>411-TL, 411-TLD, 411-TLE, 307-CS (when paved as a continuous layer)</u>	<u>2 Rollers (unspecified)</u>
<u>411-OGFC</u>	<u>2 rollers (both rollers shall be static steel double drum, 10 Ton minimum)</u>
<u>Any mix used for scratch paving</u>	<u>2 rollers (breakdown shall be pneumatic)</u>

1. ~~Except as noted below, each paving train shall consist of a minimum of three rollers meeting 407.07. The intermediate roller in each train shall be a pneumatic type. If the surface course contains a latex or polymer additive, the Contractor may use a steel wheel type roller for intermediate rolling instead of a pneumatic type provided the surface course meets density requirements. If the compaction effort is detrimental to the quality of the mat, immediately stop and re-evaluate rolling patterns and equipment. To modify the roller train from that which is specified for the mix, submit to the engineer a written request of the rollers to be substituted and a narrative explanation of how the specified equipment has been detrimental to the quality of the pavement.~~
2. ~~Provide a minimum of two rollers when placing 307 CS, 411 TL, or 411 TLD mixtures. Perform breakdown rolling, as soon as possible and while the mixture is sufficiently hot, using a pneumatic tire roller having a minimum contact pressure of 85 pounds per square inch. Do not substitute a combination roller for a pneumatic roller when placing CS mix. Regulate the paver speed so rollers can maintain proper compaction of the mixture as determined by the Engineer. The Department will only consider requests for substitution of equipment when it is shown that best practices are being followed and that the problem is not due to improper operation or poor maintenance of the equipment. If this request is approved by the Engineer, a new test strip and roller pattern shall be established.~~
3. With the Engineer's approval, the Contractor may reduce the minimum number of rollers listed above to one roller of either the steel-wheel or vibratory type on the following types of construction and projects:
 - a. Shoulder construction,
 - b. Incidental construction such as bridge approaches and driveways, and
 - c. Projects containing less than 10,000 square yards of bituminous pavement.
4. ~~Compaction of 411-OGFC mixtures shall consist of a minimum of two passes with a steel double drum asphalt roller with minimum weight of 10 tons, before the material temperature has fallen below 185 °F. Provide a minimum of two roller units so as to accomplish the compaction promptly following the placement of the material. At no time shall a pneumatic tire roller be used or a steel wheel roller be used in vibratory mode. If the roller begins to break the aggregate, immediately stop rolling.~~

Unless otherwise directed by the Engineer, begin rolling at the low side and proceed longitudinally parallel to the road centerline. When paving in echelon or abutting a previously placed lane, roll the longitudinal joint first, followed by the regular rolling procedure. When paving in echelon, rollers shall not compact within 6 inches of an edge where an adjacent lane is to be placed. Operate rollers at a slow uniform speed with the drive wheels nearer the paver, and keep the rollers as nearly as possible in continuous operation. Continue rolling until all roller marks are eliminated. Do not park rollers on the bituminous pavement.

To prevent adhesion of the mixture to the rollers, keep the wheels properly moistened with water or water mixed with very small quantities of detergent or other approved material. Limit excess use of liquid.

Do not refuel rollers on bituminous pavements.

Along forms, curbs, headers, walls and other places not accessible to the rollers, compact the mixture thoroughly using hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, the Contractor may use a trench roller to compact the mix.

B. Density Requirements

Meet the applicable density requirements specified in Tables 407.15-1 ~~to 407.15-4~~.

Table 407.15-1: Density Requirements for ~~ADT 1,000 or less~~ Bituminous Pavement

Mix Type	% of Maximum Theoretical Density (<u>Lot</u> Average)	No Single Test Less Than, % (<u>Sub Lot</u>)
<u>Travel Lanes</u> <u>ADT < 1,000</u> <u>A, B, BM, BM2, C, CW, D, EA</u>	90.0	87.0
<u>B, BM & BM2 Travel Lane</u> <u>1,000 < ADT < 3,000</u> <u>A, B, BM, BM-2, C, CW, D, E</u>	91 9.0	89 7.0
<u>Travel Lane</u> <u>ADT > 3,000</u> <u>A, B, BM, BM-2, C, CW, D, E C & CW</u>	92 9.0	90 87.0
<u>Travel Lanes and Shoulders</u> <u>Any ADT</u> <u>CS, TL, TLD, TLE, OGFC D</u>	90 NA	87 NA
<u>Shoulders</u> <u>B, BM, BM-2, D, E E</u>	90 88.0	87 85.0

Table 407.15-2: Density Requirements for ADT 1,000 to 3,000

Mix Type	% of Maximum Theoretical Density (Average)	No Single Test Less Than, %
A	91	89
B, BM & BM2	91	89
C & CW	91	89
D	91	89
E	91	89

Table 407.15-3: Density Requirements for ADT 3,000 or greater

Mix Type	% of Maximum Theoretical Density (Average)	No Single Test Less Than, %
A	92	90
B, BM & BM2	92	90
C & CW	92	90
D	92	90
E	92	90

Table 407.15-4: Density Requirements for any ADT

Mix Type	% of Maximum Theoretical Density (Average)	No Single Test Less Than, %
Shoulder Mix (B, BM, BM2, D or E)	88	85
AS and A-CRL	None ⁽⁺⁾	None
CS	None ⁽⁺⁾	None
TL, TLD, and OGFC	None	None

⁽⁺⁾ ~~The Department will waive density requirements on Bituminous Plant Mix Base Grading ACRL, Grading AS and Bituminous Plant Mix Leveling Course, Grading CS; however, the Contractor shall use a system of compaction for roadway pavements that has been approved by the Engineer. When placing Bituminous Plant Mix Base Grading ACRL and Grading AS, the Contractor may replace the specified intermediate roller (pneumatic tire) with a steel wheel type if irreparable damage to the pavement is occurring.~~

Correct ~~sublots~~~~base or surface course~~ that test below the minimum density so that the density of the area is equal to or above the minimum, at which point it can be used to determine the average density of the lot. Do not place any successive layers until the area has been corrected. As necessary to determine the classification of open graded or dense graded mixes and to measure segregation, use AASHTO T 269 or ASTM D3203.

Repair or replace defective mixture to the satisfaction of the Engineer and at no cost to the Department.

The Department will perform density testing in accordance with **407.20.B.5**.

Subsection 407.20 A. (pg. 345), 11-6-17; Revise the second paragraph as follows:

“The Department will pay for liquid anti-strip additive and hydrated lime anti-strip additive based on certified documentation of material costs not to exceed \$15 per gallon and \$90 per ton, respectively.”

Subsection 407.20 (pg. 346) 5-18-15; Basis of Payment; B. Acceptance of Mixture; Modify the last paragraph to revise 500 tons to 1000 tons:

“When the total plan quantity of any mix is less than 1000 tons, the Department will accept the mix on the basis of visual inspection and Contractor Quality Control certification. The

Department may run extraction, gradation analysis, or other tests deemed necessary for acceptance purposes.”

Subsection 407.20 (pg. 348) 10-8-18; Table 407.20-2, add OGFC information to table:

**Table 407.20-2: Acceptance Schedule of Payment
(Asphalt Plant Mix Characteristics)**

Characteristics	Pay Factor	Average Arithmetic Deviation of the Lot Acceptance Test from the JMF	
		1 Test	2 Tests or more
All mixes except 411-OGFC	1.00	0.00-0.30	0.00-0.25
Asphalt Cement Content ⁽¹⁾	0.95	0.31-0.35	0.26-0.30
	0.90	0.36-0.40	0.31-0.35
(Extraction or ignition oven)	0.80 ⁽²⁾	over 0.40	over 0.35
411-OGFC only	1.00	0.00-0.30	0.00-0.25
Asphalt Cement Content	0.90	0.31-0.35	0.26-0.30
(Extraction or ignition oven)	0.80	0.36-0.40	0.31-0.35
	0.60 ⁽²⁾	over 0.40	over 0.35
Gradation	1.00	0.00-6.50	0.00-5.70
3/8 inch sieve and larger	0.95	6.51-7.08	5.71-6.20
	0.90	7.09-7.66	6.21-6.69
	0.80 ⁽²⁾	over 7.66	over 6.69
Gradation	1.00	0.00-4.62	0.00-4.00
No. 4 sieve ⁽³⁾	0.95	4.63-5.20	4.01-4.50
	0.90	5.21-5.77	4.51-5.00
	0.80 ⁽²⁾	over 5.77	over 5.00
Gradation	1.00	0.00-3.80	0.00-3.30
No. 8, 16, 30 & 50 sieves ⁽³⁾	0.95	3.81-4.46	3.31-3.91
	0.90	4.47-5.12	3.92-4.52
	0.80 ⁽²⁾	over 5.12	over 4.52
Gradation	1.00	0.00-1.80	0.00-1.60
No. 100 & 200 sieves ⁽³⁾	0.95	1.81-2.00	1.61-1.75
	0.90	2.01-2.20	1.76-1.90
	0.80 ⁽²⁾	over 2.20	over 1.90

⁽¹⁾ Does not apply to 307 Grading A, AS, or ACRL mixes.

⁽²⁾ If approved by the Engineer, the Contractor may accept the indicated partial pay.

Characteristics	Pay Factor	Average Arithmetic Deviation of the Lot Acceptance Test from the JMF	
		1 Test	2 Tests or more
The Department may require removal and replacement at no cost. The Contractor may remove and replace at no cost to the Department at any time.			
(3)When there is more than one reduced payment relating to gradation in 1 lot of material, only the greatest reduction in payment will be applied. Reductions applicable for any other reason will be cumulative.			

Subsection 407.20 (pg. 348) 11-16-15; Table 407.20 – 2, make the following changes:

**Table 407.20-2: Acceptance Schedule of Payment
(Asphalt Plant Mix Characteristics)**

Characteristics	Pay Factor	Average Arithmetic Deviation of the Lot Acceptance Test from the JMF	
		1 Test	2 Tests or more
Asphalt Cement Content ⁽¹⁾ (Extraction or ignition oven)	1.00	0.00-0.30	0.00-0.25
	0.95	0.31-0.35	0.26-0.30
	0.90	0.36-0.40	0.31-0.35
	0.80 ⁽²⁾	over 0.40	over 0.35
Gradation 3/8 inch sieve and larger	1.00	0.00-6.50	0.00-5.70
	0.95	6.51-7.08	5.71-6.20
	0.90	7.09-7.66	6.21-6.69
	0.80 ⁽²⁾	over 7.66	over 6.69
Gradation No. 4 sieve ⁽³⁾	1.00	0.00-4.62	0.00-4.00
	0.95	4.63-5.20	4.01-4.50
	0.90	5.21-5.77	4.51-5.00
	0.80 ⁽²⁾	over 5.77	over 5.00

Subsection 407.20 (pg. 349) 10-8-18; B. 5., Add the sentence as the next to last sentences of the 1st paragraph:

“Acceptance for Mix Density on the Roadway. The Department will apply a deduction in payment, not as a penalty but as liquidated damages, for failure to meet the density requirements specified in **407.15**. As soon as practicable after the final rolling is completed on each lot, the Department will perform 5 density tests at locations determined by the Engineer, and will compute an average of all such tests. Deductions for failure to meet density requirements will be computed to the nearest 0.1% as a percentage of the total payment otherwise due for each lot. The percent of total payment to be deducted will be 5 times the percent the average in-place density for each lot that fails to meet **407.15**. The Department will make deductions in monies due the Contractor for failure to meet the density requirements under the item for Density Deduction. The Department will conduct acceptance testing for density in accordance with ASTM D2950 unless otherwise specified. [For projects with total project tonnage per mix type](#)

less than 2,000 tons (not including small quantity jobs as defined in 407.20.B.1) the department may alternatively calculate in place density by cores (AASHTO T-166), in this case no cores will be taken for gauge correlation on the test strip. The Department inspector will be a certified Asphalt Roadway Technician.”

Subsection 407.20 (pg. 350) 10-7-19; B. 5. Acceptance for Mix Density on the Roadway, Revise the last sentence in the 1st paragraph:

“**Acceptance for Mix Density on the Roadway.** The Department will apply a deduction in payment, not as a penalty but as liquidated damages, for failure to meet the density requirements specified in **407.15**. As soon as practicable after the final rolling is completed on each lot, the Department will perform 5 density tests at locations determined by the Engineer, and will compute an average of all such tests. Deductions for failure to meet density requirements will be computed to the nearest 0.1% as a percentage of the total payment otherwise due for each lot. The percent of total payment to be deducted will be 5 times the percent the average in-place density for each lot that fails to meet **407.15**. The Department will make deductions in monies due the Contractor for failure to meet the density requirements under the item for Density Deduction. The Department will conduct acceptance testing for density in accordance with ASTM D2950 unless otherwise specified. The Department inspector conducting the density tests shall ~~will~~ be a certified Nuclear Gauge Field Asphalt Roadway Technician.”

Subsection 407.20 (pg. 350) 11-16-15; B. 5. Acceptance for Mix Density on the Roadway, Replace the entire 2nd paragraph with the following:

“For density testing purposes, the Department will divide the pavement into lots of 1,000 tons. Five density tests will be performed in each lot and the average results compared with the requirements specified in Tables 407.15-1 to 407.15-4. At the beginning of a project or at any time it is deemed advisable, the Department may consider smaller lots to evaluate compaction methods or for other reasons as approved or directed by the Engineer.”

Subsection 411.03 (pg. 357) 10-8-18; B. Proportioning, modify table 411.03-1 to add TLE requirements:

“Table 411.03-1: Proportions of Total Mixture, Percent by Weight

Surface Course	Effective Combined Mineral Aggregate	Asphalt Cement
Grading D	93.0 - 94.3	5.7 - 7.0 ⁽¹⁾
Grading E ⁽²⁾	93.0 - 94.3	5.7 - 7.0 ⁽¹⁾
Grading E (shoulders)	92.0 - 94.7	6.0 - 6.5 ⁽¹⁾
Grading TL	92.5 - 94.3	5.7 - 7.5 ⁽¹⁾
Grading TLD	93.0 - 94.3	5.7 - 7.0 ⁽¹⁾
<u>Grading TLE</u>	<u>93.0 – 94.3</u>	<u>5.7 - 7.0 ⁽¹⁾</u>
Grading OGFC	92.0 - 94.0	6.0 - 8.0 ⁽¹⁾

⁽¹⁾ If the effective combined specific gravity of the aggregate exceeds 2.80, the above proportions may be adjusted as directed by the Engineer. The upper limit for flow values shall not apply to mixes with modified asphalt liquids.

⁽²⁾ The minimum allowable asphalt cement content for 411E low volume

 mixtures is 5.3%.

Subsection 411.03 (pg. 358-359) 10-8-18; B. Proportioning: 2. Grading E, modify subsection and Table 411.03-3 to add TLE requirements, remove riding surface phrase:

2. **Grading E and TLE.** In addition to the other requirements of these Specifications, ~~if using Grading E for the riding surface,~~ the composition of the mineral aggregate shall be such that, when combined with the required amount of bitumen, the resultant mixture will meet Table 411.03-3.

Table 411.03-3: Mixture Properties (High vs. Low Volume Roads)

Mix	Traffic Volume	Stability Minimum lb-ft ^(1, 3)	Flow 0.01 inch ⁽²⁾	Design Void Content % ⁽¹⁾	Production Void Content % ⁽¹⁾	VMA, Min % ⁽¹⁾
411E 411TLE	High Volume (ADT > 1,000)	2,000	8 - 16	4.0 ± 0.2	3 - 5.5	14
411E 411TLE	Low Volume (ADT ≤ 1,000)	1,500	8 - 16	3.5 ± 0.5	2 - 5	n/a

⁽¹⁾ Tested according to AASHTO T 245 with 75 blows of the hammer on each side of the test specimen, using a Marshall Mechanical Compactor.

⁽²⁾ Flow will only be required when using a non-modified binder (PG 64-22 or 67-22)

⁽³⁾ Minimum stability for shoulder mixes will be 1,500 lb-ft and optimum asphalt cement content for shoulder mixes shall be as directed by the Regional Materials Supervisor.

Subsection 411.03 (pg. 358-359) 10-8-18; C. Recycled Asphalt Pavement and Recycled Asphalt Shingles: modify Table 411.03-6 to add TLE requirements:

Table 411.03-6: Use of Recycled Asphalt Pavement

Mix Type	% RAP (Non-processed) ⁽¹⁾	Maximum % RAP (Processed) ⁽²⁾	Maximum % RAP Processed and Fractionated ⁽³⁾	Maximum Particle Size (inch)
411D (PG64-22, PG67-22)	0	15	20	1/2
411D (PG70-22, PG76-22, PG82-22)	0	10	15	1/2

Mix Type	% RAP (Non-processed) (1)	Maximum % RAP (Processed) (2)	Maximum % RAP Processed and Fractionated (3)	Maximum Particle Size (inch)
411E & 411TLE (Roadway)	0	15	20	1/2
411E & 411TLE (Shoulder)	15	30	35	1/2
411TL (PG64-22, PG67-22)	0	15	15	5/16
411TL (PG70-22, PG76-22, PG82-22)	0	10	10	5/16
411TLD (PG64-22, PG67-22)	0	15	15	5/16
411TLD (PG70-22, PG76-22, PG82-22)	0	10	10	5/16
<p>(1) “Non-processed” refers to RAP that has not been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed above prior to entering the dryer drum.</p> <p>(2) “Processed” refers to RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that above prior to entering the dryer drum.</p> <p>(3) “Fractionated” refers to RAP that has been processed over more than one screen, producing sources of various maximum particle sizes (e.g., 3/4 to 1/2 inch, 1/2 inch to #4, etc.). The Contractor may use the larger percentages of fractionated RAP specified only if individual fractions of two different maximum particle size are introduced into the plant as separate material sources for increased control.</p>				

Subsection 411.03 (pg. 363) 11-16-15; 2. Recycled Asphalt Shingles (RAS), change 5% to 3% in the 1st sentence of the 1st paragraph.

“Recycled Asphalt Shingles (RAS) may be included to a maximum of 3% of the total weight of mixture.”

Subsection 411.03 B. Anti-strip Additive (pg. 365) 6-27-16; revise the 2nd paragraph:

“Mix an approved anti-strip agent with the asphalt cement at the dosage as specified in **921.06.B.**”

Subsection 414.02 (pg. 369) 11-16-15; Materials, add the following paragraph to the end of the subsection:

“Ensure that no deleterious material is introduced into aggregate stockpiled at project site.”

Subsection 414.02 (pg. 369) 11-6-17; Revise the last sentence:

“For a slurry seal, use a Type CQS-1h emulsified asphalt. For micro-surfacing use a type CQS-1hp or CSS-1hp emulsified asphalt.”

Subsection 414.06 (pg. 379-382) 5-14-18; Remove B. 3. a., update b. to a. and revise as follows:

“B. Quality Control

3. Documentation. Maintain a lot sheet as follows:

a. Lot Sheet. Divide the Project into lots of each day’s production. For each lot, maintain a lot sheet, providing the following information:

- (1) Contract Number, Route,
- (2) Date, Air Temperature, Pavement Surface Temperature
- (3) Control Settings, Calibration Values, Unit Weight of Emulsion (pounds per gallon), Percent Residue in Emulsion
- (4) Beginning and Ending Log Miles
- (5) Computer display readings for material usage (Beginning, Ending, and Total)
- (6) Length, Width, Total Area (square yards) of the construction completed for the day
- (7) Aggregate used (dry ton) Asphalt Emulsion used (ton), additives (gallon), water (gallon), and/or Portland Cement (ton)
- (8) Application Rate of asphalt emulsion, Combined Application Rate (pounds per square yard)
- (9) Mix Design (Percent Portland cement, Percent Emulsion, Percent Asphalt Cement)
- (10) Calibration Forms
- (11) Contractor’s Authorized Signature”

Subsection 414.12 (pg. 384) 10-8-18, Basis of Payment, add the following as the last sentence of the paragraph:

“The Department will pay for accepted quantities, determined in accordance with 414.11, at the contract prices, complete in place, which payment shall be full compensation for all equipment, materials, labor and incidentals necessary to complete the work. [A price adjustment for Loss on Ignition \(LOI\) shall be applied on a project basis per 407.20.C.3.](#)”

S T A T E**O F****T E N N E S S E E**

(Rev. 5-18-15)

(Rev. 11-16-15)

(Rev. 5-15-17)

(Rev. 11-6-17)

(Rev. 5-14-18)

(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 500**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 501.03 (pg. 395), 5-18-15; 3. Mix Design Submittal; Replace the first paragraph with the following:

“Instead of the above mix design submittal, a request to use an existing design may be submitted for approval provided the design has been used on a state funded project within the last six (6) months. The approval of this concrete design submittal will not relieve the Contractor of the responsibility of providing concrete meeting the requirements of these Specifications. A temporary mix design may be issued if the 7-day or 14-day compressive strengths exceed the required 28-day strengths.”

Subsection 501.03 A. Proportioning (pg. 395) 5-15-17; Add water as 22. on the list of Design Submittal requirements, update the paragraph below the list to add water requirements:

“A. Proportioning

3. Design Submittal. Include the following information as a minimum in the proposed concrete design submittal:

1. Source of all aggregate
2. Brand and type of cement
3. Source and class of fly ash (if used)
4. Source and grade of ground granulated blast furnace slag (if used)
5. Specific gravity of cement
6. Specific gravity of fly ash (if used)
7. Specific gravity of ground granulated blast furnace slag (if used)
8. Admixtures (if used)
9. Gradation of aggregates
10. Specific gravities of aggregates (saturated surface dry)
11. Air content (if air entrainment is used)
12. Percentage of fine aggregate of the total aggregate (by volume)
13. Slump
14. Weight per cubic yard
15. Yield
16. Temperature of plastic concrete

17. Water/cement ratio (pound/pound)
18. 7-day compressive strength [minimum of two 4-inch x 8-inch cylinders]
19. 14-day compressive strength [minimum of two 4-inch x 8-inch cylinders]
20. 28-day compressive strength [minimum of two 4-inch x 8-inch cylinders]
21. Weight of each material required to produce a cubic yard of concrete
22. Water – submit testing results per Tables 921.01-1 & 921.01-2

Instead of the above mix design submittal, a request to use an existing design may be submitted for approval provided the design has been used on a state funded project within the last six (6) months. When submitting for the use of an existing mix design, the most current water testing results per 921.01 shall accompany the submittal. The approval of this concrete design submittal will not relieve the Contractor of the responsibility of providing concrete meeting the requirements of these Specifications. A temporary mix design may be issued if the 7-day or 14-day compressive strengths exceed the required 28-day strengths.”

Subsection 501.03 (pg. 399-402) 11-16-15; B. Quality Control and Acceptance of Concrete, adjust the following:

“1. Test to determine aggregate gradations (AASHTO T 27 with AASHTO T 11 when required). Conduct a combined belt gradation before work starts and at least daily to verify consistency if using a dynamic, multi-aggregate feed system.

3. Calibrate the weighing systems, aggregate feed flow rate and weigh bridges, water meters, and admixture dispensing systems before starting production.

4. Ensure accurate weighing or flow rate of the aggregates and cement, the proper metering of water and admixtures, and the quality of water.

6. Adjust mix proportions due to actual moisture content of both coarse and fine aggregates, with moisture content determined according to AASHTO T 255. If using a dynamic aggregate weighing system, multi-aggregate proportioning adjustments are to be made by using an in-bin moisture sensor.”

7. Conduct slump (AASHTO T119) or slump flow (ASTM C1611) and air tests (AASHTO T152).

Page 401- “Make, cure, and transport all early break cylinders (7-14 day, etc.) according to AASHTO T 23, and deliver to the Regional laboratory or other established satellite laboratories for testing. Make all early break cylinders (7-14 day, etc.) for self-consolidating concrete according to ASTM C1758, and deliver to the Regional laboratory or other established satellite laboratories for testing.”

Page 402 - “Correct batch weights or aggregate feed flow rates to compensate for surface moisture on the aggregate at the time of use. The Contractor...”

Subsection 501.03 (pg. 401) 5-14-18; B. Quality Control and Acceptance of Concrete, remove AASHTO T23 and replace with specification 604.15 C.”

“Make, cure, and transport all early break cylinders (7-14 day, etc.) in accordance with 604.15.C, and deliver to the Regional Laboratory or other established satellite laboratories for testing.”

Subsection 501.04 (pg. 402) 11-16-15; replace the following:

“A. Batching Plant, Multi-Aggregate Feed System, and Equipment,

1. General. The batching plant shall include bins, weighing hoppers or belt feeds with weigh bridges and load cells, and scales. If using cement in bulk,...

2. Bins and Hoppers- Add the following new paragraph under the existing paragraph

For multi-aggregate feed systems, provide bins as noted with variable size openings and variable speed belts. Each bin must have a calibrated moisture sensor to adjust aggregate feed flow rates. Assure consistent, uninterrupted aggregate flow and consistent belt speeds once aggregate feed system is calibrated.

3. Scales- Add the following new paragraph under the last paragraph in the section.

For multi-aggregate feed systems, provide a dual idler weight bridge with load cells to accurately weigh the actual aggregate flow rate.”

Subsection 501.04 A. 1. (pg. 402), 11-6-17; General, Add the following after the first paragraph:

“All producers of concrete shall be on the Department’s approved producer list and be actively certified by the National Ready Mixed Concrete Association (NRMCA) Plant Certification Program.”

Subsection 501.04 B. 3. (pg. 403), 11-6-17; Truck Mixers and Truck Agitators, Add the following to the beginning of the first paragraph:

“Truck mixers shall be certified by the National Ready Mix Concrete Association (NRMCA) Delivery Vehicle Certification Program Option A or Option B.”

Subsection 501.04 (pg. 404) 11-16-15; B. Mixers, remove the complete 4th paragraph.

Subsection 501.09 (pg. 410) 10-8-18; Revise course to coarse in the 3rd paragraph of the subsection:

“Separately weigh the fine aggregate and each size of coarse aggregate into the hopper or hoppers in the respective amounts set by the Engineer. The ~~coarse~~ aggregates shall meet the gradation requirements for Size No. 467, as specified in **903.22**, or a blend of Size No. 4 and Size No. 67 that meets the required gradation for Size No. 467, specified in **903.22**.”

Subsection 501.12 – Placing Concrete (pg. 413-415) 5-15-17; replace the subsection:

“501.12 Placing Concrete

Either unload the concrete into an approved spreading device, or deposit it directly on the base, and mechanically spread the concrete in a manner that prevents segregation of the materials. When using central or transit mixed concrete, deposit it in an approved spreader. Place the mixture so as to minimize rehandling and relocation from point of placement. The mechanical spreader will not be required on areas too small to accommodate the paving equipment, projects that contain 10,000 square yards or less of concrete paving, and on variable width sections and ramps. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Do not place concrete on frozen grade.

Perform any necessary hand spreading with shovels or other approved tools. Do not allow workmen to walk in the freshly mixed concrete with boots or shoes coated with earth or other foreign substances.

If placing concrete adjacent to a previously constructed lane of pavement and mechanical equipment is to be operated on this existing lane of pavement, that lane shall meet the requirements for opening to traffic specified in **501.22**. If the existing lane is to only carry finishing equipment, the Contractor may begin paving the adjoining lanes after 7 days.

Deposit concrete as near to expansion and contraction joints as possible without disturbing them; do not dump concrete from the discharge bucket or hopper onto a joint assembly unless the hopper is well centered on the joint assembly.

Immediately remove all concrete materials that may fall on or be worked into the surface of a completed slab using approved methods.

When using the slip-form method of concrete paving, place the concrete with an approved slip-form paver meeting the requirements of **501.04.D.11**.

Ensure that the sliding forms are rigidly held together laterally to prevent spreading of the forms. The forms shall trail behind the paver for such a distance that no appreciable slumping of the concrete will occur and so that necessary finishing can be accomplished while the concrete is still within the forms. Before the concrete has hardened, correct any edge slump of the pavement, exclusive of edge rounding, in excess of 1/4 inch.

Operate the slip-form paver with as nearly a continuous forward movement as possible, and coordinate all operations of mixing, delivering, and spreading of concrete so as to provide uniform progress while minimizing the stopping and starting of the paver. If, for any reason, it is necessary to stop the forward movement of the paver, also immediately stop the vibratory and tamping elements. Apply no tractive force to the machine, other than that which is controlled from the machine. Replace slabs with random cracks before completion of paving operations.

Contractor may choose to utilize a single lift or two lift paving process according to the following requirements.

A. Single Lift Pavement

Use vibrators to thoroughly consolidate the concrete against and along the faces of all forms and along the full length and on both sides of all joint assemblies. Do not allow vibrators to come in contact with a joint assembly, the grade, or a side form. Do not operate the vibrator for longer than 5 seconds in any one location.

The Contractor may only use hand-operated vibrators on projects containing 10,000 square yards or less of concrete paving and on variable width sections. Only operate vibrators mounted on a machine while the machine is in motion.

Equip the slip-form paver with vibrators meeting the applicable requirements of **501.04.D.1** to vibrate the concrete for the full width and depth of the strip of pavement being placed.

B. Two Lift Composite Pavement

When placing two lift composite pavements, the upper lift shall be of a lesser thickness as designated by contract design. It shall be placed such that the result is a wet-on-wet application. The lower lift will be one foot less in width than the upper lift.

Paving operations shall be adjusted and approved by the Engineer as necessary to assure a wet-on-wet monolithic pavement section. If the bonding between lifts or the consolidation of concrete is determined to be unsuitable by the Engineer, the lower lift shall be removed and replaced prior to the upper lift placement.

1. Lower Lift. Uniformly spread concrete with a spreader or slipform machine. Internal vibration will be required for the lower lift. Tie bars and dowel bars (with the use of dowel baskets) shall be placed in the lower lift at mid-depth of the finished concrete pavement thickness. The lower lift shall not require curing, texturing, or sawing before the upper lift is placed. The lower lift shall be struck off to provide a nominal lower lift thickness that complies with the pavement design. The upper lift shall be struck off to allow for the finished total pavement to conform to the cross section shown in the contract plans.

2. Upper Lift. Place the upper lift within 45 minutes following the placement of the lower lift. Placement of the upper lift shall be such that intermingling of the two concrete mixtures is minimal. External vibration for the upper lift will be allowed if proper consolidation and finishing can be demonstrated in accordance with **501.16**. Dowel bars can be inserted during the placement of the upper lift. Cure the upper lift only in accordance with **501.18**. At no time shall the total thickness be less than shown on the pavement design and the cross section shown in the contract plans.

Frequency of the vibrators shall be established based on the workability of the concrete mixture and past experiences. Electronic, internal, T-shaped, poker vibrators shall be used. Other types of vibrating equipment may be approved by the Engineer. Vibrator impulses shall be delivered directly to the concrete and the intensity of vibration shall be sufficient to consolidate the concrete thoroughly and uniformly throughout the depth and width of the lift. Increase in the speed of the vibrators will be allowed with the permission of the Engineer.

A paving plan shall be supplied to the Engineer for review and approval prior to pouring. The plan shall document procedures to ensure consistency of material properties during concrete placement and finishing, identify and eliminate potential for load misidentification, and maintain speed of production and paving. Concrete for each lift shall be produced from the same ready-mix facility.”

Subsection 501.17 (pg. 424) 11-16-15; A. Surface Testing, modify the following:

- “3. Ramps where the design speed is greater than 40 miles per hour
 - (a) Test sections shall terminate 100 feet from a stop or slow speed yield condition
 - (b) Superelevated sections greater than 40 miles per hour design speed must be ground in accordance with **Table 501.17-1**
- 4. Ramps where the design speed is 40 miles per hour or less
 - (a) Test sections shall terminate 100 feet from a stop or slow speed yield condition
 - (b) Superelevated sections with a design speed of 40 miles per hour or less must be ground in accordance with **Table 501.17-2**

Subsection 501.17 (pg. 425) 11-16-15; B. Pay Factors and Required Corrective Action, modify the following:

“Payment factors and required corrective actions relative to profile indexes for ramps with design speeds of 40 MPH or less shall conform to Table 501.17-2.

Table 501.17-2: Pay Factors & Corrective Action for Ramps with Design Speeds of 40 mph or less

Profile Indexes	Pay Factor	Corrective Action
<10 inches per mile	105%	None
10 to < 20 inches per mile	100%	None
20 to < 23 inches per mile	98%	Grind to 20 inches per mile
23 plus inches per mile	95%	Grind to 20 inches per mile

Subsection 501.26 – Basis of Payment (pg. 434) 5-15-17; add the following sentence to the 7th paragraph of the subsection:

“The Department will pay for additional concrete, measured in accordance with **501.25**, at the purchase price, F.O.B. the unloading point, as verified by invoices, with no compensation allowed for further handling. The State will be reimbursed from monies due the Contractor for a decrease in concrete measured in accordance with **501.25** in an amount equal to the purchase price of the cement, F.O.B. the unloading point. No payment will be allowed for any changes in the proportions of the aggregates. No additional payment will be made if two-lift composite pavement alternate is selected.”

STATE**OF****TENNESSEE**

(Rev. 5-18-15)

(Rev. 11-16-15)

(Rev. 6-27-16)

(Rev. 12-2-16)

(Rev. 5-15-17)

(Rev. 11-6-17)

(Rev. 5-14-18)

(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 600**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 602.17 (pg.459-477), 12-2-16; Entire Subsection: Replace all references to AASHTO M164 and AASHTO M253 with ASTM F3125, Grade A325 and A490

Subsection 602.17 (pg. 459) 12-2-16; modify the first paragraph of A.:

“All high strength bolts, or equivalent fasteners, tightened to a high tension shall be coated with permitted coatings in accordance with ASTM F3125 for their respective grade. Use the bolts in holes conforming to 602.06, 602.07, and 602.08. All Grade A325 and A490 bolts, except Type 3 bolts used in weathering steel, shall be coated. Permitted coatings for Grade A325 and Grade A490 bolts are listed in ASTM F3125, Annex A1.”

Subsection 602.17 (pg. 465-469), 12-2-16; Update Tables:

Bolt Diameter (inches)	Bolt Tension (pounds)	
	(GradeA325)	GradeA490 Bolts
½	12,000	15,000
5/8	19,000	24,000
¾	28,000	35,000
7/8	39,000	49,000
1	51,000	64,000
1-1/8	64,000	80,000
1-1/4	81,000	102,000
1-3/8	97,000	121,000
1-1/2	118,000	148,000
⁽¹⁾ Equal to 70% of the specified minimum tensile strength of bolts.		

Table 602.17-1: Minimum Bolt Tension ⁽¹⁾

Bolt Diameter (inches)	Grade A325 Snug Tension (kips)	Grade A490 Snug Tension (kips)
1/2	1	1
5/8	2	2
3/4	3	4
7/8	4	5
1	5	6
1-1/8	6	8
1-1/4	8	10
1-3/8	10	12
1-1/2	12	15

Table 602.17-3: Minimum Installation Tension

Bolt Diameter (inches)	Grade A325 Tension (kips)	Grade A490 Tension (kips)
1/2	12	15
5/8	19	24
3/4	28	35
7/8	39	49
1	51	64
1-1/8	64	80
1-1/4	81	102
1-3/8	97	121
1-1/2	118	148

Table 602.17-4: Rotation from Snug Condition

Bolt Length (measured in Step 1)	Grade A325 Required Rotation	Grade A490 Required Rotation
Up to and including 4 diameters	2/3	2/3
Over 4 diameters, but not exceeding 8 diameters	1	5/6
Over 8 diameters to 12 diameters	1-1/6	1

Table 602.17-5: Turn Test Tension

Bolt Diameter (inches)	Grade A325 Tension (kips)	Grade A490 Tension (kips)
1/2	14	17
5/8	22	28
3/4	32	40
7/8	45	56
1	59	74
1-1/8	74	92
1-1/4	94	117
1-3/8	112	139
1-1/2	136	170

Table 602.17-6

Bolt Length (measured in Step 1)	Required Rotation (All Grades)
Up to and including 4 diameters	1/3
Over 4 diameters, but not exceeding 8 diameters	1/2

Table 602.17-7

Bolt Diameter (inches)	Grade A325 Torque (ft-lbs)	Grade A490 Torque (ft-lbs)
1/2	150	180
5/8	290	370
3/4	500	630
7/8	820	1020
1	1,230	1540
1-1/8	1,730	2160
1-1/4	2,450	3050
1-3/8	3,210	3980
1-1/2	4,250	5310

Table 602.17-8

Bolt Length (measured in Step 1)	Additional Required Rotation Grade A325	Additional Required Rotation Grade A490
Up to and including 4 diameters	1/3	¼
Over 4 diameters, but not exceeding 8 diameters	1/2	1/3

Table 602.17-9: DTI Requirements for A325 Bolts

Bolt Diameter (inches)	Verification Tension (kips)	Maximum Verification Refusals	DTI Spaces	Minimum Installation Refusals
½	13	1	4	2
5/8	20	1	4	2
¾	29	2	5	3
7/8	41	2	5	3
1	54	2	6	3
1-1/8	67	2	6	3
1-1/4	85	3	7	4
1-3/8	102	3	7	4
1-1/2	124	3	8	4

Table 602.17-11

Bolt Diameter (inches)	Bolt Tension (kips)	
	AASHTO M 164 Bolts (ASTM A325)	ASTM A490 Bolts
1/2	13	16
5/8	20	25
3/4	29	37
7/8	41	51
1	54	67
1-1/8	67	84
1-1/4	85	107
1-3/8	102	127
1-1/2	124	155

Table 602.17-12

Bolt Diameter (inches)	Number of Spaces	
	Bolts (GradeA325)	Grade A490 Bolts
1/2	4	N/A
5/8	4	N/A
3/4	5	6
7/8	5	6
1	6	7
1-1/8	6	7
1-1/4	7	8
1-3/8	7	8
1-1/2	8	N/A

Subsection 602.19 (pg. 478), 6-27-16; add the following as the 2nd paragraph:

“All welders shall be qualified in accordance with the AASHTO/AWS D1.5, Bridge Welding Code, current edition. Welders shall be certified for each weld process and position which they will be using.”

Subsection 602.39 (pg.488), 6-27-16; revise the title as follows:

“CONSTRUCTION REQUIREMENTS – ERECTION – REMOVAL”

Subsection 602.42 (pg.489), 6-27-16; revise as follows:

“All contractors and subcontractors directly engaged in the erection or removal of structural steel, precast prestressed or mild steel reinforced concrete bridge beams or girders over active highway traffic lanes, on any route, railroad or any stream deemed navigable to commercial or pleasure water craft, shall submit an erection or removal plan prepared and stamped by a Professional Engineer licensed in the State of Tennessee. Include the following in these plans: the sequences of erection or removal, the generalized location of all pick points, and the plan to adequately stabilize the structure throughout the erection or removal process. Submit this plan to the Engineer at least 30 days before starting erection. At each stopping point in the erection or removal sequence, have a competent contractor’s representative inspect the beams to ensure adequate stability.

Do not begin any erection or removal work without the Engineer’s approval. The Engineer’s approval does not relieve the Contractor of the responsibility for the safety of its method or equipment or from carrying out the work in accordance with the Plans and Specifications.”

Subsection 604.02 (pg. 519), 11-16-15; C. 2nd paragraph, 1st sentence:

“Prior to construction, submit for approval shop drawings of the proposed precast structure and design calculations for any details which deviate from the standard box culvert drawings.”

Subsection 604.02 (pg. 517-518), 5-15-17; A. General, add Class DS Concrete to the index:

604.02 Materials

A. General

Provide materials as specified in:

Hydraulic cement ¹	901.01
Fine Aggregate, (all Classes of concrete).....	903.01
Coarse Aggregate	
For Class A Concrete: Size No. 57	903.03
For Class D Concrete: Size No. 57	903.03

¹Use Type I, Type IL, or Type IS unless otherwise specified or permitted, or Type I or Type IL cement with either fly ash and/or ground granulated blast furnace slag as a partial cement replacement unless otherwise specified or permitted. When using Type I or Type IL cement with either fly ash and/or ground granulated blast furnace slag as a partial cement replacement, comply with the requirements of **604.03**.

Subsection 604.02 C. (pg. 519), 11-6-17; Precast Box Sections, remove mylar reference in second paragraph:

“Submit shop drawings of the proposed precast box section and design calculations for approval before construction. As a minimum, the shop drawings shall include a plan and elevation view of the box culvert showing all precast sections, a typical precast box section showing dimensions and reinforcing, and notes and details required for construction. After obtaining the necessary approval, furnish the Structures Division a reproducible design file. . The Department will pay the Contractor for the precast box based on the price bid for the quantity of the items in the cast-in-place structure it replaces. Manufacture the precast reinforced box sections in accordance with Departmental procedures.”

For Class DS Concrete: Size No. 57	903.03
For Class L Concrete.....	903.19
Joint Filler, Preformed Type	905.01
Steel Bar Reinforcement	907.01
Welded Steel Wire Fabric	907.03
Structural Steel.....	908.01
Permanent Steel Bridge Deck Forms	908.03
Steel Castings.....	908.05
Gray Iron Castings	908.07
Bronze Bearing Plates, Plain.....	908.09
Bronze Bearing Plates, Self-Lubricating.....	908.10

Subsection 604.03 (pg. 520-521), 5-15-17; Table 604.03-1: Composition of Various Classes of Concrete and Table 604.03-2: Use of Chemical Admixtures, Add class DS to the Tables, revise footnotes 2 and 3 of Table 604.03-1 and the note below Table 604.03-3; Update Table 604.03-4: Composition of Self-Consolidating Concrete and Table 604.03-5: Use of Chemical Admixtures to add SH-SCC, update :

Table 604.03-1: Composition of Various Classes of Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design $\pm$ production tolerance)	Slump (inches)
A	3,000	564	0.45	6 ± 2	3 ± 1 ⁽¹⁾
D, DS ^(2, 3)	4,000	620	0.40	7 ⁽³⁾	8 max ⁽⁴⁾
L ^(3, 5)	4,000	620	0.40	7 ⁽³⁾	8 max ⁽⁴⁾
S (Seal) ⁽⁶⁾	3,000	682	0.47	6 ± 2	6 ± 2
X ⁽⁷⁾					

⁽¹⁾ For slip forming, the slump shall range from 0 to 3 inches.

⁽²⁾ Use Class DS concrete in riding surfaces as described in 903.03 and in accordance to Specification 903.24 requirements. Use Class D concrete in all other bridge decks except box and slab type structures unless otherwise shown on the Plans.

⁽³⁾ Design Class D, Class DS, and Class L concrete at 7% air content. Acceptance range for pumping and other methods of placement is 4.5-7.5%. Sampling will be at the truck chute.

⁽⁴⁾ Water reducing admixtures are acceptable; however, do not exceed the maximum water/cement ratio in order to achieve the required slump.

⁽⁵⁾ The unit weight of air dried Class L concrete (lightweight concrete) shall not exceed 115 pounds per cubic foot as determined according to ASTM C567.

⁽⁶⁾ The use of fly ash as a cement replacement will be allowed in Class S (Seal) concrete.

⁽⁷⁾ Plan specific requirements.

Include chemical admixtures in the concrete mixture as specified in Table 604.03-2 based on the ambient air temperature and expected weather conditions.

Table 604.03-2: Use of Chemical Admixtures

Class of Concrete	Temperature less than 85 °F and falling	Temperature 85 °F or greater and rising
A	Type A or F	Type D or G or A and B
D, DS	Type A or F	Type A or F and B or G
L	Type F	Type F and B or G
S	Type D or G or A and B	Type D or G or A and B

Table 604.03-3: Type I or Type IL Cement Modified by Fly Ash or Ground Granulated Blast Furnace Slag (GGBFS)

Modifier	Maximum Cement Replacement Rate % (by weight)	Minimum Modifier Cement Substitution Rates (by weight)
GGBFS (grade 100 or 120)	35.0	1:1
Class "F" Fly Ash	25.0	1:1
Class "C" Fly Ash	25.0	1:1

The Contractor may use ternary cementitious mixtures (mixtures with Portland cement, ground granulated blast furnace slag, and fly ash) for Class A, Class D, and Class DS concrete provided that the minimum Portland cement content is 50%. The maximum amount of fly ash substitution in a ternary cementitious mixture shall be 20%. The Department will allow Type IS cement with ternary cementitious mixtures. When using a Type IS cement, do not use any additional slag as a partial replacement for the hydraulic cement.

Table 604.03-4: Composition of Self-Consolidating Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design $\pm$ production tolerance)	Slump Flow (inches)
SCC (2,3,4,5)	3,000 ⁽¹⁾	564	0.45	6 $\pm$ 1	25 $\pm$ 4
SH-SCC (2,3,4,5,6)	4,500	620	0.45	6 $\pm$ 1	25 $\pm$ 4

(1) Or as shown on the Plans or approved shop drawings.

- (2) Acceptance range for the T50 test in accordance with ASTM C1611 shall be between 2-7 seconds.
- (3) Passing ability in accordance with ASTM C1621 shall be less than 2 inches for acceptance.
- (4) Visual Stability Index (VSI) shall not exceed 1.0 as per ASTM C1611 for acceptance.
- (5) Static segregation as measured by ASTM C 1610 shall not exceed 20%.
- (6) Air Content may be reduced if placed under water or underground if approved by the Engineer

Table 604.03-5: Use of Chemical Admixtures

Class of Concrete	Temperature less than 85 °F and falling	Temperature 85 °F or greater and rising
SCC, SH-SCC	Type A or F Type S (Viscosity Modifying)	Type D or G or A and B Type S (Viscosity Modifying)

Subsection 604.03 (pg. 520-521), 5-14-18; Table 604.03-4: Composition of Self-Consolidating Concrete and Table, update the Air Content %, Slump Flow:

Table 604.03-4: Composition of Self-Consolidating Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design $\pm$ production tolerance)	Slump Flow (inches)
SCC (2,3,4,5)	3,000 ⁽¹⁾	564	0.45	6 $\pm$ 2	26 $\pm$ 5
SH-SCC (2,3,4,5,6)	4,500	620	0.45	6 $\pm$ 2	26 $\pm$ 5

- (1) Or as shown on the Plans or approved shop drawings.
- (2) Acceptance range for the T50 test in accordance with ASTM C1611 shall be between 2-7 seconds.
- (3) Passing ability in accordance with ASTM C1621 shall be equal to or less than 2 inches for acceptance.
- (4) Visual Stability Index (VSI) shall not exceed 1.0 as per ASTM C1611 for acceptance.
- (5) Static segregation as measured by ASTM C 1610 shall not exceed 20%.
- (6) Air Content may be reduced if placed under water or underground if approved by the Engineer

Subsection 604.03 (pg. 522-523) 5-15-17; A. Classification and Proportioning and Quality Assurance: Add 22.-28, add sentence to 5th paragraph:

2. **“Mix Design Submittal.** Submit the proposed concrete design to the Engineer for approval. Develop the design using saturated surface dry aggregate weights and trial batches meeting the requirements of these Specifications. The concrete design shall be prepared by a TDOT certified Class 3 concrete technician or approved independent testing laboratory under the direction of a registered civil engineer licensed by the State of Tennessee. The concrete plant technician or the civil engineer shall certify that the information contained on the design is correct and is the result of information gained from the trial batches. The concrete design shall produce an average compressive strength to indicate that the specified 28-day strength can be obtained in the field. Make all strength determinations using equipment meeting the requirements of, and in the manner prescribed by, AASHTO T 22. Provide concrete of the design strength specified in all applicable Special Provisions, Plans, and Standard Specifications. Build trial batches for design no more than 90 days before submitting the concrete design. The approved mix design will expire after 6 months if it is not used on a Department funded project and meet the minimum 28-day strength requirements. Assume responsibility for all costs of concrete design, preparation, and submittal.

As a minimum, include the following information in the proposed concrete design submittal:

1. Source of all aggregates
2. Brand and type of cement
3. Source and class of fly ash (if used)
4. Source and grade of ground granulated blast furnace slag (if used)
5. Specific gravity of cement
6. Specific gravity of the fly ash (if used)
7. Specific gravity of the ground granulated blast furnace slag (if used)
8. Admixtures (if used)
9. Gradations of aggregates
10. Specific gravity of aggregates (saturated surface dry)
11. Air content (if air entrainment is used)
12. Percentage of fine aggregate of the total aggregate (by volume)
13. Slump
14. Weight per cubic yard
15. Yield
16. Temperature of plastic concrete
17. Water/cement ratio (pound/pound)
18. 7-day compressive strength (minimum of two 4-inch x 8-inch cylinders)
19. 14-day compressive strength (minimum of two 4-inch x 8-inch cylinders)
20. 28-day compressive strength (minimum of two 4-inch x 8-inch cylinders)
21. Weight of each material required to produce a cubic yard of concrete
22. Water – submit testing results per Tables 921.01-1 & 921.01-2

In addition to the above mentioned items, for self-consolidating concrete include as a minimum the following information in the proposed SCC design submittal:

23. Slump flow, VSI, and T50, in accordance with ASTM C1611, shall be required in place of the slump test.
24. Passing ability in accordance with ASTM C1621.
25. Static segregation in accordance with ASTM C1610.
- 26. 7-day compressive strength (minimum of two 4-inch x 8-inch cylinders), in accordance with ASTM C1758.
27. 14-day compressive strength (minimum of two 4-inch x 8-inch cylinders), in accordance with ASTM C1758.
28. 28-day compressive strength (minimum of two 4-inch x 8-inch cylinders), in accordance with ASTM C1758.

Self-consolidating concrete (Classes SCC, SH-SCC and P-SCC) shall be verified prior to placement either at the ready mix facility or prestressed plant. The submitted mix design shall be reviewed by Headquarters Materials and Tests for specification compliance. The concrete producer shall then perform a trial batch verification of the submitted mix design in the presence of Regional Materials and Tests. The trial batch will ensure that all batch quantities and target admixture dosage rates are acceptable and meet TDOT specification prior to full mix design approval. If using a previously approved SCC design additional verification of the trial batch is not required. All quantities and identified admixture target dosage rates shall meet the tolerances specified in **501.09**

Instead of the above mix design submittal, an existing design may be submitted for approval provided the design has been used on a state funded project within the last six (6) months. When submitting for the use of an existing mix design, the most current water testing results per 921.01 shall accompany the submittal. The approval of this concrete design submittal will not relieve the Contractor of the responsibility of providing concrete meeting the requirements of these Specifications. A temporary mix design may be issued if the 7-day or 14-day compressive strengths exceed the required 28-day strengths.”

Subsection 604.03 (pg. 522 and 523), 5-18-15; 2. Mix Design Submittal; Replace the first sentence of the last paragraph on page 522 with the following:

“Instead of the above mix design submittal, an existing design may be submitted for approval provided the design has been used on a state funded project within the last six (6) months.”

Subsection 604.03 (pg. 519-522), 11-16-15; A. Classification and Proportioning and Quality Assurance, modify the following:

“1a. Design and Production Parameters. Proportion the concrete based on a pre-determined minimum cement content, and a water-cement ratio that does not exceed the maximum shown in **Table 604.03-1**. Below this limit, adjust the quantity of water to meet the slump requirements. The fine aggregate shall not exceed 44% by volume calculation of the total aggregate, with the exception of slip formed Class A concrete incorporated into parapets and median barriers. For slip formed parapet and median barriers exclusively, the percentages of fine and coarse aggregate in an approved concrete mix design may be adjusted plus or minus 2%, such that the....

1b. Self-Consolidating Concrete (SCC) Design and Production Parameters. Proportion the concrete based on a pre-determined minimum cement content, and a water-cement ratio that does not exceed the maximum shown in **Table 604.03-4**. The fine aggregate shall not exceed 50% by volume calculation of the total aggregate volume. Maximum size of coarse aggregate shall not exceed a No. 67 stone. The Contractor may elect to use SCC as an alternate/option in replacement of Class A concrete.

Document mixture adjustments in the field book and daily concrete report. Ensure that the adjusted mix complies with all of the performance criteria specified in **Table 604.03-4**.

Table 604.03-4: Composition of Self-Consolidating Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design $\pm$ production tolerance)	Slump Flow (inches)
SCC (2,3,4,5)	3,000 ⁽¹⁾	564	0.45	6 $\pm$ 1	25 $\pm$ 4

(1) Or as shown on the Plans or approved shop drawings.

(2) Acceptance range for the T50 test in accordance with ASTM C1611 shall be between 2-7 seconds.

(3) Passing ability in accordance with ASTM C1621 shall be less than 2 inches for acceptance.

(4) Visual Stability Index (VSI) shall not exceed 1.0 as per ASTM C1611 for acceptance.

(5) Static segregation as measured by ASTM C 1610 shall not exceed 20%.

Include chemical admixtures in the self-consolidating concrete mixture as specified in Table 604.03-5 based on the ambient air temperature and expected weather conditions. Approved viscosity modifying admixtures (VMA) may be used as part of the chemical admixtures if they are shown in the approved mixture design.

Table 604.03-5: Use of Chemical Admixtures

Class of Concrete	Temperature less than 85 °F and falling	Temperature 85 °F or greater and rising
SCC	Type A or F Type S (Viscosity Modifying)	Type D or G or A and B Type S (Viscosity Modifying)

Dosage rates for any admixtures incorporated into the concrete shall be stated during the mix design submittal process. All admixtures shall be compatible and from the same manufacturer.

2.Mix Design Submittal. Submit the proposed concrete design to the Engineer for approval. Develop the design using saturated surface dry aggregate weights and trial batches meeting the requirements of these Specifications....

As a minimum, include the following information in the proposed concrete design submittal:

1. Source of all aggregates
2. Brand and type of cement
3. Source and class of fly ash (if used)
4. Source and grade of ground granulated blast furnace slag (if used)
5. Specific gravity of cement

6. Specific gravity of the fly ash (if used)
7. Specific gravity of the ground granulated blast furnace slag (if used)
8. Admixtures (if used)
9. Gradations of aggregates
10. Specific gravity of aggregates (saturated surface dry)
11. Air content (if air entrainment is used)
12. Percentage of fine aggregate of the total aggregate (by volume)
13. Slump
14. Weight per cubic yard
15. Yield
16. Temperature of plastic concrete
17. Water/cement ratio (pound/pound)
18. 7-day compressive strength (minimum of three 4-inch x 8-inch cylinders)
19. 14-day compressive strength (minimum of three 4-inch x 8-inch cylinders)
20. 28-day compressive strength (minimum of three 4-inch x 8-inch cylinders)
21. Weight of each material required to produce a cubic yard of concrete

In addition to the above mentioned items, for self-consolidating concrete include as a minimum the following information in the proposed SCC design submittal:

22. Slump flow, VSI, and T50, in accordance with ASTM C1611, shall be required in place of the slump test.
23. Passing ability in accordance with ASTM C1621.
24. Static segregation in accordance with ASTM C1610.
25. 7-day compressive strength (minimum of three 4-inch x 8-inch cylinders), in accordance with ASTM C1758.
26. 14-day compressive strength (minimum of three 4-inch x 8-inch cylinders), in accordance with ASTM C1758.
27. 28-day compressive strength (minimum of three 4-inch x 8-inch cylinders), in accordance with ASTM C1758.

Self-consolidating concrete (Classes SCC and P-SCC) shall be verified prior to placement either at the ready mix facility or prestressed plant. The submitted mix design shall be reviewed by Headquarters Materials and Tests for specification compliance. The concrete producer shall then perform a trial batch verification of the submitted mix design in the presence of Regional Materials and Tests. The trial batch will ensure that all batch quantities and target admixture dosage rates are acceptable and meet TDOT specification prior to full mix design approval. If using a previously approved SCC design additional verification of the trial batch is not required. All quantities and identified admixture target dosage rates shall meet the tolerances specified in **501.09**.

Subsection 604.03 (pg. 522), 12-2-16; Mix Design Submittal, modify the following:

- “18. 7-day compressive strength (minimum of two 4-inch x 8-inch cylinders)
19. 14-day compressive strength (minimum of two 4-inch x 8-inch cylinders)
20. 28-day compressive strength (minimum of two 4-inch x 8-inch cylinders)”

Subsection 604.03 B. (pg.524), 11-6-17; B. Quality Control and Acceptance of Concrete, Add the following as the last sentence of the 1st paragraph:

“If the quantity exceeds 2 cubic yards, prior approval must be obtained from the Engineer prior to

placement.”

Subsection 604.04 (pg. 525-527). 5-14-18; Remove the last 3 paragraphs from page 527 and insert the paragraphs as the 6th, 7th, and 8th paragraph of the subsection:

“604.04 Equipment

Obtain the Engineer’s approval as to the design, capacity, and mechanical condition of equipment and tools used to handle materials and perform the work. Have the equipment on the jobsite sufficiently ahead of the start of construction operations to be examined and approved by the Engineer. Use equipment and construction processes that have sufficient capacity to accomplish the maximum continuous concrete placement, as governed by the construction joints shown on the Plans or as directed by the Engineer.

Meet the requirements for batching plants specified in **501.04.A**, except that when approved by the Engineer, the requirement for storage compartments in addition to weigh bins for fine and coarse aggregates may be waived, provided the batching tolerances specified in **501.09** are maintained.

Meet the requirements for mixers specified in **501.04.B**, except that the requirement for the boom-and-bucket attachment to the mixer will be waived.

Provide ample and satisfactory equipment for conveying concrete from the mixer to final position in the forms. Use closed chutes or pipes when concrete is to be dumped or dropped for a distance greater than 5 feet. Where steep slopes are required, equip the chutes with baffle boards, or use chutes in short lengths that will allow the direction of movement to be reversed.

Use vibrators of an approved type and design, and operate them under load at the rate recommended by the manufacturer and approved by the Engineer.

When placing concrete by pumping, do not use aluminum conduit.

Do not pour any concrete for bridge decks or slabs above grade before verifying the availability and operability of all necessary equipment, including finishing machines, continuous water source or portable tanks, water distribution equipment, two work bridges, vibrators, sprayers, a 12-foot straightedge, and appropriate backup items.

Provide at every concrete deck pour a portable, cold fogger capable of changing humidity and cooling air above fresh concrete. The fogger shall be designed to provide a maximum VMD (volume mean diameter) of 15 microns, and a throw distance of 60 feet.

The Contractor may mix concrete for minor structures, as identified in **604.11.B**, in a mobile volumetric continuous mixing plant.

Use a mobile mixing plant that is:

1. Designed to accurately batch aggregates and cement by volume based on weight.
2. Equipped to perform mixing by a continuous auger and/or paddles.
3. Capable of producing a uniform concrete mix meeting all requirements of the Specifications.
4. Capable of carrying in separate compartments all the necessary ingredients needed for the concrete mix.
5. Equipped with calibrated proportional devices for each material.
6. Equipped with proportioning controls that they may be set and secured for different materials and mixes.

7. Equipped with separate bins and gate openings for each type of material, including a watertight storage bin for cement. Cover the aggregate bins with tarpaulins or by other approved methods when required.

Ensure that a metal plate identifying the discharge speed and weight-calibrated constant of the machine is attached to each unit.

Make adequate standard volume measures, scales, and weights available for checking the accuracy of the proportioning mechanism.

Furnish a calibrated chart for the individual unit when required by the Engineer.

In the Engineer's presence, the producer or factory representative shall perform the calibration and gate settings according to the manufacturer's recommendations for the design to be used.

Provide a satisfactory method of setting the dosage for admixtures. If using admixtures other than air-entraining agents, add them in the manner and in the dosage recommended by the manufacturer.

”

Subsection 604.13 (pg. 541), 5-15-17; Mixing Concrete, add Class DS concrete to the 2nd paragraph, 3rd sentence:

- A. “Do not retemper concrete by adding water or by other means. However, the Contractor may withhold a portion of the mixing water or chemical admixtures from transit mixers and add at the work site if all requirements of the approved mix design are met. Water added at the placement site for Class A, Class D, Class DS and Class L concrete shall not exceed 1 gallon per cubic yard. The total amount of water in the mix shall not exceed the maximum in the approved mix design. To achieve additional slump, use a water reducing admixture. If water, air entrainers, or chemical admixtures are added at the placement site, mix the concrete a minimum of 30 revolutions at mixing speed after making the additions. Do not use concrete that is not within the specified slump limits, air content limits, temperature limits, or time limits at the time of placement.”

Subsection 604.13 (pg. 541), 5-14-18; Mixing Concrete, revise the 2nd and 3rd sentence of the 2nd paragraph:

“Do not retemper concrete by adding water or by other means. However, the Contractor may withhold a portion of the mixing water or chemical admixtures from transit mixers and add at the work site if all requirements of the approved mix design are met, provided the delivery ticket indicates the amount of water withheld. The total amount of water in the mix shall not exceed the maximum in the approved mix design. To achieve additional slump, use a water reducing admixture. If water, air entrainers, or chemical admixtures are added at the placement site, mix the concrete a minimum of 30 revolutions at mixing speed after making the additions. Do not use concrete that is not within the specified slump limits, air content limits, temperature limits, or time limits at the time of placement.”

Subsection 604.14 (pg. 542), 11-16-15; Consistency of Concrete, modify the following:

“The slump of the concrete when measured according to AASHTO T 119 shall meet 604.03 - 1A. The slump flow of self-consolidating concrete when measured according to ASTM C1611 shall meet 604.03 1B.”

Subsection 604.15 (pg. 542-543), 11-16-15; B. Concrete Acceptance Cylinders, modify the following:

“The Department will test the specimens for compressive strength according to AASHTO T 22. Provide the necessary concrete for making test specimens and adequate curing and storage facilities at no additional cost to the Department.

Concrete cylinders submitted for testing beyond 28 days shall comply with the strength requirements specified in Table 604.15-1.

Table 604.15-1: Strength Requirements

Class of Concrete	Compressive Strength (psi) at:			
	Less than 31 days	31 to 42 days	43 days to 56 days	
A, S, CP, SCC	3,000	3,300	3,500	
D, L	4,000	4,400	4,600	
X	Plans Requirement (Req)	Req. + Req. * (10%)	Req. + Req. * (15%)	

If the acceptance cylinders fail to meet the specified strengths, the Contractor may drill core samples from the hardened concrete as verification of concrete strength instead of using the concrete cylinders. The Contractor must provide QC data from companion cylinders that meet or exceed the required strength, and TDOT Materials and Test shall perform a nondestructive test using a Swiss Hammer on the concrete to prove required strength is achieved. If the above mentioned requirements are met, the Contractor may then elect to drill a maximum of three core samples per set of cylinders from the hardened concrete. The Contractor shall obtain the cores in accordance with the Department’s Standard Operating Procedure 4-2, and bear all costs of obtaining the cores and repairing the core holes.”

Subsection 604.15 (pg. 543), 5-15-17; Table 604.15-1: Strength Requirements, Add Class DS to Table, update 2nd paragraph 3rd sentence to remove “cylinders and”:

Table 604.15-1: Strength Requirements

Class of Concrete	Compressive Strength (psi) at:		
	Less than 31 days	31 to 42 days	43 days to 56 days
A, S, CP, SCC	3,000	3,300	3,500
D, DS, L	4,000	4,400	4,600
SH-SCC	4,500	4,950	5,175
X	Plans Requirement (Req)	Req. + Req. * (10%)	Req. + Req. * (15%)

If the acceptance cylinders fail to meet the specified strengths, the Contractor may drill core samples from the hardened concrete as verification of concrete strength instead of using the concrete cylinders. The Contractor must provide QC data from companion cylinders that meet or exceed the required strength, and TDOT Materials and Test shall perform a nondestructive test using a Swiss Hammer on the concrete to prove required strength is achieved. If the above mentioned requirements are met, the Contractor may then elect to drill a maximum of three core samples per set of cylinders from the hardened concrete. The Contractor shall obtain the cores in accordance with the Department's Standard Operating Procedure 4-2, and bear all costs of obtaining the cores and repairing the core holes.

Acceptance for payment may be based on cores provided by the Contractor at its expense. These cores shall meet the strength requirements specified in Table 604.15-1. The Engineer will not accept concrete cores submitted for testing beyond 56 days.

Subsection 604.15 (pg. 542-544) 5-14-18, Compressive Strength Tests of Concrete; revise the last sentence of A. and add subsection 604.15.C.:

“604.15 Compressive Strength Tests of Concrete

A. General

The Engineer will determine concrete strength by tests performed during the progress of the work, and will use these tests to determine the strength of the concrete for acceptance and pay purposes. The frequency of testing will be as specified in the sampling and testing schedule of the Department's Standard Operating Procedures.

The frequency of testing for compressive strength to determine when forms may be removed, or when a structure may be put into service, shall be as requested by the Contractor or as deemed necessary by the Engineer in accordance with 604.15.C.

B. Concrete Acceptance Cylinders

The Department will test the specimens for compressive strength according to AASHTO T 22. Provide the necessary concrete for making test specimens and adequate curing and storage facilities at no additional charge to the Department.

Concrete cylinders submitted for testing beyond 28 days shall comply with the strength requirements specified in Table 604.15-1.

Table 604.15-1: Strength Requirements

Class of Concrete	Compressive Strength (psi) at:		
	Less than 31 days	31 to 42 days	43 days to 56 days
A, S, CP, SCC	3,000	3,300	3,500
D, DS, L	4,000	4,400	4,600
SH-SCC	4,500	4,950	5,175
X	Plans Requirement (Req)	Req. + Req. * (10%)	Req. + Req. * (15%)

If the acceptance cylinders fail to meet the specified strengths, the Contractor may drill core samples from the hardened concrete as verification of concrete strength instead of using concrete cylinders. The Contractor must provide QC data from companion cylinders that meet or exceed the required strength, and TDOT Materials and Tests shall perform a nondestructive test using a Swiss Hammer on the concrete to prove required strength is achieved. If the above mentioned requirements are met, the Contractor may then elect to drill a maximum of three core samples per set of cylinders from the hardened concrete. The Contractor shall obtain the cores in accordance with the Departments Standard Operating Procedure 4-2, and bear all costs of obtaining the cores and repairing the core holes.

Acceptance for payment may be based on cores provided by the Contractor its expense. These cores shall meet the strength requirements specified in Table 604.15-1. The Engineer will not accept concrete cylinders and cores submitted for testing beyond 56 days.

The average compressive strength of the two cores taken to represent the low test cylinders will be considered to be the acceptance strength of the in-place concrete, provided that the cores are obtained and tested within 56 days after concrete placement. In accordance with 603.31, the Engineer will accept at a reduced pay concrete that meets the required strengths specified in 604.03 for the respective class, but fails to meet the requirements in Table 604.15-1.

All concrete used shall undergo acceptance testing. The Department will determine the method to formally accept in-place concrete that is represented by acceptance cylinders that have been lost, damaged, or destroyed. These methods may include coring or non-destructive testing.

C. Early Break Cylinders

Make and cure all test specimens according to AASHTO T 23, and the applicable procedures therein defined for *Field Cured Specimens*, unless otherwise specified by the Engineer. The Department will test the specimens for compressive strength according to AASHTO T 22. Provide the necessary concrete for making test specimens at no additional charge to the Department.

Field Cured Specimens, as defined in AASHTO T 23, shall be cured in accordance with AASHTO T23- *Section 10.2. - Field Curing*. Cylinders shall be representative of the concrete placed and shall be cured in the same manner and method as the placed concrete. Specimens shall be protected from the elements in the same manner as the formed work. If specimens are to be used for determining when a structure is capable of being put into service the specimens should be removed from the molds at the time of removal of the form work.

Subsection 604.16 (pg. 545) 5-15-17; Placing Concrete, A. General – revise the 1st paragraph to add Class DS in the first sentence:

“Unless otherwise specified, before placing a bridge deck overlay of Class D , Class DS, or Class L concrete, machine scarify the surface to be covered to a minimum depth of 1 inch. In areas inaccessible to machine scarifying, and in areas of spalling where steel reinforcement is exposed, remove deteriorated concrete using hand tools or other methods approved by the Engineer. After scarifying, clean the deck of all deleterious material. Do not allow traffic on the scarified deck.”

Subsection 604.19 (pg. 551-552), 5-14-18; Removal of Forms and Falsework, Revise the 3rd paragraph and 1. to incorporate references to subsection 604.15:

“The Contractor may release and remove falsework and supports under concrete structures when the following conditions are met:

1. Representative specimens of the concrete, made and cured in accordance with 604.15.C, attain a compressive strength of 3000 pounds per square inch.”

Subsection 604.27 (pg. 560), 11-16-15; Rideability of New or Resurfaced Bridge Decks and Roadway Approaches, A. General, revise the 1st paragraph to the following:

“On all highway sections with a posted speed greater than 40 miles per hour, the following rideability provisions shall apply to new or resurfaced bridge decks and roadway approaches.”

Subsection 604.31 (pg. 567-568) 5-15-17; Basis of Payment, add Class DS to item and pay unit list:

604.31 Basis of Payment

The Department will pay for accepted quantities at the contract prices as follows:

<i>Item</i>	<i>Pay Unit</i>
Class A Concrete (Description)	Cubic Yard
Class D Concrete (Description)	Cubic Yard
Class DS Concrete (Description)	Cubic Yard
Class L Concrete (Description)	Cubic Yard
Class S Concrete (Description)	Cubic Yard
Steel Bar Reinforcement	Pound
Epoxy Coated Reinforcing	Pound
Scarifying	Square Yard
Applied Texture Finish	Square Yard
Hydro-demolition	Square Yard

Subsection 606.04.B.1(b) (pg. 578), 6-27-16; replace 1.b. with the following:

“(b) Except as provided in paragraph 2(b) below, develop an energy per blow in foot-pounds not less than 250 multiplied by R, where R is the required minimum bearing resistance of the pile in tons.”

Subsection 606.07.A. (pg. 581), 6-27-16; revise the 1st paragraph:

“Construct cast-in-place concrete piles of the design shown on the Plans and that consist of concrete cast in drilled holes or in steel shells or pipes driven to the required bearing. Use Class A concrete meeting **604**, or use Class X concrete, as required by design, meeting **604**. Provide and place suitable casing when required to prevent caving of the hole before concrete is placed.

Subsection 611.02 (pg. 620), 11-6-17; Materials, revise the last sentence of the last paragraph to remove the mylar reference:

“After obtaining the necessary approval, furnish the Engineer an electronic reproducible design file..”

Subsection 613.02 (pg. 633), 6-27-16; add the following section:

“Brick Paving Units912.05”

Subsection 615.09 (pg. 644), 10-8-18; Table 615.09-1: Class P Concrete, Revise Table and footnote (4):

Table 615.09-1: Class P Concrete, Revise Table 615.09-1 and footnote (3).

Table 615.09-1: Class P Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design $\pm$ production tolerance)	Slump or Slump Flow (inches)
P	5,000 ⁽¹⁾	658	0.45	0-8 ⁽²⁾	2 $\pm$ 1 ⁽³⁾
P-SCC ⁽⁴⁾	5,000 ⁽¹⁾	658	0.45	0-6 ⁽²⁾	<u>26 + 5</u>

(1) Or as shown on the Plans or approved shop drawings.

(2) Air entraining is optional with the Contractor, unless otherwise shown on the Plans or shop drawings.

(3) Not to exceed 3 inches before the addition of high range admixtures, and not to exceed 10 inches after the addition of high range admixtures. If water-cement ratio is equal to or less than 0.35 then the maximum slump is 10 inches. If the water-cement ratio is 0.36 – 0.45, the maximum slump is 8 inches.

(4) Maximum coarse aggregate size of a No. 67 stone.

Subsection 615.09 (pg. 644), 11-16-15; Proportioning and Mixing of Concrete, update Table 615.09-1 and add the 3rd paragraph below the table, modify the last paragraph:

Table 615.09-1: Composition of Prestress Concrete Classes

Class of Concrete	Minimum 28-Day Compressive Strength (psi)	Minimum Pounds Cement per Cubic Yard	Maximum Water/Cement Ratio (pound/pound)	Air Content %	Slump or Slump Flow (inches)
P	5,000 ⁽¹⁾	658	0.45	0-8 ⁽²⁾	2 $\pm$ 1 ⁽³⁾
P-SCC ⁽⁴⁾	5,000 ⁽¹⁾	658	0.45	0-6 ⁽²⁾	25 $\pm$ 4

(1) Or as shown on the Plans or approved shop drawings.

(2) Air entraining is optional with the Contractor, unless otherwise shown on the Plans or shop drawings.

(3) Not to exceed 3 inches before the addition of high range admixtures, and not to exceed 10 inches after the addition of high range admixtures. If water-cement ratio is equal to or less than 0.35 then the maximum slump is 10 inches. If the water-cement ratio is 0.36 – 0.45, the maximum slump is 8 inches.

(4) Maximum coarse aggregate size of a No. 67 stone.

Comply with all applicable provisions of **604.03** except as modified herein.

Submit a concrete design to the Department for review and approval. In addition to the proportions, identify in the design submittal the source or brand of all materials and the type of cement to be used. The Contractor may use Type I or Type III cement, unless otherwise specified. Do not use calcium chloride. Use a retardant admixture when the ambient temperature is 75 °F or higher. The slump of the concrete shall be 2 inches with a tolerance of ± 1 inch at the time of placement. When an approved superplasticizer is to be used, the slump of the concrete shall be the same as above before the superplasticizer is added to the mix. After the addition of the superplasticizer, the slump may be increased to a maximum of 8 inches at the time of placement.

The slump flow of self-consolidating concrete shall be determined and within the design and production tolerances stated in **Table 615.09-1**. Include chemical admixtures in the self-consolidating concrete mixture as specified in **Table 604.03-5** based on the ambient air temperature and expected weather conditions. Approved viscosity modifying admixtures (VMA) may be used as part of the chemical admixtures if they are shown in the approved mixture design.

Handle, measure, and batch materials; mix concrete; and comply with the limitations of mixing as specified in **501.09**, **501.10**, and **501.11**, respectively.

Make concrete test specimens for Class P and Class P-SCC, in accordance with AASHTO T 23 and ASTM C1758 respectively, to determine the adequacy of the concrete design and the minimum time at which the stress may be applied to the concrete. Cure the test specimens used to determine the time at which stress may be applied in the same manner and under the same conditions as the bridge members. The initial curing of specimens to determine the design strength of the concrete shall be as specified above with additional curing water, as provided in AASHTO...

Subsection 615.17 (pg. 652), 5-18-15; Table 615.17-1: Manufacturing Tolerances in Standard Sections, Update Table 615.17-1:

Table 615.17-1: Manufacturing Tolerances in Standard Sections

Description	Tolerance	
	I-Sections	Box Sections
Nominal Depth	± 1/2 inch	± 1/2 inch
Nominal Width	± 1/2 inch	± 1/2 inch
Nominal Length	Computed Elastic Shortening ±1/2 inch	Computed Elastic Shortening ±1/2 inch
Variation in Straightness, inches	1/4 inch x (Total Length in feet)/10	1/4 inch x (Total Length in feet)/10
Variation in Camber, inches	Beams in any 1 span not more than: 1/8 inch x (Total Length in feet)/10	Beams in any 1 span not more than: 1/8 inch x (Total Length in feet)/10
Location of Voids	-----	Length ± 1/2 in Wall Thickness ± 1/2 in
Bearing	Full Bearing - Full Width of Beam	Full Bearing on at Least 2/3 of Width of Beam
Tendon Placement	± 1/2 inch	± 1/2 inch
Reinforcing Steel Placement	± 1/2 inch	± 1/2 inch
Reinforcing Steel Concrete Cover	± 1/2 inch	± 1/2 inch
Reinforcing Steel Splice Lengths	Minus 1-1/2 inches	Minus 1-1/2 inches

Subsection 622.03 (pg. 686) 12-2-16; Add the following paragraph at the beginning of the section:

“Same-as designs shall not be submitted for Shotcrete.”

Subsection 622.03 (pg, 686-688) 5-14-18; Add subsection C: Placement of Shotcrete:

“C. Placement of Shotcrete

An ACI-certified Shotcrete Nozzleman shall be utilized to properly place shotcrete.”

Subsection 622.03 (pg. 687) 10-8-18; Proportioning and Quality Assurance of Shotcrete, Modify Table 622.03-2, add a sentence to the end of the paragraph between tables 622.03-1 and 622.03-2:

Table 622.03-1: Shotcrete Performance Requirements

Parameter	Value
3-Day Compressive Strength (psi)	2000
28-Day Compressive Strength (psi)	4000
Minimum Cementitious per cubic yard	660
Maximum Water/Cement (pound/pound)	0.45
Air Content (%)	7-10 ⁽¹⁾
7-Day Maximum Absorption (%)	8

⁽¹⁾ Air content acceptance range shall be between 7-10%, with sampling at the truck chute. Air entrainment is required for wet-mix shotcrete but not for dry-mix shotcrete.

Aggregate for shotcrete shall meet the strength and durability requirements of AASHTO M6/M80 and the gradation requirements specified in Table 622.03-2. An intermediate size aggregate may also be used as an additional component if needed to meet gradation. Aggregates failing to comply with Table 622.03-2 may be used if preconstruction testing as specified in 622.04 proves satisfactory results.

Table 622.03-2: Gradation Requirements

Sieve Size	Percent Passing by Weight
<u>3/4 inch</u>	<u>100</u>
1/2 inch	<u>98</u> -100
3/8 inch	90-100
No. 4	70-85
No. 8	50-70
No. 16	35- 55 <u>60</u>
No. 30	20- 35 <u>50</u>
No. 50	8-20
No. 100	<u>20</u> -10

S T A T E**O F****T E N N E S S E E**

(Rev. 6-27-16)

(Rev. 12-2-16)

(Rev. 5-15-17)

(Rev. 11-6-17)

(Rev. 10-8-18)

January 1, 2015

Supplemental Specifications - Section 700**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 712.04 (pg. 759), 12-2-16; A. Flaggers, add ABET Accredited University Programs to the list of flagger training:

- “1. American Traffic Safety Services Association (ATSSA)
2. National Safety Council (NSC)
3. Tennessee Transportation Assistance Program (TTAP)
4. ABET Accredited University Programs”

Subsection 712.04 (pg. 759), 11-6-17; A. Flaggers, replace the last paragraph with the following:

“The Department will review and determine if an alternative training program is acceptable prior to use. Alternative training programs shall meet all MUTCD requirements and follow FHWA guidance.

The Department will consider flaggers to be a general requirement of traffic control and will not make direct payment for such.

Coordinate flagging operations in a manner that causes as little delay to the traveling public as possible. Delays shall be kept within 2 minutes or ¼ mile, but shall not exceed 5 minutes or a 1 mile maximum, unless prior authorization is granted by the Department.”

Subsection 712.04.B (pg.759-760) 12-2-16; revise the second paragraph of B. THP Troopers and Uniformed Law Enforcement Officers:

“B. THP Troopers and Uniformed Law Enforcement Officers

When a THP Trooper is not available, the Contractor may provide a Uniformed Law Enforcement Officer if approved by the Engineer and the Regional Safety Coordinator or Regional Operations Office. All Uniformed Law Enforcement Officers shall provide marked law enforcement vehicle equipped with blue lights and have the authority to write traffic tickets and make arrests within the project site. The Uniformed Law Enforcement Officer shall maintain a detailed written log of enforcement activities and shall submit the log to the Engineer for verification each month.”

Subsection 712.04 G. (pg. 762), 11-6-17; G. Lane Closures, add the Type of Facility and Requirement table to the end of the subsection, revise the last sentence:

“G. Lane Closures

Hold the length of a lane closure to the minimum length required to accomplish the Work. Locate advanced warning signs for the Project so as to not overlap with the advanced warning signs for lane shifts and lane closures.

Use drums in all transition tapers for lane closures on multi-lane roads.

Contractor's Staff performing lane closure shall have the following certifications to close lanes on TDOT facilities and shall be onsite during each lane closure performed.

Type of Facility	Requirement
Two Lane	Flagging Operations Certification (Shall comply with Subsection 712.04 A)
Multi-Lane	*ATSSA Traffic Control Technician Training or equivalent
Controlled Access Freeways & Expressways	*ATSSA Traffic Control Technician Training or equivalent

*Proof of certification shall be provided to the Engineer at the Pre-Construction Meeting."

Subsection 712.09 (pg. 769), 12-2-16; change Uniformed Police Officer to Uniformed Law Enforcement in the last paragraph:

"The Department will pay for Uniformed Law Enforcement Officers provided by the Contractor at the invoice price of the work plus 5%, not to exceed \$50 per hour for the hours present on the Project. No compensation will be made for drive time."

Subsection 713.04 (pg. 772) 5-15-17; Construction Methods and Requirements; add steel requirement as the last paragraph:

"Ensure steel meets all specifications in **602.04**."

Subsection 713.04.C.6 (pg. 774), 6-27-16; replace C.6. with the following:

"6. Concrete. Use either (1) Class A concrete meeting 604.03 or (2) Class X concrete with a f'c as identified in the plans or required by the design. If Class X concrete is required, use a mix meeting the minimum requirements of **604.03** for Class A concrete, but with a cementitious material quantity necessary to produce the specified strength."

Subsection 713.04.C.8 (pg. 774), 6-27-16; add sentence to the end of 8.:

"8. Setting Anchor Bolts and Stubs. Set anchor bolts and stubs for sign supports to proper locations and elevations with templates, and carefully check them after constructing the sign foundation and before the concrete has set. Anchor rods shall conform to the requirements of section **730.11**"

Subsection 714 (pg. 779-800), 11-6-17; Revise the subsection as follows:

"MATERIALS

714.02 Materials

Provide materials as specified in **917** and as follows:

Portland Cement Concrete, Class A	604
Crushed Stone Grading D.....	903.05
Steel Bar Reinforcement for Concrete Structures.....	907.01
Welded Steel Wire Fabric	907.03

Gray Iron Castings.....	908.07
Inorganic Zinc Paint	910.03
Cement Concrete Curing Materials	913
Conduit	917.05 or 917.07

Within 30 days after the issuance of the work order, submit to the Engineer, four collated sets of the manufacturer's descriptive literature and technical data, fully describing the types of lighting equipment proposed for use. In the descriptive literature, identify the manufacturer and model, and include sufficient information for the Engineer to determine if the equipment or material meets the requirements of the Plans and these Specifications. Include with these sets of submittal data a list of the materials submitted along with descriptive material for, but not limited to, the following items when applicable:

1. Complete photometric data of luminaires as published by the manufacturer with independent testing laboratory results.
2. Computer printouts showing illumination levels throughout each interchange area where high mast luminaires are to be installed.
3. General details of light standards, breakaway bases, and bracket arms. For light standards taller than 30 feet, submit one set of design calculations and six prints of "Design" or "Shop" drawings to the Division of Structures for approval purposes. The Department will review these drawings at the earliest possible date, and will return two prints marked "Approved for Fabrication," or "Returned for Revisions as Noted." Respond by taking appropriate action to ensure the earliest possible correction of these items so as not to delay the installation.
4. Highmast tower details with a set of design calculations for each height including access hole, base, anchorage, head frame, and lowering device. Include specification references for materials and location, type, size, and extent of welds. In addition to the set of design calculations, submit six prints of "Design" or "Shop" drawings for each highmast tower height to the Division of Structures for approval purposes, in a manner similar to that specified in Item 3 above for light standards taller than 30 feet.
5. Dimension sheets and performance data on all related equipment.

The Engineer will retain one copy and forward one copy each to the the local entity (city or county engineer) and the Traffic Operations Division for their review.

Also include with the submittal sets detailed scale drawings of all non-standard or special equipment and of all proposed deviations from the Plans. Deviations from the Plans or Specifications require approval from the Traffic Operations Division. Include a letter requesting deviations or alternate materials in the submittal for Traffic Operations Division approval. Upon request, submit for approval sample articles of materials proposed for use. The Department will not be liable for any materials purchased, labor performed, or delay to the Work prior to such approval.

In addition to the above, include with each submittal a notarized letter certifying that all lighting system materials listed in the submittal conform to the Plans and Specifications. Also submit to the Engineer a statement from the Maintaining Agency that the system is acceptable to the Agency.

714.03 Codes

Furnish material and perform all work in strict accordance with the latest revision of the National Electrical Code, the National Electrical Safety Code, the Illuminating Engineering Society (IES) publications, ANSI standards, and the codes, regulations, and rules prevailing in the area in which the Work is being performed, as applicable.

714.04 Reserved**CONSTRUCTION REQUIREMENTS****714.05 Conduit**

Install conduit of the type and size specified at the locations shown on the Plans, or as directed by the Engineer. Install pull or drag wires of the type and size specified in conduit at the locations shown on the Plans.

A. Underground Conduit

- 1. General.** Underground conduit shall consist of encased or direct burial conduit. Install conduit in a trench excavated to the dimensions and lines specified.

Before beginning any excavation, determine the location of all electrical, drainage, and utility lines in the vicinity, and perform work so as to avoid damaging these facilities. Ensure that the conduit will be located so as to avoid conflict with proposed guardrail, sign posts, and other features.

Build conduit runs in straight lines where possible. Where sweeps are necessary, use standard long sweep conduit bends when feasible, and meet the minimum radius required by the National Electric Code. Install pull boxes at intervals so that the tensile strength of the conductors will not be exceeded.

Obstructions encountered when excavating trenches for underground conduit may require minor changes, such as in locations of conduit runs and pull boxes. Obtain the Engineer's approval before making such changes. Where possible, provide a minimum of 12 inches between the finished lines of conduit runs and utility facilities, such as gas lines, water mains, and other underground facilities not associated with the electrical system. Where the conduit run is adjacent to concrete walls, piers, footings, and similar structures, maintain a minimum of 4 inches of undisturbed earth or firmly compacted soil between the conduit and the adjacent concrete or, when the conduit is encased, between the encasement and the adjacent concrete.

Unless shown on the Plans, do not excavate trenches in existing pavement or surfaced shoulders to install conduit. If it is necessary to place a conduit under an existing pavement, install the conduit by jacking or other approved means with galvanized rigid steel conduit or schedule 80 PVC conduit.

Keep jacking and drilling pits at least 10 feet from the edge of the paved shoulder or sidewalk unless otherwise directed by the Engineer. When the Plans specifically allow excavation of a trench through an existing pavement or surfaced shoulder, restore the pavement and/or surface and base to their original condition. Do not leave boring pits open for extended periods of time.

Unless otherwise specified, cut trenches for conduit on a slight grade for drainage, and make the walls of the trench essentially vertical. Tamp the bottom of the trench as necessary to produce a firm foundation for the conduit.

Excavate trenches for rigid metallic conduit, with or without encasement, to a minimum depth of 18 inches, plus conduit diameter, measured from the finished subgrade.

Sheet and brace the trenches as required, and adequately support all pipe and other structures exposed in trenches as necessary to prevent damage.

Ream metallic conduit after threads are cut. Ream other conduit as necessary. Cut all ends square and to butt solidly in the joints to form a smooth raceway for cables.

Ensure that conduit joints form a water-tight seal. Coat metallic conduit threads with pipe compound and then securely connect. Make conduit joints with the materials and in the manner recommended by the conduit manufacturer and as approved by the Engineer.

Install conduit bushings in conduit where necessary and required for protection of the conductors. When the conduit is installed for future use, ensure that the ends of metallic conduit runs are properly threaded and capped, and that the ends of non-metallic conduit runs are satisfactorily plugged or capped to prevent water or other foreign matter from entering the conduit system.

a. Encased Conduit. Place encased conduit under roadway and paved shoulders unless trenching is required for installation at the locations shown on the Plans. Unless otherwise specified, construct encasement as follows:

- (1) Construct the encasement of Class A concrete meeting the requirements of **604**.
- (2) Extend the encasement of conduit under roadway pavements or surfaces to the outer edges of the surfaced or paved shoulders, or 1 foot beyond the outer edge of the sidewalk, or 1 foot beyond the outer edge of the curb when no shoulder or sidewalk is indicated.
- (3) Extend the conduit at least 6 inches beyond the encasement.
- (4) Encase the pipe with a minimum of 3 inches of concrete.
- (5) Plug the ends of the conduit temporarily to prevent the entrance of concrete or other foreign material.
- (6) Do not encase any conduit with concrete until inspected and approved by the Engineer.
- (7) Cure concrete encasement as specified in **604.23**, except that the curing period may be reduced to 24 hours if backfilling is to proceed at the time specified in **714.05.A.2**.

b. Direct Burial Conduit. When rock is encountered in the bottom of the trench, install the conduit on a bed of well compacted fine grain soil at least 4 inches thick.

2. Backfilling Conduit. Do not backfill encased conduit until the concrete encasement has cured a minimum of 24 hours. After the Engineer has inspected and approved the installation of direct burial conduit, promptly backfill to the required grade with approved material in layers not exceeding 6 inches in loose depth, and compact each layer as directed by the Engineer.

B. Conduit on Structures

Install conduits, conduit fittings, hangers, expansion fittings, and accessories on as shown on the Plans and, unless otherwise specified, in accordance with the following:

1. Run conduit parallel to beams, trusses, supports, pier caps, and similar features in the most direct manner.
2. Install horizontal runs on a slight grade, without forming low spots, to ensure proper drainage.

3. Run conduits with smooth, easy bends.
4. Hold conduits in boxes with locknuts and provide bushings for protection of the conductors.

C. Testing Conduit

After completing the installation of conduit, test it with a metallic mandrel in the presence of the Engineer. Use a mandrel having a diameter 1/4 inch smaller than the conduit, and a length of 2 inches. Repair, to the Engineer's satisfaction, all conduits that will not allow passage of the mandrel. If repairs cannot be accomplished, remove and replace the conduit at no additional cost to the Department.

After the mandrel test, scour all conduits with a stiff wire brush having a slightly larger diameter than the conduit.

Test conduits that have been installed under a previous contract with a mandrel and clean as described above before installing the cables.

714.06 Pull Boxes

Construct pull boxes in accordance with the design, dimensions, and at the locations shown on the Plans. Construct concrete pull boxes of Class A concrete meeting the requirements of **604**. Place non-metallic pull boxes only in non-traffic bearing locations and not in paved areas.

Provide a cast iron frame and cover or reinforced concrete cover, as shown on the Plans, with each pull box.

Plug unused conduit entrance holes and openings for conduit to be extended by others with suitable plugs of plastic, bituminous fiber, or other approved material to prevent the entrance of foreign matter.

714.07 Underground Cable for Lighting Circuits

Underground cable for lighting circuits shall consist of direct burial cable, preassembled cable in duct, or cable in conduit, as shown on the Plans.

If it is necessary to install a cable under an existing pavement or surfaced shoulder, install conduit, when specified, in accordance with the applicable provisions of **714.05**, and place the cable within the conduit.

Construct walls of trenches for cables to be essentially vertical. Unless otherwise specified, install underground cable as follows:

1. Excavate trenches for direct burial cable to a minimum depth of 24 inches plus the cable diameter as measured from finished subgrade.
2. In general, locate the trenches to avoid conflict with proposed guardrail, sign posts, and other features.
3. Protect direct burial cable, and preassembled cable in duct, in trenches by cushioning with sand or earth that passes a 1/4-inch screen. Place the cable, or preassembled cable in duct, and sand or earth in the trench so that a minimum 3-inch thickness of the cushion material will completely surround each cable.

A. Direct Burial Cable

Do not unreel cables and pull into the trench from one end. Unreel the cables, lay them alongside the trench, and then lay in the trench. Allow the cables to “snake” slightly in the trench to provide adequate slack for settling of earth. Ensure that there are no crossovers of cable in the trench. Where cable is brought up into the base of the lighting standard, leave sufficient slack for making the connections inside the standard.

B. Preassembled Cable in Duct

When installing in the trench, do not pull preassembled cable in duct taut, but allow it to “snake” in the ditch to provide not less than 18 inches slack per 100 feet of trench. The minimum bending radius on the cable duct shall be 18 inches. Where the duct is brought into the base of the lighting standard or into a pull box, leave sufficient length for trimming the duct to expose enough cable to allow for the connections to be made inside the standard or pull box.

C. Cable in Conduit

Carefully pull cables in conduits into place using approved methods so that the cable will be installed without electrical or mechanical damage. Pull all cables within a single conduit at the same time. If necessary to ease the pulling, use a lubricant of the type recommended by the cable manufacturer. When cables are pulled through hand holes in pole shafts, place a pad of firm rubber or other suitable material between the cable and the edges of the opening to prevent cable damage.

After the cable has been installed in the conduit, seal the ends of buried conduit with approved pliable and non-hardening material to prevent the entrance of dirt, moisture, or other foreign material.

D. Splices

Splice conductors as shown on the Plans. Only make splices at accessible points, such as handholes and pull boxes, unless otherwise shown on the Plans. After making a conductor splice, insulate it with heat-shrinkable tubing, supplied by the manufacturer, with an adhesive coating on the inner wall.

E. Ground Wire

Install ground conductors of the type and size shown on the Plans, and to be continuous in trenches with direct burial cable, and continuous inside preassembled cable in duct, and in conduit. Connect the ground conductors to the ground rod at all control points, to the ground lug in pole foundations, and to all metallic conduit runs using a grounding bushing, except that the connections to conduit in pole foundations may be omitted. Make all connections as shown on the Plans.

F. Backfilling Underground Cable

Backfill cable as specified in **714.05**.

G. Cable Identification

To assist in the identification of circuits at the pull boxes, mark the phase conductors with colored rubber-based, or equivalent, paint. When final connections are made, provide permanent tape wire markers to identify the branch circuit conductors (X1A, X1B, etc.), neutral (X1N, etc.), and the ground (g).

714.08 Light Standards

Install light standards of the designated design, kind, size, and class in accordance with and at the locations shown on the Plans. Ensure that the installed standards, complete with the bracket arm(s) and luminaire(s) as specified, provide the mounting height shown on the Plans. Determine the pole height as required by bracket arm upsweep, slope conditions, and similar characteristics.

A. Foundations for Light Standards

Consider transformer bases to be an integral part of the lighting standard unless otherwise specified.

1. Bolt-Down Base Pole Foundations

- a. Concrete Foundations.** Excavate a hole of the size and depth shown on the Plans. Remove and dispose of all excavated material as directed by the Engineer. Place anchor bolts of the type and size specified according to the pole manufacturer's recommendations, and securely hold to ensure proper position in the completed foundation. Ensure that no realignment of anchor bolts will occur after the foundation is poured. Accurately place reinforcing steel and securely hold to avoid displacement.

Accurately place conduits in foundations, orient them in the proper direction to accommodate service cables, and securely hold to avoid displacement.

Place Class A concrete in the excavated area against undisturbed earth to an elevation 4 inches below the finished ground line, and in an approved form from 4 inches below said ground line to the finished top of foundation elevation, as specified. Construct the foundation with a continuous concrete pour. Chamfer the edges of the top and formed portion of the foundation. Apply a Class 2 finish, as specified in **604.21.B**, to the portion of the foundation above grade and within 4 inches of grade.

- b. Metal Foundations.** Install metal foundations where shown on the Plans and, if desired, at locations where installation is possible without predrilling the hole.

- 2. Prestressed Concrete Butt Base Pole Foundations.** Excavate prestressed concrete butt base lighting standard foundations using manual or mechanical methods. Dig or drill the holes to the depth and the diameter shown on the Plans. Place and compact in the bottom of the hole 6 inches of crushed stone, meeting the requirements of **903.05**, Grading D.
- 3. Wood Poles.** Excavate for wood poles as specified for prestressed concrete butt base pole foundations in **714.08.A.2**. Dig or drill the holes to the depth shown on the Plans and in such diameter to allow satisfactory use of mechanical tamping equipment.

B. Light Standard Installation

Handle the standards or poles as recommended by the manufacturer and approved by the Engineer. Accomplish erection without marring the finish or otherwise damaging the standard. Ground the light standards as shown on the Plans. When installing lighting on a bridge, review the proposed bridge plans or the completed structure before ordering the standards.

- 1. Bolt-Down Base Poles.** Set standards with bolt-down bases on foundations constructed as specified in **714.08.A.1**. Use metal shims supplied with the poles to plumb the pole, if the twin bracket arm type is

used; and, unless otherwise specified, to rake or lean the pole backward 4 inches, if the single bracket arm type is used.

2. **Prestressed Concrete Butt Base Poles.** Place prestressed concrete butt base lighting standards in the hole and on the layer of crushed stone prepared as specified in **714.08.A.2**. Position the pole in the center of the hole at grade and hold in place. Rake the lighting standards with single bracket arms as specified for poles with bolt-down bases in **714.08.B.1**. Set lighting standards with two bracket arms plumb. Fill the space surrounding the pole butt-base with crushed stone, applied in 6-inch layers. The crushed stone shall meet the same requirements specified for the stone foundation in **714.08.A.2**. Moisten the stone backfill material as necessary, and thoroughly compact each layer with mechanical tamping equipment. Continue the backfill with crushed stone to the depth of the bottom edge of the cable entrance in the butt-base. After completing the installation of the electrical cable, continue placing the crushed stone backfill in 6-inch layers, and compact to a depth of 1 foot below grade. Backfill the remaining 12 inches with soil in two equal layers, and thoroughly compact each layer.
3. **Wood Poles.** Place wood poles in holes excavated as specified in **714.08.A.2**. Set the pole in the center of the hole, with any vertical curvature of the pole located in the plane of the lines, and rake in a direction opposite that of the unbalanced stress where a guy or underbrace is specified. Backfill the hole with approved material applied in 6-inch layers, and thoroughly compact each layer with mechanical tamping equipment. Install cross arms and guying components, when specified, as shown on the Plans.

C. Highmast Tower Installation

Install standards with lowering devices on foundations constructed as shown on the Plans. Ensure that the standards are plumb. Assemble the shaft in the Engineer's presence. Do not perform any field welding between sections of the shaft. Erect the tower according to the manufacturer's recommended procedures and under the manufacturer's supervision. Make adjustments to align all parts and ensure operation. Arrange for the manufacturer or its representative to instruct the local utility in the proper operation of the lowering device.

714.09 Bracket Arms

Install, on the lighting standards, bracket arms of the specified type, design, kind, dimensions, and number as shown on the Plans.

714.10 Luminaires

Use the following luminaire types on the roads and bridges: High Intensity Discharge (HID) which includes High Pressure Sodium (HPS) and Metal Halide (MH); Fluorescent and Induction lamps; and Light Emitting Diode (LED).

Install luminaires of the design and size shown on the Plans, and level according to the manufacturer's recommendations, as shown on the Plans and as approved by the Engineer. Provide glare shields on luminaires when shown on the Plans.

Clamp the pole and bracket cable in the proper terminals on the terminal board in the luminaire, and then splice the cable to the proper phase and neutral conductors outside of the handhole in the pole base. After other required circuit splices are made outside of the handhole, place all of the wire inside the handhole.

Leave slack in all cables for future maintenance. Attach a suitable identification tag to each of the phase cables.

Clean luminaire reflector surfaces and glassware after installation. Perform cleaning, if required, according to the luminaire manufacturer's recommendations.

Ensure that luminaires for sign lighting are adjustable both horizontally and vertically.

High Intensity Discharge (HID)

High Intensity Discharge (HID) luminaires shall meet IES standards from LM-51-00 to LM-35-02. The HID luminaire shall be covered by a one-year written warranty starting from the system acceptance date. All of the other electrical and mechanical component parts of the HID shall be covered by a five-year written warranty starting from the system acceptance date. The signed warranty certificate shall be submitted prior to final payment.

Light Emitting Diode (LED)

Light Emitting Diode (LED) luminaires shall be manufactured in accordance with ANSI C136.37-2011 (or recent version). All testing and data sheets for proposed LEDs shall be included in the submittal package and shall include, but not limited to, the following: Illuminating Engineering Society of North America (IESNA): LM-79-08, LM-80-08, RP-8-14, TM-3-95 and TM-15-07 (all should be up-to-date versions). In addition to these requirements, the LEDs shall meet the following requirements:

1. Finished surface: Furnish luminaires with the color mentioned in the plans. The surface of luminaire housing shall meet UL-1598 listed for wet locations, ASTM B117 for salt chamber exposure, and ASTM D1654 for rust creepage.
2. Thermal Management: the luminaire shall start and operate in the ambient temperature range of -25C to +25C.
3. Optical Assembly: The LED optical assembly package shall have a minimum Ingress Protection rating of IP 66 according to ANSI/IEC 60529. The luminaire shall have a standardized refractor/reflector to meet the required optical distribution as required by the plans. The optical assembly shall utilize high brightness, long life, minimum 70 color rendering index (CRI), (3000 K-5700 K) color temperature (+/-300 K) LEDs binned according to ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass. Provisions for house-side shielding shall be provided when specified.
4. Prevent the entrance of wildlife by limiting openings around the pipe tenon mounting area.
5. Electrical Parts (including Safety Testing) shall comply with an ANSI C136.41 with 7-pin receptacle that is fully pre-wire for LED driver's control.
6. Documents for the materials submitted need a certification from a National Voluntary Laboratory Accreditation Program (NVLAP) and that lab must be recognized by the U.S. Department of Energy.

LED Luminaire Warranty

The entire LED luminaire and all of its component parts shall be covered by a 10 year written warranty covering materials, fixture finish, and workmanship. Failure is when one or more of the following occur:

1. Negligible light output from more than 10 percent of the LED packages.
2. Condensed moisture inside the optical assembly.
3. Driver that continues to operate at a reduced output below 15 percent of the rated nominal output. The warranty period shall start from the system acceptance date. The signed warranty certificate shall be submitted prior to final payment.

714.11 Lamps

Install lamps of the design, type, and size, and at the locations shown on the Plans.

714.12 Installation of Overhead Wires

Install overhead wiring, when specified, as shown on the Plans.

714.13 Cable Markers

When shown on the Plans, place precast or cast-in-place concrete cable markers, of the dimensions indicated, at all locations where lighting cables make an abrupt change in direction. Construct the markers of Class A concrete meeting **604**. Imprint an arrow on each marker to indicate the direction of the cable run as it approaches and leaves the marker. Also imprint the circuit number on the marker.

Recess the markers into the ground approximately 3 inches, unless otherwise specified.

714.14 Control Center

Furnish and install a service pole or poles of the design, type, size, and class, and at the locations shown on the Plans. Install the service pole(s) as specified in **714.08** and as shown on the Plans. Set the service pole(s) plumb.

Notify the power company, at least 30 days before connection, of the need to furnish power to operate the lighting system.

Unless otherwise specified, furnish and install all the control center equipment and electrical supply facilities. The electrical supply facilities shall include the necessary service conduit from the control cabinet to the delivery point designated on the Plans.

Construct a concrete slab, of the dimensions and thickness indicated, around the service pole foundation. Construct the slab of Class A concrete meeting the requirements of **604**, and reinforce the slab, if specified, as shown on the Plans.

Construct a 6-foot chain-link fence and gate of the size specified around the control center as shown on the Plans and as specified in **707**.

714.15 Field Painting

After erection is completed, thoroughly clean steel standards that are not galvanized, and then apply two coats of inorganic zinc paint meeting the requirements of **910.03**. Perform painting as specified in **603**.

If the shop coat of prime paint is damaged, cover the damaged areas with a coat of the same type of paint as used for the original primer coat, and allow it to completely dry before applying the first coat of aluminum paint.

If the finish on galvanized steel materials is scratched, chipped, or otherwise damaged, the Engineer will reject the material, or may allow it to be repaired as specified in **713.04.B**.

714.16 Testing After Installation

Install all materials and equipment to form a complete installation ready for operation, unless otherwise specified.

After the installation is completed, test the lighting system in the presence of a Department representative and the Maintaining Agency. Tests shall include insulation resistance, voltage, current, and performance tests. Unless otherwise specified, perform the tests in accordance with the following:

D. Voltage Tests

Take a voltage reading at the control center at the load side of the circuit protection device and the last lighting standard served in each branch circuit. In cases where the circuit feeds in two or more directions, take the voltage reading at the light most remote from the control point or as directed by the Engineer. Unless otherwise specified, with the complete lighting system energized and all lamps operating, the voltage of this last standard shall not be less than 90% of the nominal rated voltage of the luminaire supply circuit, and the voltage at the last underpass luminaire in each branch circuit shall not be less than the minimum operating voltage recommended by the manufacturer of the luminaire ballast.

E. Current Test

Conduct current tests at each control center at the load side of each circuit protection device, using a clamp-on type ammeter. Current, in amperes, in each supply conductor shall not be greater than the rated current of a luminaire times the number of luminaires in the circuit.

F. Grounding Resistance Test

Conduct ground resistance tests with a “megger,” manufactured by the James H. Biddle Company, or a “vibraground” manufactured by Associated Research Incorporated or approved equal.

Adhere to the following when conducting this test:

1. Ensure that no equipment, such as ballast or oil switches, is connected at the time of the test.
2. Test only one conductor at a time.
3. Isolate the conductor being tested from ground.
4. Ensure that the other phase conductor and the neutral are grounded during each test.

G. Performance Tests

Prior to acceptance and after all faults have been corrected, operate the lighting system, including automatic control equipment and other specified apparatus, for a continuous 48-hour period without interruption or failure attributable to poor workmanship or defective material. After the 48 hours of continuous operation,

the Engineer will inspect all lights and equipment for normal operation. Make all necessary repairs or replacements to the Engineer's satisfaction.

Make arrangements with the Servicing Agency to purchase the electric power necessary to conduct all tests.

Furnish the Engineer five copies of the test results, together with five copies of a statement from the Maintaining Agency that the system is acceptable to the Agency.

714.17 Repair of Seeded and Sodded Areas

If areas previously seeded or sodded are disturbed during the performance of the work described in this Section, reseed (with mulch) or re-sod such areas as specified in **801** or **803**, respectively. Perform these repairs as the work progresses to minimize erosion of disturbed areas.

H. 714.18 Disposal of Excess or Unsuitable Material

Dispose of excess or unsuitable material as specified in **203.07**.

714.19 Final Cleanup

Perform final cleanup as specified in **104.10**. Remove existing foundations, designated for removal, to a minimum of 6 inches below grade. Before final inspection, touch-up finishes, clean surfaces including signs that are lighted, and perform such other work as directed by the Engineer to ensure the effectiveness and neat appearance of the work.

COMPENSATION**714.20 Method of Measurement**

When the bid schedule contains an item for Roadway and Structure Lighting on a lump sum basis, measurement will be for the sum total of all items to be furnished and installed.

When the bid schedule contains items for various elements of Roadway and Structure Lighting, the Department will make measurement for payment as follows:

A. Conduit

The Department will measure:

1. Encased Conduit and Direct Burial Conduit by the linear foot of conduit for each kind, number, and size installed as indicated, and
2. Conduit (Structures) of the kind and size specified by the linear foot of each individual kind and size of conduit placed.

B. Pull Boxes

The Department will measure Pull Boxes by the unit, per each.

C. Cable

The Department will measure Cable of the type, and number and size of conductors specified, by the linear foot from the center to center of pull boxes, light standards, and similar features, for each type and number and size of conductors. No additional allowance will be made for slack length, length inside equipment or standards, and similar instances requiring additional length of wire.

D. Preassembled Cable in Duct

The Department will measure Preassembled Cable in Duct by the linear foot from the center to center of pull boxes, light standards, and similar features. No additional allowance will be made for slack length.

E. Light Standards

The Department will measure Light Standards of the kind and design specified by the unit, per each.

F. Luminaires

The Department will measure Luminaires of the size, type, and design specified by the unit, per each, regardless of their classifications (i.e. LED, HID).

G. Overhead Conductors

The Department will measure Overhead Conductors of the gauge, type, and kind specified by the linear foot between supports. No allowance will be made for slack length.

H. Cable Markers

The Department will measure Cable Markers by the unit, per each.

I. Control Center

The Department will measure the Control Center on a lump sum basis. Such measurement will be for the sum total of all items to be furnished and installed at the control center, except as specified in **714.20.J** and **714.20.K**.

J. Class A Concrete

The Department will measure Class A Concrete used to construct the concrete slab around the service pole at the control center by the volume in cubic yards, as determined from the specified thickness shown on the Plans and surface measurements for width and length. The Department will not measure reinforcement for the concrete slab for payment, but will consider the costs thereof as incidental to the item for Class A Concrete.

K. Chain-Link Fence and Gate

The Department will measure and pay for Fence and Gates in accordance with **707.08** and **707.09**, respectively.

L. Navigational Lighting and Overhead Sign Lighting

The Department will measure Navigational Lighting and Overhead Sign Lighting furnished and installed in accordance with the Plans on a lump sum basis.

M. Incidental Items

The Department will consider incidental, and will not directly measure, the following:

1. Excavation and backfilling performed in connection with this construction.
2. The removal and satisfactory disposal of existing pavement, surface, and base required to install conduit, and for restoring the base, pavement, and surface to their original condition.
3. Furnishing, installing, and subsequently removing sheeting, bracing, and supports needed to install conduit.
4. Labor, materials, equipment, electrical energy, and incidentals required to conduct the performance tests specified in **714.16.D**.
5. Reseeding, resodding, and otherwise restoring to their original condition areas that were disturbed during the performance of the work described in this Section.

714.21 Basis of Payment

When the bid schedule indicates payment will be made for Roadway and Structure Lighting on a lump sum basis, such payment is full compensation for all materials, labor, equipment, and incidentals necessary to produce a completely integrated, operative, and finished installation of a Roadway and Structure Lighting System, as shown on the Plans.

When the bid schedule contains items for various elements of Roadway and Structure Lighting, the Department will make payment as follows:

A. Conduit

1. **Encased Conduit.** The Department will pay for Encased Conduit at the contract unit price per linear foot, complete in place, for each kind, number, and size installed as indicated. Such payment is full compensation for all excavation, sheeting when required, backfilling, disposal of excess or unsuitable material, furnishing and placing or installing all materials and accessories, including grounding materials, concrete, and reinforcement when specified, all bends, joints, fittings and appurtenances, and installing the encased conduit complete.
2. **Direct Burial Conduit.** The Department will pay for Direct Burial Conduit of the kind, number, and size specified at the contract unit price per linear foot, complete in place. Such payment is full compensation for all excavation, sheeting when required, backfilling, jacking of conduit, disposal of excess or unsuitable material, furnishing and placing or installing all materials and accessories, including grounding materials, bedding materials when required, all bends, joints, fittings and appurtenances, and installing the conduit complete.
3. **Conduit (Structures).** The Department will pay for Conduit (Structures) of the kind and size specified at the contract unit price per linear foot, complete in place. Such payment is full compensation for furnishing

and installing all materials, including conduits, hangers, expansion fittings, grounding materials, and associated hardware and accessories, and installing the conduit complete.

B. Pull Boxes

The Department will pay for Pull Boxes at the unit price per each, complete in place. Such payment is full compensation for furnishing and installing or constructing pull boxes and for all excavation, backfilling, and other work connected therewith.

C. Cable

The Department will pay for Cable of the type, and number and size of conductors, as specified, at the contract unit price per linear foot, complete in place. Such payment is full compensation for furnishing and installing the cable and grounding materials, making splices, joints and connections, and for trenching, furnishing, and placing cushion and backfill material, and disposing of excess or unsuitable excavated material.

D. Preassembled Cable in Duct

Preassembled Cable in Duct of the kind and size specified will be paid for at the contract unit price per linear foot, complete in place. Such payment is full compensation for furnishing and installing the cable duct, grounding materials, making splices and connections, and for trenching, furnishing, and placing cushion and backfill material, and disposing of excess or unsuitable excavated material.

E. Light Standards

The Department will pay for Light Standards of the type specified at the contract unit price per each, complete in place. Such payment is full compensation for furnishing and installing the complete light standards, including the foundation, standard, bracket arm or arms, associated hardware and wiring, grounding materials, excavation, backfilling materials, and backfilling. The Department will measure foundations for high mast towers separately.

F. Luminaires

The Department will pay for Luminaires of the size and type specified at the contract unit price per each, regardless of their classifications (i.e. LED, HID), complete in place. Such payment is full compensation for furnishing and installing the complete luminaire, including the ballast(s), lamp(s), glare shields where required, and associated hardware and wiring.

G. Overhead Conductors

The Department will pay for Overhead Conductors of the gauge, type, and kind specified at the contract unit price per linear foot, complete in place.

H. Cable Markers

The Department will pay for Cable Markers of the design specified at the contract unit price per each, complete in place. Such payment is full compensation for furnishing and installing the marker complete, including the excavation, backfilling, and removal and disposal of excess or unsuitable excavated materials.

I. Control Center

The Department will pay for the Control Center at the contract unit price per lump sum, complete in place. Such payment is full compensation for furnishing and installing all equipment and materials, including service pole(s) when specified, and photoelectric relays, relay cabinets, multiple relays, lightning arrestors, fuse cutouts, and all other equipment, materials, associated hardware, and accessories, as shown on the Plans. Payment for the Control Center is full compensation for furnishing and installing all electrical supply facilities from the delivery point for electrical energy, as shown on the Plans, to the control center.

J. Class A Concrete

The Department will pay for Class A Concrete, measured as specified in **714.20.J**, at the contract unit price per cubic yard, complete in place.

K. Navigational Lighting and Overhead Structure Lighting

The Department will pay for Navigational Lighting and Overhead Structure Lighting by the lump sum complete in place including all materials and labor.”

Subsection 716.05 (pg. 813), 10-8-18, Snowplowable Reflective Pavement Marker, Add the following as the third sentence:

“Contour the pavement at each snowplowable marker location to match the bottom of the marker casting. Install markers according to the manufacturer’s recommendations. For asphalt surfaces, only use the dry saw method to apply snowplowable reflective pavement markers. When using the dry saw method, provide a vacuum system to contain the dust. For other surfaces, —rRegardless of the saw method used, ensure that the saw cut is clean, dry, and free of all dust or residue before applying the adhesive. Accompany each shipment of adhesive with a written statement from the adhesive manufacturer certifying that the material furnished conforms to the recommendations of the marker manufacturer, and stating the minimum temperature at which the adhesive can be satisfactorily mixed and applied.”

Subsection 730.11 (pg. 835), 6-27-16; Revise the title:

“AnchorRods”

Subsection 730.11 (pg. 835), 6-27-16; revise the first paragraph:

“Furnish, with anchor-base type poles, anchor rods meeting the requirements of ASTM F1554, Grade as required by design. Fit each anchor bolt with two heavy hex nuts. Hot-dip galvanize all nuts and not less than 10 inches of the threaded ends of anchor bolts according to ASTM A153. The anchor bolts shall be capable of resisting at yield strength stress the bending moment of the shaft at its yield strength stress.”

Subsection 730 (pg. 828-880), 11-6-17; replace section with the following:

SECTION 730 – TRAFFIC SIGNALS

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DESCRIPTION**730.01 Description of Work**

This work consists of furnishing and installing all necessary materials and equipment to complete in-place traffic signal systems, modify existing systems, or both, all as shown on the Plans or the Standard or Special Details, and as specified in these Specifications. Unless otherwise shown on the Plans or specified in the Special Provisions, all materials shall be new.

Where existing systems are to be modified, incorporate the existing material into the revised system, salvage it, or abandon it as specified or as directed by the Engineer.

Furnish and install all incidental parts that are not shown on the Plans or specified herein, but that are necessary to complete the traffic signal or other electrical systems, or that are required for modifying existing systems, as though such parts were shown on the Plans or specified herein. Include the costs of such incidentals in bid price for other items. All systems shall be complete and in operation to the Engineer's satisfaction at the time of completion of the work.

GENERAL REQUIREMENTS**730.02 Regulations and Code**

Ensure that all equipment provided conforms to NEMA Standards Publication, Traffic Control Systems, latest revision, or the Radio Manufacturers Association, whichever is applicable. In addition to the requirements of these Specifications, the Plans, and the Special Provisions, all material and work shall conform to the requirements of the NEC and the NESC; the Standards of ASTM, ANSI, ITE, and IMSA; the MUTCD; and other applicable local ordinances.

Wherever reference is made to the NEC, or the Standards mentioned above, consider the reference to mean the code or standard that is in effect on the date of advertising the bids or authorization for force account.

730.03 Submittal Data Requirements

Within 30 days after the issuance of the work order, submit to the Engineer, the Traffic Operations Division, and the local entity (city or county engineer), one collated set of the manufacturer's descriptive literature and technical data that fully describes the types of signal equipment proposed for use. In the descriptive literature, identify the manufacturer and models and include sufficient information for the Engineer to determine if the equipment or material meets the requirements of the Plans and these Specifications. Include with these sets of submittal data a list of the materials submitted along with descriptive material for, but not limited to, the following items:

1. Controller
2. Cabinet and Exhaust Fan
3. Detectors
4. Signal Heads including Lamp Information and Mounting Hardware
5. Loop Wire and Loop Sealant
6. Shielded Detector Cable
7. Signal Cable
8. Cable for Span Wire, Guys, and similar features
9. Pull Boxes
10. Conduit
11. Coordination Equipment

Also include in the submittal sets detailed scale drawings of all non-standard or special equipment and of all proposed deviations from the Plans. Upon request, submit for approval sample articles of materials proposed for

use. The Department will not be liable for any materials purchased, labor performed, or delay to the Work prior to such approval.

In addition to the above, submit to the Engineer a notarized letter certifying that all traffic signal materials listed in the submittal conform to the Plans and Specifications along with a copy of a statement from the maintaining agency that the system is acceptable to the agency. Any material substitutions requested by the maintaining agency shall meet minimum Department standards and shall be approved by the Department in writing prior to purchase or installation. The Department will not be liable for any materials purchased; labor performed, or delay to the Work regarding such approval.

Submit an electronic copy in PDF format of “Design” or “Shop” drawings, indicating the proposed dimensions and material specification for each of the supports and mast arms involved, to the Division of Structures for approval purposes within 30 days after the work order is issued. The Department will review these drawings at the earliest possible date, and will return the electronic copy marked “Approved for Fabrication,” or “Returned for Revisions as Noted.” Respond by taking appropriate action to ensure the earliest possible correction of these items so as not to delay the installation.

730.04 Mill Test Reports and Certification

Provide Mill Test Reports (MTR) or Certifications of Conformance to the Specifications for Materials and Design for all materials incorporated into the Work. Supply the following prior to acceptance of the structures:

1. MTRs for MAJOR structural items only, as identified in Table 730.04-1, shall include both physical and chemical descriptions of the material as supplied to the fabricator. When physical properties are altered during the fabrication, supplement the MTR covering chemical composition with certified test reports indicating the physical properties of this material after fabrication.
2. Certifications of Conformance to the Specifications for all remaining material not covered by MTR as identified in Table 730.04-1.
3. Certification that all welding was performed by operators qualified as follows: Steel welders to AWS and aluminum welders to ASME.
4. Certification of Conformance to the Specification for the Design of all components not completely dimensioned and detailed on the Standard Drawing.

Table 730.04-1: Required Mill Test Reports and Certifications

Component Materials	MTR	Certification
Tubes for arms and poles	X	
Base Castings	X	
Anchor Bolts	X	
Pole tops, misc. fittings, and hardware		X
Fabricated or cast-type arm connections		X
Galvanizing		X

730.05 Working Drawings

Provide within the controller cabinet and to the local maintaining agency an electrical schematic diagram of the cabinet and system wiring. Submit manufacturer’s instructions for installation, maintenance, and operation of all equipment to the local maintaining agency and also place a copy within the controller cabinet. Place all such materials inside a plastic envelope mounted in the cabinet.

730.06 Guarantee

Guarantee the Traffic Signal System(s) installed under these Specifications, including all equipment, parts, and appurtenances in connection therewith, to the City or County and State against defective workmanship and materials for a period of not less than 1 year following the date the signal system is installed and made operational, except in no case shall this guarantee expire prior to 3 months after the final acceptance of the Project. Upon completion of the Project, turn over to the government agency responsible for maintaining the signal installation all warranties or guarantees on equipment and materials that are offered by the manufacturers as normal trade practice.

730.07 Training

Provide to the maintaining agency and/or the Department a training session on the controller and associated cabinet equipment to be supplied on the Project. The training session shall last for a minimum 4 hours unless the maintaining agency and/or the Department determines a lesser time is adequate. Train the user in the complete operation and programming features of all controllers. Provide this training prior to the acceptance of the Project at a facility agreed upon by the maintaining agency.

After the required training, certify to the Engineer that training has been completed.

This training requirement shall not apply if a training program meeting these criteria has been provided to the maintaining agency by this vendor and/or manufacturer on the equipment being bid within 18 months prior to the date of the invitation to bid. This requirement shall apply if the bidder is proposing new, upgraded, or modified equipment not covered in the previous training program.

MATERIALS AND INSTALLATION**730.08 Excavating and Backfilling**

Perform excavation needed to install conduit, foundations, and other equipment, so as to cause the least possible damage to the streets, sidewalks, and other improvements. Excavate trenches no wider than necessary to properly install the electrical equipment and foundations. Do not begin excavating until immediately before installing conduit and other equipment. Place the material from the excavation where it will cause the least disruption and obstruction to vehicular and pedestrian traffic and the least interference with the surface drainage.

Backfill the excavations and compact to at least the density of the surrounding material. Remove all surplus excavation material and dispose of outside the highway right-of-way, in accordance with **203.07**, or as directed by the Engineer.

After backfilling, keep excavations well-filled, and maintain in a smooth and well-drained condition until permanent repairs can be made.

At the end of each day's work, and at all other times when construction operations are suspended, remove all equipment and other obstructions from that portion of the roadway used by public traffic, and park a minimum of 30 feet from the edge of pavement unless otherwise protected by guardrail, bridge rail, or barriers installed for other purposes.

Perform excavation in the street or highway so as to restrict no more than one traffic lane in either direction at any time. Do not obstruct traffic during hours of peak flow unless otherwise approved by the Engineer. Incorporate construction signing in accordance with the MUTCD.

730.09 Removing and Replacing Improvements

Replace or reconstruct, with the same kind of materials as found on the Work, improvements, such as sidewalks, curbs, gutters, Portland cement concrete and asphalt concrete pavement, bituminous surfacing, base material, and all other improvements removed, broken, or damaged by the Contractor.

Before removing the sidewalk and pavement material, use an abrasive type saw to cut, to a minimum depth of 2 inches, the outline of all areas to be removed in Portland cement concrete sidewalks and in all pavements. Use any method satisfactory to the Engineer to cut the remainder of the required depth. Make cuts neat and true with no shatter outside the removal area.

Whenever a part of a square or slab of existing concrete sidewalk or driveway is broken or damaged, remove the entire square or slab and reconstruct the concrete as specified above.

Perform all work in accordance with these Specifications, or the applicable local ordinance, whichever is of a higher standard. Consider this removal and replacement work to be incidental to other items.

730.10 Foundations

Construct foundations for posts, standards, and cabinets of Class A Portland cement concrete.

Pour foundations for posts, standards, and pedestals after the post, standard, pedestal, or anchor bolts or reinforcing steel is in proper position. Form the exposed portions to present a neat appearance. Rest the bottom of concrete foundations on firm undisturbed ground.

Construct forms to be true to line and grade. Finish tops of footings for posts and standards, except special foundations, to curb or sidewalk grade or as ordered by the Engineer. Use rigid forms, securely braced in place. Place conduit ends and anchor bolts by means of a template until the concrete sets. Moisten both the forms and the ground that will be in contact with the concrete before placing concrete. Do not remove forms until the concrete has cured for at least 12 hours and hardened sufficiently to allow form removal without causing damage to the concrete.

Apply an ordinary surface finish to exposed surfaces of concrete. Wherever the edge of a concrete foundation or sidewalk section is within 18 inches of any existing concrete improvement, extend the sidewalk section to meet the existing improvement.

Where obstructions prevent the construction of planned foundations, construct a foundation satisfactory to the Engineer.

730.11 Anchor Rods

Furnish, with anchor-base type rods, anchor bolts meeting the requirements of ASTM F1554, grade as required by design. Fit each anchor bolt with two heavy hex nuts. Hot-dip galvanize all nuts and not less than 10 inches of the threaded ends of anchor bolts according to ASTM A153. The anchor bolts shall be capable of resisting at yield strength stress the bending moment of the shaft at its yield strength stress.

Set standards, posts, and pedestals plumb by adjusting the nuts before the foundation is finished to final grade. Do not use shims or similar devices for plumbing or raking. After plumbing or raking has been completed, cut off anchor bolts 1/4 inch above the top nut, and paint the exposed surface with rust protective paint.

Furnish all anchor bolts and nuts required for relocating existing standards and posts.

730.12 Pull Boxes

Construct and install pull boxes as shown on the Plans and the Standard Drawings or as directed by the Engineer. Additional pull boxes may be required where conduit runs are more than 150 feet long. The maximum spacing

between pull boxes shall be 150 feet, unless otherwise directed by the Engineer. Install pull boxes wherever practicable out of the line of traffic. Set covers level with the pavement, or with the curb or sidewalk grade, or with the surrounding ground as required.

Place electrical conductors within pull boxes so as to be clear of the metal frame and cover.

Rest the bottom of the pull box firmly on a bed of crushed stone with a minimum depth of 12 inches below the bottom, and extending 6 inches beyond the outside edge of the pull box, unless otherwise directed by the Engineer.

A. Concrete Pull Boxes

Construct concrete pull boxes of a mixture of one part cement, two parts sand, and four parts gravel or 1-inch crushed stone with reinforcement placed as shown on the Standard Drawings. Reinforcement shall consist of welded wire reinforcement, 4 x 4 inches - No. 4/4 at 85 pounds per 100 square feet, meeting the requirements of **907.03**. Pull boxes may be poured in place or precast. The color of the pull box concrete material shall match the surrounding concrete color.

Install a cast iron frame and cover of the dimensions shown on the Drawings in each pull box. Provide castings of Class 30, meeting the requirements of **908.07**. The covers shall have a roughened top surface of 1/8 inch in relief. Provide notches for removing the cover. Inscribe the words "TRAFFIC SIGNALS" on top of the covers with letters 1-1/2 inches high and 1/8 inch in relief as shown on the Drawings.

The frame shall have a minimum weight of 42 pounds. The cover shall be of the "Extra Heavy" type with a minimum weight of 54 pounds.

B. Reinforced Plastic or Epoxy Mortar Pull Boxes

Ensure that pull boxes composed of reinforced plastic or epoxy mortar are designed and tested to temperatures of -50 °F and meet the requirements of the following: ASTM D543, ASTM D570, ASTM D790, and ASTM D635, and are based on a 30,000-pound single axle load over a 10 x 20 inch area. The top of the pull box shall consist of a concrete frame (ring) and cover. The color of the pull box concrete material shall match the surrounding concrete color. Inscribe the words "TRAFFIC SIGNALS" on top of the covers.

730.13 Transformer Base

Fabricate the transformer base from steel plate and sheet, and design it to harmonize with the shaft. Provide each transformer base with:

1. One 7-1/2 x 9 inch minimum handhole, with a cover secured with stainless steel fastening screws;
2. Four galvanized steel bearing plates to fasten the base to the anchor bolts;
3. Four galvanized steel bolts, nuts, and washers to fasten base and standard; and
4. One 1/2-inch, 13 UNC grounding nut welded to the inside of the base opposite the handhole opening.

Ensure that the strength of the transformer base is comparable with that of the shaft.

When a transformer base is required, no handhole will be required in the shaft.

730.14 Conduit

Furnish and install plastic and steel conduit in accordance with these Specifications and close conformity with the lines shown on the Plans or as established by the Engineer.

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Threads shall be clean cut, straight, and true and of sufficient length to allow proper coupling. Do not use long running threads on any part of the Work. Protect threads in transit and during installation, and provide conduit with proper supports and protection during construction to prevent damage. Properly thread, ream, and cap all ends of pipe installed for future connections to prevent water and foreign matter from entering the conduit system. Provide threaded ends with approved conduit bushings.

Signal conduit shall be a minimum 2 inches in diameter, and detector conduit a minimum 1 inch in diameter, unless otherwise specified or directed by the Engineer. Conduit for service connections shall be 1 inch in diameter. Do not use conduits smaller than 1 inch in diameter unless otherwise specified, except grounding conductors at service points shall be enclosed in 3/4-inch diameter conduit. Larger-sized conduit may be used, at no additional cost to the Department, in which case it shall be for the entire length of the run with no reducing couplings allowed.

A. Materials

Provide conduits and fittings of the type as shown in the construction plans or as directed by the Engineer and as follows:

1. Steel Conduit

- a. Rigid conduit and fittings shall be heavy-wall, hot dipped galvanized steel conforming to Federal Specification WW-C-581-d(3) and ANSI C80.1. It shall be galvanized inside and out and shall meet the requirements of ASTM A53. Each length shall bear the label of Underwriters Laboratories, Inc.
- b. Flexible conduit shall be galvanized flexible steel meeting Federal Specification WW-C-581-d(3), ANSI C80.1 and UL Standard 6 with a minimum 40-mil thickness of polyvinyl chloride (PVC) coating conforming to ASTM D746.

2. Plastic Conduit. For plastic conduit, provide high impact PVC, Schedule 40 or Schedule 80.

3. High-Density Polyethylene (HDPE). Materials used for the manufacture of HDPE conduit and fittings shall be per ASTM F2160 and consist of a Standard Dimension Ratio (SDR) 9-11. No other substitutions shall be allowed unless directed by the Engineer. HDPE conduit can be used with preassembled cable and rope-in-conduit.

B. Installation

All bends shall be in strict compliance with the NEC.

Lay conduits to a minimum depth of 6 inches below subgrade but not less than 24 inches below pavement grade except when approved by the Engineer; conduit may be laid at a depth of not less than 24 inches below top of curb when placed in back of the curb. Place conduit runs for detectors parallel to existing or proposed curbs and not more than 18 inches behind the curb face unless otherwise specified. Place steel conduit or Schedule 80 PVC conduit under existing pavements by approved jacking or drilling methods. Do not disturb pavements without the Engineer's approval. Where trenching is allowed in a traffic bearing area, use PVC conduit (Schedule 40) encased in concrete.

Conduits shall be continuous and extend from end point (i.e. pull box, foundation signal pole, pedestal pole, etc.) to another end point, or as directed by the Engineer. Conduit splicing shall not be permitted between end points.

After completing the installation of the conduit, test all conduits installed under the Contract with a mandrel having a diameter 1/4-inch smaller than the conduit and a length of 2 inches. Repair, to the Engineer's satisfaction, all conduits that will not allow passage of the mandrel; if repairs cannot be accomplished, remove

and replace the conduit at no additional cost to the Department. After the mandrel test, scour all conduits with a stiff wire brush slightly larger in diameter than the conduit. Clear all conduits in the Engineer's presence.

Extend conduits terminating in anchor base standards and pedestals approximately 2 inches above the foundation and slope them toward the hand-hole opening. Conduits shall enter concrete pull boxes from the bottom and shall terminate not less than 2 inches nor more than 4 inches above the bottom of the box and near the box walls to leave the major portion of the box clear.

Clean existing underground conduit to be incorporated into a new system by blowing with compressed air, or by other means approved by the Engineer.

730.15 Conductors

Furnish and install conductors in accordance with these Specifications and close conformity as shown on the Plans, or as directed by the Engineer.

Traffic Control Conductors shall be rated at 600 volts. Run all conductors, except loop conductors and cables run along messengers, in conduit, except where run inside poles. Where signal conductors are run in lighting standards containing high voltage street lighting conductors, encase the signal conductors in flexible or rigid metal conduit. Where telephone circuits are introduced into controller foundations, encase the telephone conductors in flexible metal conduit and in conformance with the NEC.

Conductors for traffic loops shall be continuous AWG No. 14 XLP stranded wire to the detector terminals or spliced with shielded detector cable within a pull box, conduit, or pole base.

Detector cable shall be two conductor twisted pair shielded AWG No. 14 stranded meeting IMSA Specification No. 50-2.

730.16 Cable

All signal cable shall conform to applicable IMSA Specification No. 19-1 or 20-1. Use stranded cable color coded AWG No. 14 for all signal and accessory circuits. Retain the same color identification for the entire length of a circuit run.

730.17 Wiring

1. Terminate all wiring to screw terminals using lugs.
2. Make all splices with solderless connectors, and insulate splices with weatherproof tape applied to a thickness equal to the original insulation.
3. Attach cables to messenger with non-corrosive lashing rods or stainless steel wire lashings.
4. All wiring within enclosed cabinets shall be neatly formed and harnessed and shall have sufficient length for access and servicing.

730.18 Service Connection

Coordinate service connection details and metering with the local utility as directed by the Engineer and in conformance with the City and County requirements. Obtain the necessary service for each installation.

730.19 Sealant

Provide sealant material selected from the Qualified Products List maintained by the Department's Material and Test Division for sealing saw-cuts. The sealant material shall resist the upward movement of loop and lead-in and shall

exhibit stable dielectric characteristics, including a low permittivity and high dielectric strength. It shall bond to the roadway paving material, preventing entry of moisture, and shall remain flexible without melting through the anticipated temperature and weather conditions.

730.20 Strand Cable

Span cable for suspending signal heads between pole supports shall be 7-strand, Class A, copper-covered steel wire strand or greater, meeting the requirements of ASTM A460, with a minimum breaking strength as noted on the Plans. An acceptable alternate is 7-strand steel wire with a Class A zinc coating meeting the requirements of ASTM A475, with a minimum breaking strength as shown on the Plans.

Strand cable for messenger wire (other than span wire as specified above) and pole guy cable use shall be of the diameter(s) shown on the Plans and shall meet the requirements of ASTM A475 for zinc-coated steel wire strand, 7-strand Siemens-Martin Grade with a Class A zinc coating or greater.

A Figure 8 cable combining the messenger cable and conductor cable in an insulated jacket is an acceptable alternate to conductor cable lashed to a messenger cable.

730.21 Bonding and Grounding

Make metallic cable sheaths, conduit, transformer bases, anchor bolts, and metal poles and pedestals mechanically and electrically secure to form a continuous system, and ensure they are effectively grounded. Bonding and grounding jumpers shall be copper wire or copper strap of not less than the same cross-sectional area as No. 6 AWG.

Furnish and install a ground electrode at each service point. Ground electrodes shall be one-piece lengths of copperweld ground rod not less than 8 feet in length and 1/2 inch in diameter, installed in accordance with the NEC. Ground the conduit and neutral as required under the NEC, except that grounding conductors shall be No. 6 AWG or approved equal, as a minimum. Enclose exposed ground conductors in 1/2-inch diameter conduit, and bond to the electrode with a copperweld ground clamp.

730.22 Field Test

Prior to completing the work, conduct the following tests on all traffic signal and lighting circuits in the Engineer's presence:

1. Test for ground in circuit.
2. Conduct a megger test on each circuit between the circuit and ground. The insulation resistance shall be not less than the values specified in Section 119 of the NEC.
3. Conduct a functional test to demonstrate that each part of the system functions as specified or intended herein.
4. Test all detector loops and leads before and after they are sealed in the pavement to ensure there are no shorts to ground in the system and to ensure that the loop plus lead-in inductance is within the operating range of the detector.

Replace or repair, in a manner approved by the Engineer, all faults in material or in the installation revealed by these tests. Repeat the applicable testing until no fault appears.

730.23 Inspection

After completion of the installation and before final acceptance of the Project, conduct a full operational check of the system under actual traffic conditions in the presence of the Engineer. The operational check shall cover a

minimum time period of 30 calendar days. During this period, perform all necessary adjustments and replace all malfunctioning parts of the equipment required to place the system in an acceptable operational condition at no additional cost to the Department. Perform all work and furnish all materials required under these Specifications subject to the direct supervision, inspection, and approval of the Engineer. Provide the Engineer and authorized representatives free access to the work, and to all plants, yards, shops, mills, and factories where, or in which, articles or materials to be used or furnished in connection with such work are being prepared, fabricated, or manufactured. Provide full and sufficient information to determine that the performance of the work, the character of materials, and the quality of workmanship and materials meets the intent of these Specifications.

Only perform work in the presence of the Engineer or the Inspector appointed by the Engineer, unless permission to do otherwise has first been obtained. The Engineer may reject any work that is performed or constructed in the absence of the Engineer or Inspector, without such permission having been granted, either expressly or by implication.

The inspection of the work shall not relieve the obligation to properly fulfill the Contract as specified. If the Engineer finds a part of the work, or the materials used in the work, to be defective or unsuitable at any time prior to final acceptance, repair or replace such defective or unsuitable work or material.

Request the presence of an Engineer or Inspector in connection with the work under these Specifications at least 24 hours before such services will be required.

SIGNAL HEADS

730.24 Signal Heads

Signal heads shall meet the latest requirements published in the Equipment and Materials Standards of the Institute of Transportation Engineers (ITE) for Adjustable Face Vehicle Traffic Control Signal Heads” and the National Electrical Code. The arrangement of traffic signal heads shall be mounted as shown on the Plans or as specified by the Engineer and be in accordance with the latest versions of the MUTCD and the TDOT Traffic Design Manual.

All circular indications shall use 12-inch lenses unless otherwise shown on the Plans. All arrow indications shall use 12-inch lenses. All new vehicle signal heads installed at any one intersection shall be of the same style and from the same manufacturer. All exposed metal signal housings, doors, visors, backplates and framework parts shall be painted with a powder coated finish and be in accordance to the MUTCD specifications. Suspensions for span wire mounting of multi-faced signal heads and signal head clusters (such as a 5-section signal head) shall include an approved swivel type balance adjuster for proper vertical alignment.

Signal head housings shall be cast aluminum and all associated parts/hardware shall be of non-corrosive material. In addition to these requirements, comply with the following:

A. Optical Units

Traffic signal indications shall be LED type and meet the Institute for Transportation Engineers (ITE) latest LED specifications. All LED indications shall have a five year warranty.

B. Signal Head Mounting and Mounting Brackets

Furnish signal heads that either have integral serrations or are equipped with positive lock rings and fittings designed to prevent heads from turning due to external forces. Lock ring and connecting fittings shall have serrated contacts. Provide signals with water-tight fittings.

Support bracket-mounted signal heads, as shown on the Plans, by mounting brackets consisting of assemblies of 1-1/2 inch standard pipe size. Ensure that all members are either plumb or level, symmetrically arranged, and securely assembled. Conceal all conductors within poles and mounting assembly. Secure each slip fitter to the pole.

C. Directional Louvers

Where shown on the Plans, furnish and install louvers in the hoods of the signal head sections designated.

Directional louvers shall have a snug fit in the signal hoods. Construct the outside cylinder and vanes from a non-ferrous metal or galvanized sheet steel. Louvers shall be painted with a powder coated finish.

D. Back Plates

Where shown on the Plans, furnish and attach back plates to the signal heads. All back plates shall be louvered and constructed of 3,003, half-hard, 0.051-inch minimum thickness aluminum sheet. Other materials such as plastic or fiberglass may be used where approved. In fabricating back plates, bend back the inside vertical edges, adjacent to the signal head, to form mounting brackets for attaching to the signal. Form back plates in two or more sections and bolt together, thus allowing for installation after signal heads are in place. Back plates shall have a dull black appearance in the front and back.

E. Wiring

Signal head leads shall be No. 18 AWG stranded with 221 °F thermoplastic insulation. Wire a separate white (common) lead to each socket shell; and wire a colored lead, corresponding to the color code shown on the Plans, to each socket terminal. Provide leads of sufficient length to allow connection to the terminal block specified. Provide each complete signal head with a minimum 4-point terminal block, properly mounted in a signal section. Stud type terminal blocks shall have not less than 1/4-inch edge clearance to any portion of the stud. Exterior wiring shall have a 360-degree drip loop in advance of entering the head.

F. Pedestrian Signals

Pedestrian signal heads shall meet the latest requirements published in the Equipment and Materials Standards of the Institute of Transportation Engineers (ITE) for Adjustable Face Pedestrian Signal Heads”, the National Electrical Code and be compatible with NEMA standards. The arrangement of pedestrian signal heads shall be mounted as shown on the Plans or as specified by the Engineer and be in accordance with the latest versions of the MUTCD and the TDOT Traffic Design Manual. The pedestrian indications shall be LED symbols and in conformance with the Institute for Transportation Engineers (ITE) latest LED specifications. All LED indications shall have a five year warranty.

In addition, where pedestrian signal heads are provided, they shall:

1. include a pedestrian change interval countdown display where the calculated pedestrian change interval is more than 7 seconds;
2. include Accessible Pedestrian Signals and pedestrian pushbuttons complying with MUTCD Accessible Pedestrian Signals section;
3. incorporate a locator tone meeting the requirements of the MUTCD Accessible Pedestrian Signals;
4. include a pedestrian pushbutton with tactile vibrating arrow button and audible sound.

The pedestrian countdown display shall conform to the latest FCC regulation on Emission of Electronic Noise.

The manufacturer must supply certification, which includes a copy of the test report by an independent technical laboratory as to the compliance with ITE specifications (where it applies). The report shall also indicate that the tests were performed only after the modules received a thirty (30) minute operational warm-up period immediately preceding the tests.

The housing door, door latch, and hinges shall be of aluminum, or polycarbonate or approved equal. Hinge pins shall be stainless steel. Provide the door with a neoprene gasket capable of making a weather resistant, dust-proof seal when closed.

All pedestrian signal heads, mountings, outside of hoods, and pedestrian push button housings shall have a powder coated finish (if aluminum) or colored resin (if polycarbonate) in accordance to MUTCD specifications.

G. Signal Head Installation

Install signal heads and pedestrian signal heads with the faces completely covered until the entire installation is ready for operation.

CONTROLLERS – GENERAL

730.25 Controllers

Controller equipment shall be permanently marked with the manufacturer's name or trademark, part number, and serial number.

Controllers must meet the following applicable industry standards and amendments:

NEMA TS2 Controller NEMA TS-2-2016

ATC Controller AASHTO/ITE/NEMA ATC 5.2b

All NEMA TS2 and ATC controllers must provide functionality that meets or exceeds operational characteristics, including NTCIP support, as described in NEMA TS-2-2016.

NEMA TS2 Type 2 controllers shall be used when downward compatibility to existing TS1 cabinets is desired.

Except for replacing controllers in existing systems, all new installations must include controllers that capture high resolution event-based data elements to provide the automated traffic signal performance measures.

The manufacturer must supply certification of the conformance to the above requirements at the time of the bid.

In addition to the above requirements, the controller shall:

5. have all timing values entered via a front panel mounted keyboard. This keyboard shall be an integral part of the controller unit;
6. have an English language menu for programming or reading all controller features;
7. continue to operate the intersection as values are inspected or altered;
8. include the ability to upload and/or download the controller software operating system and user programmed database to or from external media (datakey, usb, sd card etc).
9. support Flashing Yellow Arrow for Permissive Left-turn Movements applications.

Surge Protection Devices The cabinet shall have Surge Protective Devices (SPDs) for the main AC power input, all signal head field wiring terminals, interconnect cable terminals and loop lead-in cable terminals which are located in the cabinet. Furnish SPDs to provide effective defense against high transient voltages caused by lightning discharges or other sources. SPDs must be unobstructed and accessible from the front side of any panel used in the cabinet. The SPD for the main AC power input of the cabinet must be connected on the load side of the cabinet circuit breaker. SPDs must meet the following minimum requirements:

1. AC power SPD:
 - a. Must be UL 1449 4th Edition Listed
 - b. Parallel connected device
 - c. UL Nominal Surge Rating (In): 20kA
 - d. UL Short Circuit Current Rating (SCCR): 150kA minimum
 - e. Surge current rating: 50kA per phase minimum

- f. Visual status indication
 - g. Remote signalization contacts for monitoring purposes
 - h. 10 year manufacturer's warranty minimum
- 2. DC power SPD:
 - a. Must be UL 1449 4th Edition recognized
 - b. Parallel connected device
 - c. UL Nominal Surge Rating (In): 10kA minimum
 - d. Must provide protection between all +/-Gnd connections
 - e. Surge current rating: 20kA per phase minimum
 - f. Visual status indication
 - g. Remote signalization contacts for monitoring purposes
 - h. 10 year manufacturer's warranty minimum
- 3. Data and communication SPD:
 - a. Must be UL 497B listed
 - b. 10 year manufacturer's warranty minimum
- 4. Signal and interconnect cable field wiring terminal SPD:
 - a. Clamp the surge voltage to a level no greater than twice the peak operating voltage of the circuit being protected
 - b. Withstand a surge current of 1000A with an 8 by 20 μ s waveform six times (at 1 second intervals between surges) without damage to the suppressor
 - c. 10 year manufacturer's warranty minimum
- 5. Loop lead-in cable field wiring terminal SPD:
 - a. Protect the detector unit loop inputs against differential (between the loop lead) surges, and against common mode (between loop leads and ground) surges
 - b. Clamp the surge voltage to 25 V or less when subjected to repetitive 300A surges
 - c. Withstand repetitive 400A surges with an 8 by 20 μ s waveform without damage
 - d. 10 year manufacturer's warranty minimum

All SPDs must be installed according to the SPD manufacturer's instructions and not affect the operation of equipment. SPD leads must be kept as short and straight as possible.

CABINETS – GENERAL

730.26 Cabinets

Cabinets must be permanently marked with a label including the manufacturer's name or trademark, model/part number, and the year and month of manufacture. The label should be placed on the inside of the main door using a water resistant method. The label must be visible after installation.

Cabinets shall be provided as a complete unit and have all terminals and facilities necessary for traffic signal control as shown on the plans and shall meet at a minimum, the following requirement:

NEMA TS2 Controller Cabinet NEMA TS 2 2016

The manufacturer must supply certification of the conformance to the above requirements at the time of the bid.

Cabinets shall also be in accordance with the latest version of the TDOT Traffic Design Manual.

Two paper copies of the cabinet wiring diagram shall be provided with each cabinet. The nomenclature of signal heads, vehicular movements and pedestrian movements on the wiring diagram must be in accordance with the signal

operating plan. Documentation must include a list identifying the termination points of cables used for vehicular and pedestrian signal heads, detector loop lead-ins, and pedestrian pushbutton wires. A heavy duty, resealable plastic bag must be mounted on the backside of main cabinet door for storing cabinet documentation.

House the controller in a rigid, weatherproof cabinet, constructed, finished, and equipped as follows, and as shown on the Standard Details:

1. **Material.** Provide weather-tight cabinets fabricated from aluminum sheet or cast aluminum alloy with a minimum 0.125-inch thickness. All welds on fabricated cabinets shall be internal and continuous; spot welding is not acceptable. Painting of cabinets is only required if the final finish presents an unsightly appearance.
2. **Doors.** Type III, IV, and V cabinets shall have a hinged front opening door that shall include substantially the full area of the front of the cabinet. Equip the door with a positive hold fast device to secure the door in at least two open positions: one position at approximately 90 degrees and the other at 120 degrees or more. The holdfast device shall be easily secured and released without the use of tools. Equip doors for Type II, III, IV, and V cabinets with a switch compartment, and provide the manual switches, specified in **730.26.6.k**, with a hinged front opening auxiliary door. Each door shall have a gasket to provide a weatherproof seal when closed.

Provide the main door with a No. 2 pin-tumbler cylinder lock, and the auxiliary door with a standard police sub-treasury lock. Provide four keys for each lock.

Provide a switch which is to be tied to the cabinet light so that cabinet light will be on when the door is open and off when the door is closed.

3. **Cabinet Mounting.** Mount cabinets as shown on the Plans or Standard Details.
4. **Ventilation.** Unless otherwise specified, provide ventilation as follows:
 - a. On all cabinets housing controllers, mount a screened, rain-tight vent, 1-1/2 inches in diameter or larger, on the cabinet top.
 - b. Provide screened or filtered inlet ventilation openings, equal to or greater in area than top vents, located in the bottom or lower back side of Type I and II cabinets or around the lower 8 inches portion of Type III cabinets.
 - c. Construct the vents so as to project within the cabinet no more than necessary to provide for lock nuts and gaskets to retain the vent.
 - d. Locate vents so as to not interfere with the mounting of controller equipment.
5. **Cabinets with Exhaust Fans.** Exhaust fans shall consist of an electric fan with ball or roller bearings and a capacity of at least 100 cubic feet per minute. Mount the fan in a rain-tight housing attached to the top of the controller cabinet.

The fan shall be controlled by a thermostat having a temperature differential between turn-on and turn-off of 15 °F (-0, +5 °F), adjustable for turn-on through a minimum calibrated range of from 100 °F to 150 °F.

Whenever a fan is to be installed, provide the air inlet filter and filter holder shown in the Standard Details, or approved equal. Internally seal other air inlets. Provide exhaust fans in all cabinets that house controllers, with the exception of flasher controllers.

6. Auxiliary Equipment. With the exception of cabinets used in special applications (Type I and II), provide all cabinets with the following:

- a. Substantial shelves or brackets to support controller and auxiliary equipment.
- b. Panel for terminals arranged for adequate electrical clearance. Panels should be located in the cabinet as described below:

- Detectors	Lower left wall
- AC power	Lower right wall
- Auxiliary/police switches	Door
- Load switch bay	Back wall

c. The cabinet shall include an LED light and GFI duplex receptacle which can be used when the main circuit breaker is off.

d. Control panel assembly consisting of:

1. Power supply connections made to a 30-ampere circuit breaker mounted on the cabinet separate from the signal terminal panel. The circuit breaker shall be a magnetic trip type, having an interrupting capacity of at least 2,000 amperes at 125 volts AC. The circuit shall trip between 101% and 125% of rated load, with an inverse time delay characteristic provided. Instantaneous tripping shall occur at ten times the nominal rating. All controllers shall be internally fused.
 2. Service line surge protection.
 3. Electrical service termination point sized to accept No. 4 AWG copper wire.
 4. Ground fault receptacle.
 5. Porcelain lamp receptacle to accept a standard traffic signal lamp. If LED lenses are utilized, the shall be dimmable and switchable to reduce glare at night time.
 6. Circuit breakers in accordance to the National Electric Code for:
 - (a) Main power input to provide all power associated with normal operation.
 - (b) Flasher power input to provide all power associated with flash operation.
 - (c) Service power to provide power for the lamp and duplex receptacle and cabinet light.
 7. Copper ground bus (minimum of 12 positions).
- e. Flasher mechanism independent of controller. The cabinet shall be wired for and include a NEMA flasher mounted on the back panel. All cabinets shall have a two-circuit flasher. The flasher shall have output indicators mounted on the front of the flasher case and shall be rated at a minimum of 15 amperes.
- f. General purpose relays, where required to perform specified functions. All relays external to the controller or appurtenances shall meet NEMA standards. In addition:
- Flash transfer relays shall be of heavy-duty type and have a minimum contact rating of 10 amperes. Contacts shall be of silver material to reduce contact pitting.
 - Unless otherwise specified, each cabinet shall include six (6) flash transfer relays.

- Flash transfer relays shall support Flashing Yellow Arrow for Permissive Left-turn Movements applications.

- g. Type II, III, IV, and V cabinets, when specified as housing for traffic actuated controllers, with two or more insulated terminal blocks mounted within the housing, one or more for terminating each field wire.
- h. A minimum of 12 available bare ground positions tied to AC Common Return.
- i. Earth (driven) ground tie point to terminate a single No. 4 AWG copper ground.
- j. A tie point to tie all ground systems within the cabinet to a single reference point. All grounds (AC - return, Chassis, and Logic Ground) must be referenced to a single ground point at the electric service.
- k. A panel (police subpanel) shall contain the following:
 - 1. A main power switch, which shall be wired to remove all cabinet power when in the Off position
 - 2. An Automatic Flash switch, which shall be wired as follows:
 - (a) The Flash position shall cause the cabinet to provide Flash Operation. The controller shall continue to operate, and Stop Time shall be applied to the controller.
 - (b) Auto/Manual switch to activate Manual Control Enable.
 - (c) Manual control pushbutton switch with self-coiling cord. Cord shall attach to a 2 position terminal strip via fork type connector
 - (d) Upon return from Flashing to Automatic, the controller shall initialize in the Start-Up Display condition as programmed in the controller, typically major road phases.
 - 3. A panel mounted inside the main door shall contain the following switches:
 - (a) A technician Stop-Time switch to apply Stop Time to each controller ring.
 - (b) An Interval Advance switch, enabled only by the Stop Time switch, to be momentary pushbutton switch to apply Interval advance to the timer.
 - (c) A Signal On-Off switch, which shall remove the AC power applied to the signal heads for normal operation while the controller continues to operate.
 - (d) Individual phase vehicle and pedestrian detector test switches to be miniature toggle of the On-Off Momentary type to place:
 - i. No Call - Call provided by detectors
 - ii. Locked detector call
 - iii. Momentary detector call

Insulate or shield switch terminals on back of main cabinet door so that no live parts are exposed.

Leads from the terminal block to the auxiliary door switches shall be no less than No. 18 AWG stranded, with TW plasticized polyvinyl chloride or nylon insulation enclosed in

an insulating loom, and shall be of sufficient length to allow full opening of the main cabinet door.

l.

The cabinet shall be wired with the appropriate number of load switches to accommodate vehicular and pedestrian phasing according to plans. At a minimum cabinets shall include 16 load switch bases. The load switch wiring shall support Flashing Yellow Arrow for Permissive Left-turn Movement applications.

m. All cabinet wiring shall be neatly routed and labeled, laced and permanently secured. All cable shall be secured to the panel, where practical. There shall be no holes drilled through the cabinet walls to mount panels or secure cables.

n. All terminals in the cabinet shall be of the barrier type. The following field connector terminals shall be provided:

- Four (4) signal output positions per load switch bay (R-Y-G-FL).
- Ten (10) positions per phase for vehicle loop detector harness.

- One position per phase for pedestrian detector inputs. o. Cabinets shall have SDLC communication between the controller, MMU, Detector Rack, Radar Detector (if applicable) and Video Detection (if applicable).

p. Cabinets should have an electrical outlet (Non GFI) that has 120 VAC from the OUTPUT side of the Main Power Surge unit.

q. Cabinets shall support Flashing Yellow Arrow for Permissive Left-turn Movements applications.

r. All cabinets shall be supplied with a Malfunction Management Unit (MMU) and shall meet at a minimum, the following requirement:

NEMA TS2 Malfunction Management Unit NEMA TS 2 2016

The manufacturer must supply certification of the conformance to the above requirements at the time of the bid.

According to NEMA TS2 the MMU shall be able to detect the presence of voltage on conflicting on conflicting field connection terminals, the absence of proper voltages on all the signal field connection terminals of a channel, and shall be capable of monitoring for the presence of satisfactory operating voltages within the Controller Unit (CU) and the MMU itself. The MMU shall be able to operate as a Type 16 with sixteen channels or as a Type 12 with twelve channels (compatible with NEMA TS1 cabinets).

The MMU should have an Ethernet port.

730.27 Auxiliary Equipment for Traffic Signal Controllers

Furnish and install the following auxiliary equipment in each cabinet for traffic actuated controllers.

A. Load Switches

Provide each cabinet complete, with the necessary number of NEMA load switches and Flash Transfer relays necessary to effect the specified signal sequence and phasing. Load switches shall:

1. Meet NEMA standards.
2. Have front-face mounted LED indicators to indicate the "On" condition of both the Input and Output circuits.

3. Use replaceable “cube” type circuitry or encapsulated discrete component construction. No unencapsulated discrete component construction are acceptable.

B. Time Clock Switches

Where shown on the Plans, provide time clock switches of solid state circuitry, continuous duty, with a 7-day cycle clock operating from the 120-volt AC service line. Provide switching for a minimum of one independent output and ensure the time of day selection is adjustable to within 1 minute of the desired time. Provide a battery backup system that can maintain time keeping and memory a minimum of 24 hours after power interruption. Furnish an omitting device as an integral part of the time switch to allow the switching operation to be skipped for any preselected day or days of the week. The time clock shall automatically compensate for daylight savings time changes. When the time clock is supplied as an internal component of the controller, supply the clock feature to provide for the selection of Maximum Green II on time of day, day of week, week of year basis. Time clocks shall meet NEMA environmental specifications.

When required in the traffic signal plans, the auxiliary equipment listed below shall meet the following requirements:

- A. Uninterruptable Power Supply (UPS) – An UPS shall power the traffic signal cabinet in the event of a power failure for a minimum of 3 hours.

UPS assemblies should include off-the-shelf deepcycle AGM batteries.

Loss of utility power, transfer from utility power to battery power, and transfer back to utility power must not interfere with normal operation of connected equipment. In the event of UPS failure or battery depletion, connected equipment must be energized automatically upon restoration of utility power.

Removal and replacement of the UPS must not disrupt the operation of the equipment being protected.

All harnesses necessary to connect and operate the system must be included. All connectors must be keyed to prevent improper connection.

UPS assemblies shall be installed in accordance with the manufacturer’s recommendations.

An UPS operation and maintenance manual shall be provided in the cabinet where the UPS is installed with cabinet wiring schematics, electrical interconnection drawings, parts layout and parts lists.

The UPS shall include a manufacturer’s warranty covering defects for a minimum of three years (5 years for the external batteries) from the date of final equipment acceptance. The warranty must include provisions for providing a replacement UPS within 10 calendar days of notification for any UPS found to be defective during the warranty period at no cost to the maintaining agency.

B. Communications - Wireless - consist of installing a Wireless Network Communications Link with all necessary hardware in accordance with the plans and standard drawings to provide a data link between field devices (i.e. Traffic Signal Controllers).

Each link shall consist of Master ODU (Out Door Unit, Antenna) connected to a data switch within one of the signal cabinets and a Slave ODU connected to a data switch within the other signal cabinet. Each ODU is aligned to face the opposing ODU. The cable length between the ODU and its associated data switch may not exceed 300 feet.

The Wireless Network Communications Link components at each of the linked traffic signal cabinets shall include an ODU, a LPU (Lightning Protection Unit), power supply mounting hardware, and CAT 5e cabling. The ODU is pole mounted per manufacturer’s specifications. The LPU and power supply are mounted within the traffic signal cabinet. CAT 5e cable is installed between the ODU and LPU.

For the applicable frequency spectrum of the radios being deployed, perform a spectrum analysis to ensure no competing equipment in the area. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. Typically, if the ODUs can be mounted with clear line of sight between them, this is sufficient to ensure proper operation. If this is not possible, it may be determined that a repeater station is necessary to complete the intended link. Provide the test results to the ENGINEER for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. The ENGINEER will approve final locations of the ODUs and any necessary repeater stations.

Install each ODU in such a manner that avoids conflicts with other utilities (separation distances in accordance with the guidelines of the NESC) and as specified in the ODU manufacturer's recommendations. Secure the ODU mounting hardware to the pole and route the CAT 5E cable such that no strain is placed on the RJ-45 connectors. Align each antenna/radio to be perpendicular to the ground (using bubble level) and to face the opposing radio.

C. Fiber optic cables - Multi-mode type fiber optic cable shall be 50 μ m core diameter, with at least 12 fibers per cable unless otherwise specified in the plans. Single-mode type cable shall be between 8-9 μ m core diameter, with at least 12 fibers per cable unless otherwise specified. A fiber optic drop cable shall be a minimum of 6 fibers (each type) and be spliced into the trunkline in a splice enclosure either aerially or in a pull box. 50ft. of slack shall be provided, either lashed to a span aerially, or coiled in a pull box for underground installations. Termination panels shall be provided with sufficient size to provide for a neat installation, and enough panel space to accommodate the specified number of fibers for termination. ST connectors shall be used unless otherwise specified. Any necessary jumpers shall be provided for installed equipment.

MISCELLANEOUS TRAFFIC SIGNALS

730.28A Flashing School Signals

When shown on the Plans, provide flashing school signals that conform to the following:

1. The signal shall produce two alternate flashing lights within the marginal limits of a school speed limit sign. Details of the sign construction shall be as shown on the Plans. Sign colors shall conform to the MUTCD and be constructed of materials complying with these specifications.
2. The two LED lenses shall be yellow in color and a minimum of 8 inches in diameter. The LED lenses shall be part of a weather-proof and water-tight optical unit. The LED lenses shall meet the same requirements for vehicular signal head LED lenses. Mount the lenses in the sign using a molded endless rubber gasket with the sign being mounted to the signal case.
3. Provide a two circuit type flasher unit to provide alternating equal on-off operation. The flashing mechanism shall produce between 50 and 60 flashes per minute through two 120-volt, 60-cycle AC, 15-ampere circuits. The flasher shall be of solid state construction.
4. Wire the unit for external circuits.
5. The signal shall be actuated by time switch meeting **730.27**. Locate the timing device in a remote mounted control cabinet.
6. Where an illuminated speed limit indication is shown on the Plans, the numeral message shall be illuminated in Portland Orange in a rectangular lens and illuminated only during the period when the signal produces two alternately flashing amber lights.

In addition, the Time Clock Unit/Switch used for Flashing School Signals shall be a programmable module that allows a user to define the time and day that the school speed zone flasher assembly will initiate and terminate flashing operation. The module shall be installed within the pole-mounted signal cabinet provided as part of project. The time clock shall be compatible with the cabinet's wiring relays and termination panels and the battery power supply system. The time clock switch provided shall also have the following features/capabilities outlined below:

1. Daylight Savings Time shall be a user-programmable setting, in addition to having automated compensation per TDOT specifications.
2. The unit shall provide a minimum 12-character, multi-line alpha-numeric LCD back-lit display capable of displaying all programming parameters.
3. The unit shall be capable of being programmed manually (using an integral keyboard pad) or programmed externally using an optional software program via a laptop computer and cable connection (compatible software program is a separate and distinct item from the time switch unit, and if required, will be separately specified and noted in list of estimated project quantities).
4. Unit shall provide automatic Leap Year compensation.
5. The time clock switch shall be capable of up to minimum 24-hours of capacitive back-up operation, 48 hours desirable, in the event of power interruption.
6. Unit shall be compatible with the supplied solar powered power system / battery unit
7. Time clock switch shall be capable of being programmed for one (1) Normal / Main program, and an additional minimum of 12 Exception periods /programs allowing holiday, vacation and custom skip plans. The exception programs will allow for the Normal / Main program to be skipped or allow for flasher operation on alternative schedules (i.e. early release days, summer school, etc).
8. Unit shall conform to TDOT standard specification subsection 730.27 – Auxiliary Equipment for Traffic Actuated Controller – Time Clock Switches except as superseded herein.
9. Unit shall have non-volatile program memory to allow retention during power loss.

730.28B-Solar Power Flashers. When required, the solar power flasher equipment listed below shall meet the following requirements:

1. Solar panel and mounting equipment shall be installed on cantilever pole shaft as illustrated on layout detail sheet and as directed by manufacturer instructions.
2. Solar power unit assembly shall include all required mounting equipment, wiring/cables, battery supply, battery charging unit and other ancillary equipment necessary to operate the solar panel and properly charge the battery. The photovoltaic array shall include mounting bracket assembly to permit adjustment of the array to optimal sun exposure. The photovoltaic module shall be mounted and aligned per manufacturer recommendations to maximize solar exposure.
3. Battery unit shall meet manufacturer specifications required to operate and power L.E.D. signal displays and continuous time clock switch operation. Battery shall be compatible with cabinet equipment, including the time clock switch and the flasher signal displays. Battery unit shall meet minimum environmental and performance specifications required for system operation as recommended by solar panel and time clock switch manufacturers.
4. Solar panel and battery supply shall be of a size and power rating necessary to provide required power to time switch clock and flasher signal displays. Obtain the power load requirements from the solar power equipment manufacturer and provide as required. On a typical school day, it should be expected that the flasher system will operate up to four (4) hours per day with the time clock continuously operating to maintain its clock timer. Provide a solar system sizing report from the manufacturer indicating the power supply requirements of the proposed system required to meet the expected power demand.

5. The photovoltaic modules shall be warranted for a minimum of five (5) years from date of installation.
6. The battery system shall be a gelled-electrolyte type battery with capacity to provide a minimum of five (5) days continuous operation of the flasher assembly without charging. Batteries shall be field replaceable. Batteries shall have prorated warranty of a minimum of five (5) years from date of installation.

730.28C Portable Traffic Signals

Portable Traffic Signals (PTS) consists of furnishing, installing and configuring a complete PTS system that may be used in construction zones or in other temporary signal locations. The work will be at various sites throughout the state of Tennessee and will consist of providing all labor, materials, equipment and incidentals necessary to make functional the PTS in accordance with these specifications.

The PTS shall be trailer or cart mounted units that provide for easy transportation and quick setup and deployment. There shall be 2 unit options and each unit shall be self-contained.

1. Type 1 units are typically used for long term projects (i.e. projects 5 days or longer in duration) and shall include 2 signal heads per trailer with an upper signal head mounted on an overhead mast arm that can be extended over the travel lane, and a lower signal head mounted on the vertical upright of the trailer.
2. Type 2 units are typically used for short term projects (i.e. projects 4 days or shorter in duration) and shall include 1 signal head that is mounted on the vertical upright of the trailer or cart. Cart-mounted units shall be successfully crash tested to NCHRP 350 TL-3, or equivalent MASH standards. If the project duration is extended beyond 4 days, then Type 1 units should be substituted in lieu of the Type 2 units for all PTS within the signal system.

The PTS shall be MUTCD Compliant and utilize standard ITE signal heads, and adhere to the ITE Specifications and Standards for Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement. The unit shall be solar powered and communicate via a wireless or hardwire connection. The unit shall include all the major components listed below or be able to perform the functions of these components. The major components of the unit shall include but are not limited to the trailer or cart, telescoping mast arm (on Type 1 units only), signal head(s) and back plates, traffic signal controller with operating software, solar charging system with batteries, input and output devices, flasher units, conflict monitor, relays, communications system and other equipment required for the safe operation and installation of the unit.

The PTS signal heads and all applicable components of the PTS shall meet the physical display and operational requirements of conventional traffic signals as specific in the MUTCD.

1. For Type 1 units, each unit shall contain 2 signal heads with an upper signal head mounted on an overhead mast arm that can be extended over the travel lane with a minimum clearance of 17 feet measured from the bottom of the signal head unit to the road surface. The lower signal head shall be mounted to the vertical upright of the trailer at a minimum height of 8 feet from the bottom of the signal head unit to the road surface. The signal heads shall also include black back plates that can be easily removed. The signal heads shall have the ability to be rotated 180 degrees to face in the opposite direction and shall have the ability to rotate and lock in approximately 10 degree increments to position the signal head for the optimum visibility to motorists.
2. For Type 2 units, the signal head of the unit shall be mounted to the vertical upright at a minimum height of 8 feet from the bottom of the signal head unit to the road surface. The signal head shall also include black back plate that can be easily removed. The PTS shall be easily rotated to position the signal head for optimum visibility to motorists.

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The PTS shall include a solid-state controller with operating temperature range of -40°F to +180°F and compliance with NEMA TS-5 Performance Standard. The controller or programming module shall have an easy to read front panel indicator display. The display shall be backlit and have the capability to facilitate programming and display the currently operating program for each vehicular approach. The controller shall be capable of operating the PTS system in a fixed time, traffic actuated, or manual control mode. Each PTS in a connected system shall have the capability to serve as either the master or slave signal. Each PTS shall include a Conflict Monitor Unit (CMU), or Malfunction Management System (MMS) to ensure phase conflicts do not exist during operation.

1. A minimum of 5 automatic time-of-day timing plans within a 24-hour period should be available in fixed time mode. The operating system should have the ability to control a minimum of 4 traffic phases with programmable cycle time adjustments and user adjustable red, amber, minimum green and maximum green times. The operating system shall also have the capability of facilitating standby modes of red, red flash and yellow flash.
2. The system shall also have the ability to operate in vehicle actuation mode when vehicle detection detectors are used. The operating system shall have the capability to allow the PTS to be connected to and controlled by a standard NEMA controller.
3. The system shall have the capability to be configured and controlled remotely using a handheld wireless remote control with the capability of being operated at a distance up to ¼ mile from the master.
4. The system shall have the capability of remote monitoring for reporting, at a minimum, signal location and status, battery voltage and system defaults. The remote monitoring shall have capability to alert designated individuals if a fault condition occurs.
5. The operating system shall include password protection to prevent unauthorized programming.

The PTS shall communicate with all other PTS within the signal system via license-free wireless 900 MHZ radio link communications. The radio units shall maintain communications at a minimum distance of 1 mile. The radio system shall conform to the applicable Federal Communications Commission (FCC) requirements, including FCC 90.17, and all applicable state and local requirements. The PTS shall be in direct communication at all times either by wireless or hardwire connection to provide for the required conflict monitor.

The system shall also have the ability to operate in vehicle actuation mode when vehicle detection detectors are used. For Type 1 units, the PTS detector shall be a high-definition, multi-beam, microwave radar stop bar detector for each vehicular approach. The Type 1 radar detector shall have a minimum range of 140 feet and shall be mounted at a minimum height of 17 feet measured from the top of the road surface. For Type 2 units, the PTS detector shall be a radar detector for each vehicular approach. The Type 2 radar detector shall have a minimum range of 140 feet and shall be mounted and have complete radar detection functionality at a minimum height of 8 feet measured from the top of the road surface.

The PTS shall be equipped with a solar power array, charging unit and battery system. For Type 1 units, the number and size of batteries shall be sufficient to operate the signal for a minimum of 21 days at 70 degrees without additional charging or assist from the solar array. An on-board battery charger shall be compatible with both the solar array and with a 120V AC power source. The solar panel array shall provide for a minimum of 440 watts of solar collection capability. For Type 2 units, the PTS shall have batteries sufficient to operate the signal for a minimum of 5 days at 70 degrees without additional charging or assist from a solar array. All instrumentation for the electrical system and battery compartment shall be mounted in a lockable weatherproof enclosure. Solar panels shall be secured to the mounting brackets for theft prevention. All wiring for the unit shall be protected against weather and damage.

The trailer or cart, and all mounted components, shall conform to the wind loading requirements (90 mph minimum) as described in the AASHTO Standard Specifications for Highway Signs, Luminaries and Traffic Signals. The wind load calculations shall be completed by an independent third-party contractor, and stamped by a U.S. Registered Professional Engineer. The trailer or cart shall be made of structural steel and shall include 4 leveling/stabilizer

jacks capable of lifting the trailer or cart a minimum of 6 inches. The trailer or cart shall be equipped with a hydraulic or electric lift system sufficient for 1 person to be able to raise and lower the vertical upright and/or horizontal mast arm to and from the operating position. For Type 1 or 2 units, the trailer or cart shall be equipped to provide legal and safe transport on the public highway system at speeds up to 55 mph. All exterior metal surfaces, except signal heads and back plates, shall be powder-coat painted highway safety orange.

The PTS work shall meet the following general contractor requirements:

1. Be responsible for locating the PTS in the appropriate location based on MUTCD and ITE standards for visibility to motorists and for safe operation.
2. Be responsible for providing all hardware, software, communications equipment and licenses to operate a complete PTS system.
3. Be responsible that all PTS equipment is installed according to the manufacturer's recommendations including wireless or hardwire connections.
4. Be responsible for transport, setup, configuration, operation and monitoring of the PTS throughout the entire project. The Engineer shall approve all timing and settings that are used for operation of the signal.
5. As directed by the Engineer, it may be necessary to relocate the PTS during the project. The cost of the relocation shall be included in the PTS price bid.

DETECTORS

730.29 Detectors

Provide detectors, of the type shown on the Plans, to actuate signal phases of traffic actuated controllers. Provide ample lightning protection to provide effective defense against high transient voltages caused by lightning discharges or from other sources. The lightning protection unit must withstand repeated 400-ampere surges on a 9 x 20 microsecond waveform. Also, the unit must be a two-stage device capable of clamping a minimum of one hundred 300-ampere surges to 25 volts within 40 nanoseconds for surge applied across the two detector leads.

A. Inductive Loop Detection System

Inductive loop detector units (loop amplifiers) shall meet at a minimum, the following requirement:

NEMA TS2 Inductive Loop Detector Units NEMA TS 2 2016

Loop amplifiers may be single or multi-channel and shall be of the totally self-contained type.

All loop amplifiers shall be of the type to provide both "Extended" and "Delayed" outputs.

The loop detector amplifier shall be full automatic, requiring no adjustments to effect operational ability other than setting of the operating frequency and sensitivity. The amplifier shall:

1. Sense any legal motor vehicle traveling at speeds up to 65 miles per hour.
2. Have both a "Pulse" and "Presence" Output:
 - a. Pulse output shall generate an output of 125 ± 25 millisecond output for each vehicle entry.
 - b. Presence output shall provide a continuous output for up to 60 minutes as long as a vehicle is within the detection zone.
3. Provide at least four user selectable sensitivity ranges.

4. Be supplied with at least three frequency ranges for crosstalk minimization.
5. Have a front-face mounted indicator to indicate active output of the internal relay. This indicator shall indicate the presence of:
 - a. Normal Output
 - b. Delayed Output
 - c. Extended Output
6. Have a front-panel mounted "Reset" switch that when pressed shall cause the unit to completely re-tune itself.
7. Have Delayed or Extended timing features with the following ranges:
 - a. Delayed output of 0 to 30 seconds in 1-second increments.
 - b. Extended output of 0 to 10 seconds in 1/4-second increments.
8. Have internal diagnostics to determine the operational ability of the loop. These diagnostics shall determine if a loop is opened or shorted, and shall provide a visible indication of such condition. Additionally, if such a condition occurs, the amplifier unit shall default to a "constant" output.
9. Provide output by a mechanical relay, which shall be "off" to provide an output.
10. Have all delay functions wired to the associated plan phase green to inhibit that function during controller phase green.
11. Be able to operate with loop lead-in lengths of at least 2,000 feet.

Comply with the details of the detector loop installation as shown on the Plans or Standard Drawings.

B. Video Detection System (VDS)— when specified in the plans, the equipment shall consist of all items necessary to provide a complete functional video detection system that process images and provide detection outputs to the traffic signal controller.

VDS shall be capable of NEMA TS2 operation.

VDS shall be waterproof and weather resistant.

VDS shall provide user-defined detection zone programming via a graphical user interface (GUI) and any necessary equipment for future programming. The configuration database shall have the ability to be stored on a removable data storage external to the video card.

VDS shall display programmable detection zones and detection activations overlaid on live video inputs. It shall detect vehicles in real time as they travel across each detection zone.

VDS shall have a minimum of 24 programmable detection zones per camera.

VDS shall be capable of:

1. shadow rejection without special hardware;
2. non-impaired operation under light intensity changes;
3. maintained operation during various weather conditions (e.g. rain, fog, snow)
4. anti-vibration, 5% rejection based on image change;
5. ability to select direction of flow parameters;
6. ability to properly detect directionally;
7. ability to configure presence, pulse, extend and delay outputs;
8. ability to set up a minimum of six detection zones per camera view to count the number of vehicles detected and store the information for retrieval;
9. variable focus providing a minimum of 4 to at least 40 degree horizontal field of view;
10. store detection zones in non-volatile memory;

VDS shall have no splices between the processors and the cameras.

VDS shall provide LED indicators to show active detection.

VDS camera shall have an internal heater to assure proper operation of the equipment during low temperatures.

VDS shall have surge ratings as set forth in NEMA specifications.

VDS shall have a two-year warranty and updates of all software shall be available without charge during the warranty period.

C. Radar Vehicle Detection System (RVDS) – when specified in the plans, the equipment shall consist of all items necessary to provide a complete functional RVDS that process high-definition, multi-beam radar electromagnetic waves and provide detection outputs to the traffic signal controller.

RVDS shall be capable of NEMA TS2 operation.

An RVDS shall consist of the following components: Radar sensor (1), detector rack interface module (1) power and surge protection panel or module (1) (cabinet interface devices that combine one or more of the above components shall be acceptable as well), and all associated equipment required to setup and operate in a field environment including software, serial and ethernet communication ports, cabling, electrical connectors and mounting hardware.

The RVDS shall be able to operate in all types of weather conditions including: rain, snow, sleet, ice, fog and windblown dust.

Lightning and surge protection will be provided for power connections and communications links to the radar RVDS.

The RVDS shall provide a “fail safe” operation that triggers when communication between the radar vehicle sensor and the interface module is broken. Contact closure from the interface module will occur on all programmed detector channels associated with the affected radar sensor when the fail safe is triggered and will remain in this state until communication is re-established between the interface module and the radar vehicle sensor.

The RVDS shall comply with all applicable Federal Communications Commission (FCC) requirements. The manufacturer will provide documentation of compliance with FCC specifications.

The RVDS shall maintain frequency stability without the use of manual tuning elements by the user.

The RVDS as a minimum must provide a minimum of 4 separate RF channels selectable by the user to avoid interference with other devices working on the same frequency.

The communication port(s) shall support a communication speed that will not introduce excessive latency between when a vehicle is detected and the contact closure in the traffic signal cabinet.

RVDS interface modules that utilize the detector rack must operate at 12V or 24V DC. Shelf mounted interface modules must operate within a range of 89V to 135V AC, 60 Hz single phase. Power to the RVDS radar sensor must be from the transient protected side of the AC power distribution system in the traffic control cabinet in which the RVDS is installed.

RVDS documentation shall include a comprehensive user guide as well as quick reference guide(s).

RVDS shall have the ability to configure presence, pulse, extend and delay outputs.

D. Wireless Magnetometer Detection System (WMDS) - when specified in the plans, the equipment shall consist of all items necessary to provide a complete functional wireless magnetometer detection system that process changes to earth magnetic field and provide detection outputs to the traffic signal controller.

WMDS shall be capable of NEMA TS2 operation.

The WMDS shall consist of the following components: In-pavement sensors, all wireless communication equipment needed to establish communication links to the controller cabinet, interface modules compatible with NEMA TS-2 V2.06b cabinet detector rack, surge protection for the WMDS and system software for set-up and monitoring of the WMDS.

The WMDS must be capable of detecting a variety of vehicle types including motorcycles, automobiles and large trucks. The system must allow the user to select sensitivity levels that adjust the amount of hysteresis to the magnetic field needed to achieve contact closure to the assigned detector channel. Magnetometer sensitivity level adjustments must allow for different levels of vehicle detection.

WMDS shall have the ability to configure presence, pulse, extend and delay outputs.

WMDS equipment failure such as: the sensor, communications link, access point radio, repeater radio (if used) or interface module, shall result in constant vehicle call “fault state” on the affected detector channel to the traffic controller.

WMDS detection accuracy must be comparable to properly operating inductive loops.

The WMDS shall provide real-time vehicle detection (within 150 milliseconds (ms) of vehicle arrival). Once detection is achieved by the sensor, the traffic controller must receive contact closure to the assigned detector channel within the 150 ms time frame.

The WMDS in-pavement sensor must operate on batteries without the need for underground power or communication cable connections to the unit.

The average operating life span of the sensor under battery power must be a minimum of 10 years.

The interface module must provide 2 or 4 detector channels. Sensors must be assignable to the available detector channels on the interface module using software provided with the WMDS.

The front face of the module shall identify detector channel 1 and detector channel 2. Each must use an LED to indicate contact closure on the channel. When vehicle detection is achieved, the LED will be on and contact closure applied to the detector channel. During periods of no vehicle detection the LEDs will be in an off state and no contact closure will be applied to the detector channel.

The interface module will use an LED indication to indicate a “fault state” with the WMDS. When the fault state is active contact closure will be applied to the appropriate detector channel.

E. Pedestrian Push Buttons

Where shown on the Plans, furnish and install pedestrian push buttons of substantial tamper-proof construction. They shall consist of a direct push type button and single momentary contact switch in a cast metal housing. Operating voltage for pedestrian push buttons shall not exceed 24 volts.

Provide a weatherproof assembly, constructed to prevent electrical shocks under any weather condition.

Where a pedestrian push button is attached to a pole, the housing shall be shaped to fit the curvature of the standard or post to which it is attached to provide a rigid installation.

Unless otherwise specified, install the push button and sign on the crosswalk side of the pole.

Pedestrian push buttons shall have a transient protection that meets NEMA specifications.

730.30 (Reserved)

730.31 (Reserved)

TRAFFIC SIGNAL SUPPORTS

730.32 Cantilever Signal Supports

This Subsection applies to the manufacture of steel poles and mast arms for the support of traffic signals. The height of poles, shaft dimensions and wall thickness shall meet the design requirements and mounting height of traffic signals as set forth in these Specifications and shown on the Plans. The Plans indicate bracket arm lengths.

Furnish poles consisting of a straight or uniformly tapered shaft, cylindrical or octagonal in cross-section, having a base welded to the lower end and complete with anchor bolts. All castings shall be clean and smooth with all details well defined and true to pattern. Steel castings shall conform to ASTM A27, Grade 65-35. Gray iron castings shall conform to ASTM A126, Class A.

All mast arms shall be compatible with the poles in material, strength, shape, and size.

A. Anchor Base

Secure an anchor base of one-piece cast steel or steel plate of adequate strength, shape, and size to the lower end of the shaft. Place the base so as to telescope the shaft, and weld at the top and bottom faces with continuous fillet welds so that the welded connection develops the full strength of the adjacent shaft section to resist bending action. Provide each base with a minimum of four holes to receive the anchor bolts. Provide cast steel bases with removable cast iron covers for anchor bolts and tapped holes for attaching covers with hex head cap screws.

Provide a welded frame handhole, 5 x 8 inches minimum and located with a clear distance above the base of no less than the pole diameter, "D". Weld a 1/2-inch 13 UNC grounding nut to the inside of the pole at a point readily accessible for wiring.

B. Shaft

Fabricate shafts from the best, hot-rolled basic open hearth steel. The shaft shall have only one longitudinal electrically welded joint and may have electrically welded intermediate transverse full penetration circumferential joints, at intervals of not less than 10 feet. The shaft shall be longitudinally cold-rolled to flatten the weld and increase the physical characteristics so that the metal will have a minimum yield strength of 48,000 pounds per square inch. Where transverse full penetration circumferential welds are used, the shaft fabricator shall furnish to the Engineer certification that: (1) all such welds have been radiographed and ultrasonically tested by an independent testing laboratory using a qualified Nondestructive Testing (NDT) technician and (2) the NDT equipment has been calibrated annually.

Fit the shaft with a removable pole cap, a J-hook wire support welded inside near the top, and a flange plate assembly to match that welded to the butt end of the mast arm.

C. Mast Arms

Provide mast arms fabricated and certified in the same manner as the upright shafts and that have the same physical characteristics.

The mast arms shall meet the design requirements necessary to support rigidly mounted traffic signals as shown on the Plans. All arms shall include a removable cap at the tip, grommets wire outlets, and signal hanger assemblies of the type and number shown on the Plans, and a flange plate welded to the butt end to provide a rigid connection to the mast. The assembly shall be constructed so that all wiring can be concealed internally.

Connect mast arms to the upright pole at a height necessary to provide a minimum clearance of 16 feet 6 inches and a maximum clearance of 19 feet under the traffic signal heads. Install separate signal heads to provide the same clearance.

D. Finish

Galvanize steel poles, mast arms, and hardware in accordance with ASTM A123.

Galvanize all steel and cast iron components, hardware, and threaded fasteners, except anchor bolts, after fabrication in accordance with ASTM A123, or A153 or A385, as applicable.

730.33 Steel Strain Poles

Provide steel strain poles consisting of a uniformly tapered or equivalent upright shaft fitted with a removable pole top, J-hook wire support and 45-degree wire inlet near the top, a span wire clamp, a 5 x 8 inch handhole with reinforced frame and cover, bent anchor bolts, and all other accessories needed to make a complete installation. The pole and all of its component parts shall be designed to support tethered traffic signals of the type and number

shown on the Plans, suspended from a span wire assembly. Fabricate and certify the poles as specified for the upright shafts in **730.32**.

Determine the shaft length required to meet field conditions and vertical clearances of signal heads over the roadway. The signal head clearance shall be a minimum of 16 feet 6 inches and a maximum of 19 feet. Fasten the span wire no closer than 1 foot 6 inches from the top of the pole.

Unless otherwise specified, provide all strain pole traffic signal supports with a one-piece anchor type base, fabricated from drop forged or cast steel of sufficient cross-section to fully develop the ultimate strength of the poles. Fasten the base to the pole with a welded connection that develops the full strength of the pole. Provide the base with a minimum of four holes of sufficient size to accommodate the proper size anchor bolts that are capable of resisting at yield strength stress, the bending moment of the shaft at its yield strength stress. Provide removable cast iron covers for the anchor bolts.

The shaft shall be fabricated from material providing a minimum yield strength of 48,000 pounds per square inch after fabrication.

Galvanize the steel poles and hardware in accordance with ASTM A123.

Galvanize all steel and cast iron components, hardware, and threaded fasteners, except anchor bolts, after fabrication in accordance with ASTM A123, or A153 or A385, as applicable.

730.34 Pedestal Support Signal Poles

Provide pedestal poles consisting of one upright pole with suitable base and other accessories or hardware as required to make a complete installation.

All poles shall be made of one continuous piece from top of base connection for the entire height of the pole. The cross-section shall be either cylindrical or octagonal and may or may not be uniformly tapered from butt to tip.

The cross-section at the tip shall have a 4-1/2 inch outside diameter.

A. Type "A" Pedestal (Aluminum)

Pedestals shall be of uniform octagonal or cylindrical cross-section of the tubular tapered type fabricated of one full length sheet.

Bases shall be octagonal or square in shape, of the ornamental type fabricated of cast material. Provide a handhole in each base.

Caps shall be of the nipple or tenon type mounting fabricated of cast material.

Furnish bases with four steel anchor bolts of sufficient size and length to securely anchor the base to the concrete footing. Weld the shaft to the cast metal base. Refer to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (current edition).

Type A pedestal shaft shall be fabricated from aluminum tubing 6063-T4 heat treated to T-6 temper after fabrication, and meeting ASTM B221.

Type A anchor base shall be made of sand-cast aluminum alloy 356-T6 meeting ASTM B26 - SF 70A-T5 specifications.

B. Type "B" Pedestal (Steel)

Pedestals shall be fabricated from a 4-1/2 inch (outside diameter) seamless steel pipe.

Bases shall be octagonal in shape of the ornamental type fabricated of cast or malleable iron and shall have minimum height of 12 inches. The top opening of the base shall be threaded to receive the shaft. Provide a handhole in each base.

Furnish bases with four steel anchor bolts of sufficient length to securely anchor the base to the concrete footing.

730.35 Wooden Pole Signal Supports

A. General

Provide wooden poles of the class and length shown on the Plans and that meet **917.11**. Set poles to the depth shown on the Plans, and fit them with all the necessary hardware to make the installation complete.

The signal head clearance shall be 16 feet 6 inches minimum and 19 feet maximum. Fasten the span wire at least 2 feet below the top of the pole.

B. Guying Components

Guy clamps shall be steel, 3-bolt type, 6 inches in length, and of the proper strand size to fit the wire used. The clamp bolts shall have upset shoulders fitting into the clamp plate. Substitution of the cable grip is subject to the Engineer's approval.

Attach guy wire to the pole with a 5/8-inch diameter x 12-inch length single strand angle-type eye bolt with 2 x 2 inch square cut washers, lock washer, and square nut.

Instead of the eye bolt specified above, an angle single strand eye of drop forged steel may be used, fastened on threaded end of span wire eye bolt.

Sidewalk guy fittings shall consist of 2-inch inside diameter standard galvanized steel pipe of required length with malleable iron pole plate and guy clamp. Fasten the pole plate to the pole with a 3/8-inch thru bolt and 1/2-inch lag screws.

All guying components and hardware shall be galvanized in accordance with ASTM A123 or A153.

Anchors for guys shall be of the pressed steel four-way expanding fluke type or of the steel or malleable iron sliding plate type. The minimum unexpanded diameter shall be 8 inches, and the minimum expanded area shall be 110 square feet. Coat anchors with a black asphaltic paint.

Guy anchor rods shall be drop-forged steel, 3/4-inch diameter and 7-foot minimum length, threaded, of the single thimble eye type, with a square anchor bolt nut.

730.36 Pole Location

Install all signal support poles at the locations shown on the Plans or where directed by the Engineer.

COMPENSATION

730.37 Method of Measurement

Measurement for traffic signals will be on a per item basis for each item to be furnished and installed, as specified herein and shown on the Plans.

With regard to items for signal head assemblies, each item to be furnished, installed, or both furnished and installed shall be distinguished with a code number as follows:

1. The first digit is the number of faces per assembly.
2. The second digit will indicate the number of 12-inch lenses per assembly (including arrow lenses).
3. The third digit is the quantity of 8-inch lenses per assembly.
4. The letter "A" indicates an arrow lens and the digit following the "A" indicates the number of 12-inch arrow lenses per assembly.
5. The letter "H" or "V" indicates the arrangement of arrow signal lenses to be horizontal or vertical with respect to solid ball indications.

EXAMPLE:

1 5 0 A 2 H

Digits indicate the following:

1 = one face

5 = five 12-inch lenses

0 = zero 8-inch lenses

A2 = two 12-inch arrow lenses

H = Arrow lenses placed horizontally with respect to circular indications

A. Removal of Signal Equipment

The Department will measure items of equipment or material designated or required for removal on a per each intersection basis. Removal and salvage of all signal heads, poles, control equipment, cabinets, span wire, cable, and similar features to be performed at an intersection shall be included as a unit cost per each intersection. This includes the cost of stockpiling salvable equipment for pick-up by the appropriate agency, as noted in the Plans.

Signal Head Assembly (includes Pedestrian Signal Heads)

The Department will measure signal heads of the type shown on the Plans by the individual assembly complete in place, per each. This item shall include the signal heads, terminals, lamps, attachment hardware, cable connection, and testing.

Pull Box

The Department will measure each pull box of the type required as one complete unit, installed, per each. This item includes the pull box, excavation, backfilling, crushed stone base, and other incidental items as called for in the Plans or Standard Drawings.

Electrical Service Connection

The Department will measure Electrical Service Connections on a per each signal installation basis. This item includes the electrical service supplied to the weatherhead by the local utility, all necessary materials and labor for connection of the electrical service from the controller to the weatherhead, the wiring of the controller and detectors, and all incidentals necessary to render a complete and operable system.

Signal Cable

The Department will measure the length of Signal Cable of each size (number of conductors) installed in linear feet to the nearest foot from point to point along the routing for each cable.

The Department will make horizontal measurements by center to center measurement from:

1. Pole to pole
2. Pole to signal head (when terminating in a signal head)
3. Pull box to pull box
4. Pull box to pole
5. Pull box to pole-mounted or base-mounted controller

For cable inside mastarms, the Department will measure from center of vertical support to signal head where cable terminates.

The Department will make vertical measurement by one of the following:

1. For cable inside poles or conduit risers, the distance from ground level to the point of attachment of the span wire.
2. For cable inside mast arm supports, the distance from ground level to the mast arm connection.
3. For cable to pole-mounted controller,
 - a. From ground level to bottom of controller.
 - b. From bottom of controller to point of attachment of span wire.
4. For cable to pole-mounted signal head or pushbutton,
 - a. From ground level to bottom of signal head or pushbutton
 - b. From bottom of signal head or pushbutton to point of attachment of span wire.

The Department will make no additional allowance for slack length, length inside equipment or supports (except as noted), length for the required 360-degree drip loop, and similar instances requiring additional length of cable.

Span Wire

The Department will measure Span Wire Assembly, Tether Wire Assembly, and Messenger Cable by type in linear feet to the nearest foot. The measurement will be made from center to center of poles. These items include attachment hardware, strain insulators, and other hardware shown in the Plans as part of the assembly. The Department will make no additional allowance for slack length and other instances requiring additional length of wire.

Steel Conduit Riser Assembly

The Department will measure conduit riser assemblies per each for each size conduit riser installed on the outside of a pole, as shown on the Plans. This item includes conduit, weatherhead, conduit, fittings, nuts, washers, banding, clamps, grounding, and other items necessary for installation.

Conduit

The Department will measure conduit in linear feet to the nearest foot for each size and type of conduit installed.

The Department will measure underground conduit along the conduit by one of the following:

1. From the face of curb to the center of a pull box, pole or controller foundation,
2. From center to center of pull boxes,
3. From center to center of a pull box and a pole or controller foundation, or
4. From center to center of pole foundations or pole foundation and controller foundation.

The Department will add:

1. 1 foot to the above measurements for each entry to a pull box or pole foundation and each exit of a pull box or pole foundation.
2. 3 feet to the measurement for each capped extra entry (conduit stub) or exit to a pull box or pole foundation installed, as shown on the Plans.
3. 3 feet to the measurement for each connection between underground conduit and above ground riser.
4. 3 feet to the measurement for each entry or exit to a foundation for a base-mounted controller.

This item includes trenching, backfilling, sealing, capping, fittings, bushings, banding, grounding, and other accessories and hardware required for installation of the conduit system.

Vehicle Loop Detector (Amplifier)

The Department will measure vehicle detector loop amplifier per each unit, including the cable and associated hardware necessary to electrically connect the amplifier to the controller and loop lead in.

The Department will measure two and four channel card rack type amplifiers per each unit, including the cable, card rack(s), and associated hardware necessary to electrically connect the amplifiers to the controller and loop lead-ins.

Shielded Detector Cable

The Department will measure the two-conductor shielded detector cable installed between the controller cabinet and the loop detector wires in linear feet to the nearest foot.

The Department will make horizontal measurements (overhead and underground) by one of the following:

1. From center to center of pull boxes,
2. From center to center of pull box and pole,
3. From center to center of poles, or
4. From center to center of pull box or pole and controller foundation.

The Department will make vertical measurements by one of the following:

1. From ground level to the point of attachment of span wire, inside pole or conduit riser,
2. From the bottom of controller cabinet to the point of attachment of span wire, or
3. From ground level to the bottom of controller.

The Department will make no additional allowance for slack length, length inside equipment or supports (except as noted), splices, and similar instances requiring additional length of cable.

Saw Slot

The Department will measure the length of saw slot for installation of detection loop and lead wiring in linear feet to the nearest foot. Measurement for detection loops in the traffic lanes will be made based on the loop size shown on the Plans (the nominal length plus the nominal width) times 2. The Department will make no additional allowance for saw overruns to obtain full depth of saw slot or diagonal cuts to prevent sharp bends in the loop wire. The Department will measure saw slot for detection loop leads from the conduit entry at the face of curb or edge of pavement and along the route of the lead-in to the detection loop.

This item includes backing rods, or polyethylene foam sealant, loop sealant, and all other incidentals necessary to render a complete and operable system.

Loop Wire

The Department will measure the length of loop wire for installation of detection loops and lead-ins in linear feet to the nearest foot. Measurement will be made from the pull box or pole to the detection loop, around the loop the required number of turns and back to the pull box, pole, or point of splice. The Department will make no additional allowance for slack length, length inside equipment or supports, splices, and similar instances requiring additional length of wire.

This item includes electrical connections, testing, and all other incidentals necessary to render a complete and operable system.

Controller

The Department will measure controllers as one complete unit, installed, per each. This item includes all auxiliary equipment shown the Plans to provide signalization control as shown on the Plans, and all hardware, including the cabinet (and cabinet foundation, if base-mounted), necessary for installation.

Wood Pole

The Department will measure Wood Poles, of the type and size shown on the Plans, per each, installed.

Guying Device

The Department will measure Guying Devices, of the type shown on the Plans, per each, installed. This item includes the guy wire, anchor, clamps, and all other components shown on the Plans necessary for installation.

Steel Strain Pole

The Department will measure Steel Strain Poles of the type and size shown on the Plans, per each, installed. This item includes the pole, foundation, anchor bolts, grounding, and all other hardware shown on the Plans necessary for a complete installation.

Cantilever Signal Support

The Department will measure Cantilever Signal Supports, of the type and size shown on the Plans, per each, installed. This item includes the vertical pole shaft, mast arm, foundation, anchor bolts, grounding, and all other hardware shown on the Plans necessary for a complete installation.

Service Cable

The Department will measure two conductor power service cable, of the type and size shown on the Plans, in linear feet to the nearest foot, installed. Horizontal runs will be measured center to center of poles. Vertical runs will be measured from the ground to the weatherhead inside a pole or conduit riser, or from the ground to the bottom of the controller, or from the bottom of the controller to the weatherhead. This item includes all necessary attachment hardware. The Department will make no additional allowance for slack length or other instances requiring additional length of cable.

Pedestrian Pushbutton with Sign

The Department will measure Pedestrian Pushbutton with Sign as one complete unit, in place, per each. This item includes the pushbutton, sign, mounting hardware, wiring of pushbutton, testing, and all other incidentals necessary for a complete installation.

Pedestrian Signal Display with Pushbutton and Sign

The Department will measure Pedestrian Signal Display with Pushbutton and Sign as one complete unit, in place, per each. This item includes the signal heads, terminals, lamps, cable connections, pushbutton, sign, all attachment hardware, testing, and other incidentals necessary for a complete installation.

Portable Traffic Signal

The Department will measure Portable Traffic Signal, of the type shown on the Plans or as directed by the Engineer, per each, installed. This item includes the all of the software and hardware necessary for a complete installation.

730.38 Basis of Payment

The Department will pay for accepted quantities, complete in place, at the contract prices as follows:

<i>Item</i>	<i>Pay Unit</i>
Traffic Signal	Lump Sum
Removal of Signal Equipment	Each
Signal Head Assembly (Description)	Each
Install Pull Box (Description)	Each
Electrical Service Connection	Each
Signal Cable – (Description)	Linear Feet
Span Wire Assembly (___ pounds min. break strength)	Linear Feet
Tether Wire Assembly – ___ " Diameter	Linear Feet
Messenger Cable – ___ " Diameter	Linear Feet
Riser Assembly (Description)	Each
Conduit ___ " Diameter (Type)	Linear Feet
Vehicle Detector (Description)	Each
Shielded Detector Cable	Linear Feet
Saw Slot	Linear Feet
Loop Wire	Linear Feet
Controller (Description)	Each
Wood Pole (Description)	Each
Guying Device (Description)	Each
Steel Strain Pole (Description)	Each
Cantilever Signal Support (Description)	Each
Service Cable	Linear Feet
Pedestrian Pushbutton with Sign	Each
Pedestrian Signal Display with Pushbutton and Sign	Each
Portable Traffic Signal (Type)	Each

The unit price to be paid includes the cost of furnishing and installing, complete in place, each of the various types of equipment required by the Summary of Quantities shown on the Plans. Total payment is full compensation for all materials, labor, equipment, and incidentals necessary to produce a completely operative and finished installation of a traffic signal or traffic signal system as shown on the Plans and as specified herein, including restoration of pavements, sidewalks, and appurtenances damaged or destroyed during construction and tests. All additional materials and labor not specifically shown or called for, which are necessary to complete the traffic signal installation or traffic signal system described, will be considered incidental to the system and no additional allowance will be made.

Subsection 730.32.A. (pg. 868), 6-27-16; revise the last paragraph of subsection 730.32 A.:

“Provide a welded frame handhole, 5 x 8 inches minimum and located with a clear distance above the base of no less than the pole diameter, “D”.”

STATE

(Rev. 5-18-15)
 (Rev. 11-16-15)
 (Rev. 6-27-16)
 (Rev. 12-2-16)
 (Rev. 5-15-17)
 (Rev. 11-6-17)
 (Rev. 5-14-18)
 (Rev. 10-8-18)

OF**TENNESSEE**

January 1, 2015

Supplemental Specifications - Section 900**of the****Standard Specifications for Road and Bridge Construction****January 1, 2015**

Subsection 901.01 (pg. 918), 5-14-18; Add the following sentence as the second paragraph of the subsection:

Provide hydraulic cement, selected from the Department's QPL, which conforms to the following for the kind and type specified or allowed:

Portland cement.....AASHTO M 85
 Portland blast-furnace slag cement (Type IS) AASHTO M 240
 Portland-pozzolan cement (Type IP).....AASHTO M 240
 Portland-limestone cement (Type IL)AASHTO M 240

The maximum allowable equivalent alkalies is 0.60% for all cements and blended cements used in concrete riding surfaces with aggregates meeting the requirements of 903.24. This includes Class CP, A Paving, and DS concrete mixtures.

Subsection 903.01 - Table 903.01-1 (pg. 920), 5-18-15; Replace Note (1) with the following:

“(1) If the fine aggregate is manufactured from crushed stone and if material finer than the No. 200 sieve consists of the dust of fracture, essentially free from clay or shale, this limit may be increased to 5%.

Subsection 903.01 - Table 903.01-1, Table 903.01-2 (pg. 921), 5-15-17; replace Tables 903.01-1 and 903.01-2 with the following Tables:

Table 903.01-1: Limits of Deleterious Substances in Fine Aggregate for Concrete

Substance	Maximum Permissible Limits Percent by Weight
Clay Lumps	0.5
Coal and Lignite	0.5
Material Passing the No. 200 Sieve ⁽¹⁾⁽³⁾	3.0
Other deleterious substances (such as shale, alkali, mica, coated/grains, soft and flaky particles) ⁽¹⁾⁽²⁾	3.0
⁽¹⁾ If the fine aggregate is manufactured from crushed stone and if material finer than the No. 200 sieve consists of the dust of fracture, essentially free from clay or shale, this limit may be increased to 10%. ⁽²⁾ Determine other organic impurities according to AASHTO T 267. ⁽³⁾ If the fine aggregate is manufactured from crushed gravel and if material finer than the No. 200 sieve consists of the dust of fracture, essentially free from clay or shale, this limit may be increased to 3.5%.	

Table 903.01-2: Gradation Requirements for Fine Aggregate

Sieve Size	Total Percent Passing by Weight
3/8 inch	100
No. 4	95-100
No. 16	50-90
No. 50	5-35
No. 100	0-20
No. 200 ⁽¹⁾	0-3
⁽¹⁾ If the fine aggregate is manufactured from crushed stone and if material finer than the No. 200 sieve consists of the dust of fracture, essentially free from clay or shale, this limit may be increased to 10%.	

Subsection 903.03 (pg. 922) 5-15-17; Coarse Aggregate for Concrete, add the following as the 4th paragraph:

“Coarse aggregate in two-lift composite pavements shall consist of Size No. 467 in the lower lift, graded as specified in 903.22. Coarse aggregate in the upper lift shall be Size No. 57 or 67 graded as specified in 903.22 and shall meet 903.24 riding surface requirements.”

Subsection 903.03 (pg. 922-923) 11-16-15; Coarse Aggregate for Concrete, modify the 4th and 5th paragraphs, update Table 903.03-1: Coarse Aggregate Sizes to the following:

“Coarse aggregate in Portland cement concrete bridge decks and overlays on interstates and four or more lane highways consisting of Size No. 57 shall meet 903.24.

The coarse aggregates for travel lanes and bridge decks shall be crushed and consist of stone, slag, gravel, quartzite, gneiss, or combination thereof with an absorption of plus 4 material not to exceed 5%. Do not use uncrushed gravel, pea gravel, or any other uncrushed particles. Crushed gravel, if used, shall consist of siliceous washed particles after processing, of which at least 70% by count of the material retained on the No. 4 sieve contains a minimum of two fractured faces. One face shall be fractured for the approximate average diameter or thickness of the particle.”

Table 903.03-1

Application	Coarse Aggregate Size ⁽¹⁾
Structural concrete	No. 57
Self-Consolidating concrete	Maximum-No.67
Prestressed concrete	No. 57 or 67
Precast concrete	Any size fraction
Concrete curbing placed by machine-extrusion methods	No. 7, 57, 67, or 78
Cement treated permeable base (2)	No. 57
(1) Gradation shall conform to 903.22 .	
(2) Aggregate shall meet the quality requirements specified below.	

Subsection 903.03-2 (pg. 924) 5-15-17; Revise Table 903.03-2: Limits of Deleterious Substances in Coarse Aggregate for Concrete, update Material passing No. 200 Sieve and Footnote 2:

Table 903.03-2: Limits of Deleterious Substances in Coarse Aggregate for Concrete

Substance	Maximum Percent by Weight
Soft or non-durable fragments (fragments that are structurally weak such as shale, soft sandstone, limonite concretions, gypsum, weathered schist, or cemented gravel), and organic impurities as determined by AASHTO T 267 ⁽¹⁾	3
Coal and lignite ⁽¹⁾	1
Clay lumps ⁽¹⁾	0.25
Material passing the No. 200 sieve ⁽¹⁾⁽²⁾	1.5
Thin or elongated pieces (length greater than 5 times average thickness)	10
Other local deleterious substances ⁽¹⁾	1
⁽¹⁾ The sum of the percentages of these materials (i.e., soft or non-durable fragments, coal and lignite, clay lumps, material passing the No. 200 sieve, and other local deleterious substances) shall not exceed 5.0.	
⁽²⁾ For crushed aggregate, if all the material finer than the No. 200 sieve, as determined in accordance with AASHTO T 11, consists of the dust of fracture, essentially free of clay or shale, this limit may be increased to 2.0.	

Subsection 903.05 – B. Type B Aggregate (pg. 927), 5-18-15; Replace the 1st paragraph of subsection 3. With the following:

- “3. Do not use material having clay content greater than 12%, as determined by hydrometer analysis performed in accordance with AASHTO T 88. Material may be used having a clay content exceeding 12% if a plasticity index-fines product does not exceed 3 when calculated by the following formula”

Subsection 903.05 – Aggregate for Mineral Aggregate Base and Surface Courses (pg. 928) 5-15-17; add section C to the bottom:

C. Reclaimed Concrete Aggregate. Provide material comprised of concrete reclaimed from the demolition of a concrete structure or pavement. Reclaimed Concrete Aggregate may only be used as a mineral aggregate base course, subbase or shoulder course. The material shall be free of any materials classified as Solid or Hazardous Waste, especially asbestos, lead and mercury, with test results submitted by the contractor to the Project Supervisor. These test results shall be certified and notarized. The percentage of wear as determined in accordance with AASHTO T 96 shall not exceed 50. Deleterious substances shall be kept to a minimum, and may not be higher than the amounts listed on Table 903.05-3.

Table 903.05-3: Deleterious Materials

Material	Maximum Permissible Limits Percent by Weight
Brick	5
Bituminous Concrete Materials	5
Weathered Rock	2
Wood	0.1
Metals	0.1

The gradations of the coarse and fine fractions of aggregate shall be such that, when combined in proper proportions, the resultant mixture will fall within the grading specified in Table 903.05-4.

Table 903.05-4: RCA Grading Tolerances

Sieve Size	Total Percent Passing per Weight
1 ½ inch	100
1 inch	85-100
¾ inch	60-95
3/8 inch	50-80
No. 4	40-65
No. 16	20-40
No. 100	5-18

Subsection 903.05 – Aggregate for Mineral Aggregate Base and Surface Courses (pg. 925) 5-15-17; add reference to subsection **903.05 C.** in the second paragraph of subsection A.:

“903.05 Aggregate for Mineral Aggregate Base and Surface Courses

Provide crushed stone, crushed slag, crushed or uncrushed gravel, or crushed or uncrushed chert that may be blended with crushed recycled concrete or screened reclaimed asphalt pavement (RAP), together with material such as manufactured sand or other fine materials that are either naturally contained or added as needed to conform to these Specifications.

Provide aggregate of Types A and B, as specified below.

A. Type A Aggregate

Provide hard, durable particles or fragments of stone, slag, gravel, or chert, and other finely divided mineral matter.

The Contractor may use recycled concrete aggregate per 903.05 C. or reclaimed asphalt pavement, at a maximum rate of 25% by weight, for Type A aggregate, provided the combined aggregate blend meets all the requirements specified below. Crush and screen the recycled concrete and asphalt to produce a uniform stockpile before blending it with the virgin material. Keep the recycled stockpiles free of bricks, steel, wood, and all other deleterious materials. “

Subsection 903.05 – Aggregate for Mineral Aggregate Base and Surface Courses (pg. 925-926) 5-15-17; add reference to subsection **903.05 C.** in the second paragraph of subsection B.:

“For Provide crushed or uncrushed gravel, crushed or uncrushed chert, crushed stone or crushed slag, and other finely divided particles.

The Contractor may use recycled concrete aggregate per 903.05 C. or reclaimed asphalt pavement, at a maximum rate of 30% by weight, for Type B aggregate, provided the combined aggregate blend meets all the requirements specified below. Crush and screen recycled concrete and asphalt to produce a uniform stockpile before blending it with the virgin material. Keep the recycled stockpiles free of bricks, steel, wood, and all other deleterious materials.”

Subsection 903.06 - C. Combined Aggregate Grading (pg. 930) 11-16-15; add the following sentence at the end of the first paragraph:

“For mixtures including recycled asphalt pavement, RAP, and/or recycled asphalt shingles, RAS, stockpiles will not be considered as contributing to the required minimum of three stockpile sizes.”

Subsection 903.11 - Aggregate for Asphaltic Concrete Surface Coarses (Hot Mix) (pg. 934) 11-16-15; add the following sentence at the end of the first paragraph:

“For mixtures including recycled asphalt pavement, RAP, and/or recycled asphalt shingles, RAS, stockpiles will not be considered as contributing to the required minimum of three stockpile sizes.”

Subsection 903.11 (pg. 934) 11-16-15; A. Coarse Aggregate (retained on a No. 4 sieve), revise the 1st paragraph and subsection 3:

“Provide aggregate, consisting of crushed stone, crushed slag, crushed gravel, crushed granite, crushed quartzite, crushed gneiss, or natural combinations of these materials.”,

“3. Combined aggregate shall consist of siliceous particles processed from washed material, of which at least 70% by count of the material retained on the No. 4 sieve shall have a minimum of two fractured faces, one of which must be fractured for the approximate average diameter or thickness of the particle. Do not add pea gravel or uncrushed particles. The absorption of the crushed aggregate retained on the No. 4 sieve shall not exceed 5% when tested in accordance with AASHTO T 85.”

Subsection 903.11 - A. Coarse Aggregate (retained on a No. 4 sieve) (pg. 934), 5-18-15; revise subsection 2. as follows:

“2. Material retained on the No. 4 sieve shall contain a maximum of 10% elongated pieces (length greater than five times the average thickness)”

Subsection 903.11 C. Combined Aggregate Grading (pg. 936) 10-8-18; Table 903.11-2 Revise Table to add TLE information:

**Table 903.11-2: Asphalt Concrete Surface Course Mixture Designation
Design Range of Gradations**

Sieve Size	Total Percent Passing by Weight				
	Grading D	Grading E	Grading TL	Grading TLD/ <u>TLE</u>	Grading OGFC
3/4 inch	--	--	--	--	100
5/8 inch	100	100	--	--	--
1/2 inch	95-100	95-100	100	100	85-100
3/8 inch	80-93	80-93	100	90-100	55-75
No. 4	54-76	54-76	89-94	54-76	10-25
No. 8	35-57	35-57	53-77	35-57	5-10
No. 30	17-29	17-29	23-42	17-33	--
No. 50	10-18	10-18	--	10-18	--
No. 100	3-10	3-11	9-18	3-10	--
No. 200	0-6.5	0-8	6-14	4-7	2-4

Subsection 903.11 C. 2. (pg. 937) Grading E, add TLE to the title:

“Grading E and TLE. When using Grading E as a surface for traffic lanes, 50% to 80% of the mineral aggregate shall be composed of crushed limestone, and the remaining 50% to 20% shall be natural sand, slag sand, sand manufactured from gravel or other approved non-skid aggregates, or any combination of these materials, with the following exceptions:

The sand percentage on the Job Mix Formula (JMF) shall range from 20% to 50%. However, if needed to meet or improve the specified design criteria, the Contractor may alter the limestone and sand percentage by 5% from the percentage shown on the original JMF. If altering the aggregate percentages shown on the original JMF, submit a revision of the original design showing the altered percentages of aggregate.

b. When using Grading E for surfacing of shoulders or other non-traffic lane construction, the mineral aggregate may be composed entirely of limestone, including Size No. 10 (screenings) and manufactured sand, but in no case shall the mineral aggregate for this construction consist of less than 50% limestone.

c. Recycled Asphalt Pavement (RAP) milled from Department or other State Highway Agency projects shall be assumed to contain 75% non-skid material.”

Subsection 903.11 C.3. (pg. 938), 6-27-16; revise the 1st paragraph of subsection C.3 to the following:

“3. Grading OGFC. A minimum of 75% of the aggregate shall meet the requirements specified in 903.24 for Surface Mixtures (Non-Skid Aggregates). The coarse aggregate shall have at least 90% crushed aggregate with two fractured faces and 100% with one fractured face as determined in accordance with ASTM D5821. The coarse aggregate shall have a LA Abrasion value of less than 40% and a maximum absorption of 3.0%.”

Subsection 903.11 (pg. 938), 12-2-16; Add the following to C. as subsection 5.:

“5. Grading C, CS, CW. The mixture shall meet all requirements of **903.06**. When using Grading C, CS, or CW as a final riding surface for traffic lanes and the design ADT is greater than 1000, a minimum of 75% of the aggregate shall meet the requirements specified in **903.24** for Surface Mixtures (Polish-Resistant Aggregate) for the appropriate levels.”

Subsection 903.12 (pg. 938) 11-16-15; A. Aggregate for Slurry Seal, revise the 1st paragraph a A. as shown; delete the 2nd paragraph:

“The aggregate shall be crushed slag, crushed granite, or crushed stone (crushed stone as specified in 903.24), meeting the requirements of ASTM D692, except the gradation shall be as specified in Table 903.12-1. The aggregate shall have a minimum sand equivalent, as determined in accordance with AASHTO T 176, of 45.

Subsection 903.12 (pg. 939) 11-16-15; B. Aggregate for Micro-Surface: modify the first paragraph, delete the second paragraph:

“The aggregate shall be crushed slag, crushed granite, or crushed stone (crushed stone as specified in **903.24**) meeting the gradation limits specified in Table 903.12-2 and the physical properties of ASTM D692, except the percent of fractured pieces shall be 100. The aggregate shall have a minimum sand equivalent, as determined in accordance with AASHTO T 176, of 65. Polish-resistant aggregates will not be required for leveling courses, provided they will be covered with riding surface mixtures.

Subsection 903.12 (pg. 939) 5-15-17; B. Aggregate for Micro-Surface: Add the following as the 2nd paragraph:

“If blending aggregates from more than one source, use automated proportioning and blending equipment which has individual bins for each aggregate source used to produce a stockpile meeting the job mix formula gradation. Proportion and blending equipment shall be calibrated at the beginning of production. All aggregate sources shall meet the requirements of **Table 903.24-1**. Do not blend aggregates with a front end loader. Proportion the aggregate to produce a uniform gradation meeting the requirements specified in Table 903.12-2. The contractor shall provide a Type A laboratory as defined by **106.06** capable of verifying gradation at the location where blending occurs.”

Subsection 903.13 (pg. 940), 12-2-16; modify the last sentence of the 1st paragraph:

“Provide aggregate consisting of crushed stone, crushed slag, or crushed gravel, meeting the quality requirements of ASTM D692, except that at least 50% by count of crushed gravel aggregates shall have at least one fractured face. Crushed slag aggregate retained on the No. 4 sieve shall contain no more than 20% by weight of glassy particles. Provide aggregates meeting the requirements of **903.24 except, if ADT is less than 1000.**”

Subsection 903.15 (pg. 941), 5-15-17; revise the 3rd paragraph:

“The Contractor may use recycled concrete aggregate per 903.05 C. or reclaimed asphalt pavement (RAP), at a maximum rate of 25% by weight, provided the combined aggregate blend meets all the requirements specified above. If blending, crush and screen the recycled concrete and/or asphalt to produce a uniform stockpile before blending it with the virgin material. Keep the reclaimed asphalt pavement stockpiles free of bricks, steel, wood, and all other deleterious materials. The virgin and reclaimed pavement blend shall meet the quality requirements specified in Table **903.05-1.**”

Subsection 903.24 (pg. 946), 5-18-15; Modify the 1st paragraph to the following:

“Provide coarse aggregate consisting of crushed gravel, crushed granite, crushed slag, crushed quartzite, crushed gneiss, or crushed sandstone. Other crushed aggregate may be used provided it has the chemical, physical, and performance characteristics specified in Table 903.24-1.”

Subsection 904.01 (pg. 948) 11-16-15; Asphalt Cements, add the following between the 4th and 5th paragraphs:

“Polyphosphoric acid may be used as a modified not exceeding 0.5% by weight of asphalt binder and may only be used when the primary modifier is one of the styrene-based products listed above.”

Subsection 904.01 (pg. 948) 11-6-17; Asphalt Cements, modify the fourth paragraph with the following:

“To modify the asphalt, properly blend one or more modifier(s) consisting of styrene butadiene (SB), styrene butadiene styrene (SBS), or styrene butadiene rubber (SBR), or Ground Tire Rubber (GTR) to a PG 64-22 or PG 67-22 base asphalt.

GTR used to modify asphalt shall meet the requirements of 921.17. Blending of GTR into asphalt cement shall occur only at the asphalt terminal. ”

Subsection 904.01 (pg. 948), 11-6-17; Asphalt Cements, add the following paragraph as the next to last paragraph:

“In addition to the above, asphalt cement modified with GTR shall meet the following requirement. The temperature difference determined by the Separation Test shall not exceed 15 °F. The separation test shall consist of taking the difference in softening point, as determined by the Ring and Ball Test (AASHTO T53), between the top and bottom thirds of a specimen prepared per ASTM D7173.”

Subsection 904.01 (pg. 949), 12-2-16; Modify Table 904.01-1:

“Table 904.01-1: Requirements for Asphalt Cement

Property*	PG 64- 22, PG 67-22	PG 70- 22	PG 76- 22	PG 82- 22
Non-recoverable creep compliance at 3.2kPa, Jnr(3.2), kPa ⁻¹ at 64°C, Max	4.5	1.0	0.5	0.5
% Difference in Non-Recoverable Creep Compliance, Jnr(diff) at 64°C, %, Max	75	75**	n/a	n/a

* Tested in accordance with AASHTO T350.

** Shall be waived if Jnr(3.2) is equal to or less than 0.5

PG76-22 and PG82-22 grade asphalts shall meet the requirements for Indication of Elastic response as defined in Appendix X1 of AASHTO M332. PG70-22 grade asphalts shall have a minimum percent recovery at 3.2 kPa of 29%.”

Subsection 904.01 (pg. 948-950) 5-18-15; revise the 1st paragraph to add the word cement, add sentence to the end of the 2nd paragraph, add “cement high-temperature grade properties to the 4th paragraph, remove the grades of asphalts and add asphalt cements to the 5th paragraph, update Table 904-01-1 to remove “Ring and Ball” and” Elastic Recovery”, add “Non-recoverable creep compliance” requirements to Table 904-01-1, add footnote to Table, add a 6th paragraph, remove A. Test Procedures and Table 904.01-2, remove Materials Certification header, remove 8th paragraph, and revise the 9th paragraph:

“Only obtain asphalt cement for use on Department projects from Certified Asphalt Cement Suppliers that have an approved Quality Control Plan in accordance with the Department’s Standard Operating Procedures.

Asphalt cement shall conform to AASHTO M 320 and Department procedures. Direct Tension testing is not required.

Instead of PG 64-22, the Contractor may use asphalt cement graded to PG 67-22. PG 67-22 shall conform to the requirements of AASHTO M 320 when the applicable tests are conducted at 67 °C and -12 °C, and the dynamic shear of the rolling thin film, pressure aged vessel sample is tested at 26.5 °C.

To modify the asphalt cement high-temperature grade properties, properly blend styrene butadiene (SB), styrene butadiene styrene (SBS), or styrene butadiene rubber (SBR) to a PG 64-22 or PG 67-22 base asphalt.

In addition to the above requirements, asphalt cements shall meet the requirements specified in Table 904.01-1.

Table 904.01-1: Requirements for Asphalt Cement

Property*	PG 64-22, PG 67-22	PG 70-22	PG 76-22	PG 82-22
Non-recoverable creep compliance at 3.2kPa, $J_{nr}(3.2)$, kPa^{-1} at 64°C, Max	4.5	1.0	0.5	0.5
% Difference in Non-Recoverable Creep Compliance, $J_{nr}(diff)$ at 64°C, %, Max	75	75	75	75

* Tested in accordance with AASHTO T350.

All modified grades shall meet the requirements for Indication of Elastic response as defined in Appendix X1 of AASHTO M332.

Furnish a certification to the Engineer on each project stating that the asphalt cement provided meets the Department's specification. Ensure that quality control and compliance testing are completed in accordance with the asphalt supplier's approved quality control plan and Department procedures.

In addition, the asphalt cement supplier shall provide a temperature-viscosity curve for PG 64-22 and PG 67-22 asphalt cements with a recommended mixing temperature range. In order to develop a temperature-viscosity curve, it may be necessary to run the viscosity test at a higher temperature, based on the softening point of the modified asphalt cement."

Subsection 904.01(pg. 949), 6-27-16; Modify Table 904.01-1:

Table 904.01-1: Requirements for Asphalt Cement

Property	PG64-22			
	PG67-22	PG 70-22	PG 76-22	PG 82-22
Non-recoverable creep compliance at 3.2kPa, Jnr(3.2), kPa ⁻¹ at 64°C, Max	4.5	1.0	0.5	0.5
% Difference in Non-Recoverable Creep Compliance, Jnr(diff) at 64°C, %, Max	75	75	75	n/a

Subsection 904.01 B. (pg. 949) 11-6-17; Asphaltic Cements, B. Materials Certification, add the following as the last sentence of the first paragraph:

“Furnish a certification to the Engineer on each project stating that the asphalt cement provided meets the Department’s specification. Ensure that quality control and compliance testing are completed in accordance with the asphalt supplier’s approved quality control plan and Department procedures. Identify on the certification, the type(s) of modifier used.”

Subsection 904.03 (pg. 951) 11-16-15; Emulsified Asphalts, Add “TTT-3” to 904.03-1 with the following requirements:

Saybolt-Furol Viscosity @ 77 °F, seconds	10-100
Particle Charge	Positive
Sieve Test, %	0.1 Max
Residue by	Distillation ⁽¹⁾
Residue, %	50 Min
Demulsibility, %	65 Min
Penetration	40-90

¹-Distill at 350°F

Subsection 904.03 (pg. 954), 12-2-16; Revise Table 904.03-1(c) to remove TTT-1, TTT-2, and TTT-3:

Table 904.03-1(c): Test Requirements for Emulsified Asphalt

Practices	AASHTO Test Method	CRS-2P	RS-2	RS-1
Saybolt-Furol Viscosity @ 77 °F, seconds	T59	n/a	n/a	20-100
Saybolt-Furol Viscosity @ 122 °F, seconds	T59	100-400	75-400	n/a
Storage Stability Test, 24- h, %	T59	1 Max	1 Max	1 Max
5-day Settlement, %	T59	n/a	n/a	n/a
Particle Charge	T59	Positive	n/a	n/a
Sieve Test, %	T59	0.1 Max	0.1 Max	0.1 Max
Residue by	T59	<i>Evaporation</i>	Distillation	Distillation
Residue, %	T59	65 Min	63 Min	55 Min
Demulsibility, %	T59	40 Min	60 Min	60 Min
Distillate, %	T59	n/a	n/a	n/a
Oil Test, %	T59	n/a	n/a	n/a
Stone Coating	T59	n/a	n/a	n/a
Float Test, seconds	T50	n/a	n/a	n/a
Penetration	T49	75-175	100-200	100-200

Practices	AASHTO Test Method	CRS-2P	RS-2	RS-1
Elastic Recovery, % (2)	T301	50 Min	n/a	n/a
Ductility @ 77 °F, cm	T51	40 Min	40 Min	40 Min
Ductility @ 40 °F, cm	T51	n/a	n/a	n/a
R&B Softening Point, °F	T53	125 Min	n/a	n/a
Original G*/sind @ 82 °C	T315	n/a	n/a	n/a

Subsection 904.03 (pg.954), 5-18-15; Replace with the following:

Subsection 904.03, Table 904.03-1(c). Modify as follows for TTT-1, TTT-2:

Table 904.03-1(c): Test Requirements for Emulsified Asphalt

Practices	AASHTO Test Method	CRS-2P	RS-2	RS-1	TTT-1	TTT-2
Saybolt-Furol Viscosity @ 77 °F, seconds	T59	n/a	n/a	20-100	20-100	10-100
Saybolt-Furol Viscosity @ 122 °F, seconds	T59	100-400	75-400	n/a	n/a	n/a
Storage Stability Test, 24- h, %	T59	1 Max	1 Max	1 Max	1 Max	1 Max
5-day Settlement,	T59	n/a	n/a	n/a	n/a	n/a

Practices	AASHTO Test Method	CRS-2P	RS-2	RS-1	TTT-1	TTT-2
%						
Particle Charge	T59	Positive	n/a	n/a	n/a	Positive
Sieve Test, %	T59	0.1 Max	0.1 Max	0.1 Max	0.1 Max	0.1 Max
Residue by	T59	<i>Evaporation</i>	Distillation	Distillation	Distillation	Distillation (1)
Residue, %	T59	65 Min	63 Min	55 Min	50 Min	50 Min
Demulsibility, %	T59	40 Min	60 Min	60 Min	n/a	n/a
Distillate, %	T59	n/a	n/a	n/a	n/a	n/a
Oil Test, %	T59	n/a	n/a	n/a	n/a	n/a
Stone Coating	T59	n/a	n/a	n/a	n/a	n/a
Float Test, seconds	T50	n/a	n/a	n/a	n/a	n/a
Penetration	T49	75-175	100-200	100-200	0-20	40-90
Elastic Recovery, % (2)	T301	50 Min	n/a	n/a	n/a	n/a
Ductility @ 77 °F, cm	T51	40 Min	40 Min	40 Min	n/a	n/a
Ductility @ 40 °F, cm	T51	n/a	n/a	n/a	n/a	n/a
R&B Softening Point, °F	T53	125 Min	n/a	n/a	60-75	n/a
Original G*/sind @ 82 °C	T315	n/a	n/a	n/a	1.0 Min	n/a
(1) Distill at 350 °F						
(2) Straight-sided mold, 20-cm elongation, 5min hold, 25 °C						

Subsection 905.01 (pg. 956) 5-14-18, Revise subsection, add part C. Polypropylene Foam Type:

“905.01 Preformed Joint Fillers (Non-Extruding and Resilient Types)

Provide preformed joint fillers as shown on the Plans. When designated, punch holes in preformed joint filler to admit the dowels.

Furnish the filler for each joint in a single piece for the full depth and width required for the joint unless otherwise directed by the Engineer. If the Engineer approves the use of more than one piece for a joint, fasten the abutting ends securely, and hold to shape by stapling or using other positive means of fastening satisfactory to the Engineer.

A. Bituminous Type

Provide bituminous type preformed joint fillers conforming to AASHTO M 213.

B. Non-Bituminous Types

Provide non-bituminous types of preformed joint filler conforming to AASHTO M 153, Type I, II, or III, as specified.

C. Polypropylene Foam Type

Provide semi-rigid, closed-cell, polypropylene foam, preformed expansion joint filler conforming to ASTM D8139. ”

Subsection 908.04 (pg. 968), 5-18-15, High Strength Bolts, A. Specifications; Add the following to the first paragraph:

“Unless otherwise shown on the Plans, mechanically galvanize all bolts, nuts and washers in accordance with ASTM B695 Class 50.”

Subsection 908.04 (pg. 968), 12-2-16, High Strength Bolts, A. Specifications; revise the first paragraph:

“Unless otherwise shown on the Plans, all bolts, nuts and washers shall be coated with acceptable coating in accordance with ASTM F3125 for the respective grade.”

Subsection 908.04 (pg. 968) 12-2-16; revise A. Specifications, 1.:

“A. Specifications: 1. Bolts. ASTM F3125, Grade 325 and Grade 490 - High Strength Bolts for Structural Joints”

Subsection 908.04 (pg. 970) 12-2-16; Revise C. Testing, 3. Assemblies, subsection f., update Table 908-04-2:

C. Testing, 3. Assemblies, f. Table 908.04-2 The minimum rotation, from a snug tight condition (10% of the specified proof load), shall be as specified in Table 908.04-2.

Table 908.04-2: Rotation from Snug Tight Condition

Bolt Length	Minimum Rotation from Snug
Up to and including 4 diameters	240 degrees (2/3 turn)
Over 4 diameters, but not exceeding 8 diameters	360 degrees (1 turn)
Over 8 diameters	480 degrees (1-1/3 turn)

(Note: These values differ from those shown in ASTM F3125.)

Subsection 908.07 (pg. 973), 5-14-18; Add the following as the last sentence in the subsection:

“Furnish the Engineer a certification from the manufacturer identifying each heat number and certifying that the requirements from AASHTO M 105 and the above additions have been met.”

Subsection 909.02(pg. 977), 12-2-16; Remove the 4th paragraph referencing a tolerance of 5% from B. Steel Posts and Braces.

Subsection 909.02 (pg. 980-981), 12-2-16; Remove the word minimum from Table 909.02-1:

Table 909.02-1: Post and Braces

Application	Material	ASTM Specification	Nominal Diameter (inches)	Outside Diameter (inches)
Line Posts	Galvanized steel pipe	F1083	1.5	1.900
	Aluminum alloy standard (ANSI Schedule 40) pipe	B429, Alloy 6063, Temper T6	1.5	1.900
	Triple	F1043,	1.5	1.900

Application	Material	ASTM Specification	Nominal Diameter (inches)	Outside Diameter (inches)
	coated steel pipe with a 0.120-inch wall thickness	Group I-C		
End, Corner, and Pull Posts	Galvanized standard steel pipe	F1083	2.0	2.375
	Aluminum alloy standard (ANSI Schedule 40) pipe	B429, Alloy 6063, Temper T6	2.0	2.375
	Triple coated steel pipe with a 0.130-inch wall thickness	F1043, Group I-C	2.0	2.375
End and Corner Braces	Galvanized standard steel pipe	F1083	1.25	1.660
	Aluminum alloy standard (ANSI Schedule 40) pipe	B429, Alloy 6063, Temper T6 (for corner posts: B241)	1.25	1.660
	Triple coated steel pipe with a 0.111-inch wall thickness	F1043, Group I-C	1.25	1.660

Subsection 909.03 (pg. 983), 12-2-16; Remove the last paragraph of the subsection.

Subsection 912.05 (pg. 1001), 6-27-16; Add subsection 912.05 – Brick Paving Units:

“912.05 Brick Paving Units

Provide brick of the kind and grade specified.

A. Masonry Brick

1. Sidewalk: ASTM C902, Class SX, Type 1
2. Crosswalks and Roadway: ASTM C1272, Type R

B. Concrete Brick and Truncated Dome Concrete Brick

Provide brick conforming to ASTM C936

C. Truncated Dome Brick

Provide brick conforming to ASTM C902, Class SX, Type 1”

Subsection 915.02 (pg. 1007), 6-27-16; modify the description of 915.03, remove zinc coated, iron from 915.02 A. update the first paragraph of 915.02 A., Remove subsection B. Aluminum Coated Steel Pipe, Revise C. to become B., revise D to become C, Remove 1st and 2nd paragraphs of D now C, revise E to become D, update 915.03 to match index title: :

“SECTION 915 – METALLIC PIPE

915.01 Ductile Iron or Cast Iron Pipe	1007
915.02 Corrugated Metal Pipe Culverts, Pipe Arches, and Underdrains.....	1007
915.03 Polymer Pre-coated, Corrugated Steel Pipe, Culverts, and Underdrains....	1008

915.01 Ductile Iron or Cast Iron Pipe

Provide ductile iron pipe conforming to ASTM A716 for the specified diameters and strength classes. Unless otherwise specified, either smooth, corrugated, or ribbed pipe may be furnished. For pipe diameters in excess of 48 inches, conform to ANSI Standard for Cast Iron Pipe, or as otherwise specified in the Contract, for the specified diameter and strength class.

Provide cast iron drain pipe conforming to ASTM A74. Unless otherwise specified, provide ductile iron pressure pipe for water lines or sewer construction conforming to the requirements of ASTM A377 for the diameters and working pressures specified.

915.02 Corrugated Metal Pipe Culverts, Pipe Arches, and Underdrains

A. Corrugated Steel Pipe, Pipe Arches, and Underdrains

Provide corrugated steel pipe, pipe arches, or underdrains, including special sections, such as elbows and flared ends, that conform to AASHTO M 36, aluminum-coated Type 2 meeting AASHTO M274. Special Sections shall be the same thickness as the pipe, arch, or underdrain to

which they are joined. Furnish shop-formed elliptical pipe and shop-strutted pipe only where shown on the Plans.

B. Corrugated Aluminum Pipe, Pipe Arches, and Underdrains

When using corrugated aluminum pipe, pipe arches, or underdrains, conform to the applicable requirements of AASHTO M 196. Use special sections, such as elbows and flared end sections that conform to the applicable requirements of AASHTO M 196 and that are of the same gauge as the conduit to which they are joined.

C. Structural Plate Corrugated Steel and Aluminum Structures

Corrugated aluminum alloy structural plate for pipe, pipe arches, and arches shall conform to the requirements of AASHTO M 219.

D. Bituminous Coating

When material supplied for any of the items specified above are to be bituminous-coated, ensure that the metal to be coated is free of grease, dirt, and other contaminants. Bituminous coating and paving shall conform to the requirements of AASHTO M 190. Apply the coating in accordance with the manufacturer's recommended procedures and as directed by the Department."

915.03 Polymer Pre-coated, Corrugated Steel Pipe, Culverts and Underdrains

Provide polymer pre-coated corrugated steel pipe conforming to AASHTO M 245, Grade 250/250, unless otherwise specified."

Subsection 916.05 E. (pg. 1012); 12-2-16, Add sentence to first paragraph:

"Fabricators must be AISC certified as specified in **602.04 A.4.**"

Subsection 917.02.A.6. (pg. 1023), 6-27-16; Revise the following:

"6. Anchor Bolts. Use anchor rods of high strength steel meeting the requirements of ASTM F 1554, Grade to be determined by design. Fit each anchor bolt with a hex nut and lock-washer."

Subsection 918.01 (pg. 1033-1035), 5-14-18; Revise the 1st paragraph and 3rd paragraph of A. General, Revise Table 918.01-1, Table 918.01-2, Table 918.01-4, Table 918.01-5, Revise the last paragraph of B. Seed Groups, Revise Table 918.01-6 Temporary Seeding:

A. General

Provide seed meeting the rules and requirements of the Tennessee Department of Agriculture Chapter 0080-05-06.

Pack grass seed in new bags or bags that are sound and not mended.

The vendor shall notify the Department before making shipments to allow the Department to

arrange for inspection and testing of stock.

The vendor shall furnish the Department a certified laboratory report from a Society of Commercial Seed Technologists accredited commercial seed laboratory or from a State seed laboratory showing the analysis of the seed to be furnished. The report from an accredited commercial seed laboratory shall be signed by a Registered Member of the Society of Commercial Seed Technologists. The Department may take samples of the seed to check against the certified laboratory report. Sampling and testing will be in accordance with the requirements of the Tennessee Department of Agriculture.

Use commercial grade 10-10-10 fertilizer or equivalent.

B. Seed Groups

When a seed group is used, provide mixtures meeting the requirements specified in Tables 918.01-1 through 918.01-5, unless otherwise specified.

Table 918.01-1: Group A (February 1-July 1)

Kind of Seed	Quantity, Percent by Weight
Kentucky 31 Fescue	80
Korean Lespedeza	15
Annual Rye Grass	5

Table 918.01-2: Group B (June 1-August 15)

Kind of Seed	Quantity, Percent by Weight
Kentucky 31 Fescue	5575
Korean Lespedeza	15
German Millet	10

Table 918.01-3: Group B1 (April 15 - August 15)

Kind of Seed	Quantity, Percent by Weight
Bermudagrass (hulled)	70
Annual Lespedeza	30

Table 918.01-4: Group C (August 1-December 1)

Kind of Seed	Quantity, Percent by Weight
Kentucky 31 Fescue	70
EAnnual Rye Grass	20
White Clover	10

Table 918.01-5: Group C1 (February 1-December 1)

Kind of Seed	Quantity, Percent by Weight
Crown Vetch	25
Kentucky 31 Fescue	70
Annual Rye Grass	5

Uniformly mix seed when forming Groups. Do not mix Group seed until each type seed that is used to form the Group has been tested separately and meets DOA requirements for purity and germination.

C. Over-Seeding

Groups A, B, and C, when sown on slopes 3:1 and steeper, shall be over seeded with Sericea Lespedeza at the rate of 15 pounds per acre. When over-seeding is performed between February 1 and July 1, use Scarified Sericea Lespedeza with an additional 2 pounds per acre of Weeping Lovegrass. Between July 1 and December, use unhulled Sericea Lespedeza. Only use Group C1 when shown on the Plans.

D. Temporary Seeding

For temporary seeding, use seed groups and approved varieties as specified in Table 918.01-6.

Table 918.01-6: Temporary Seeding

Seed Group (Season)	Kind of Seed	Percent by Weight
Group D (January 1 – May 1)	ItAnnual Rye Grass	33-1/3%
	Korean Lespedeza	33-1/3%
	SSpring Oats	33-1/3%
Group E (May 1 – July 15)	SSorghum-Sudan Crosses ⁽¹⁾	100%
	or StGerman Millet ⁽²⁾	100%
Group F July 15 – January 1	BCereal Rye	66-2/3%
	ItAnnual Rye Grass	33-1/3%

Subsection 918.04 (pg. 1036), 12-2-16; add as a 2nd paragraph:

“For small quantities less than 100 units of seeding or sod, bagged pelletized or agricultural limestone meeting the Department of Agriculture Tennessee Liming Materials Act may be utilized.”

Subsection 921 (pg. 1049), 11-6-17, Section 921 – Miscellaneous Materials, add Ground Tire Rubber to the Index:

“921.17 Ground Tire Rubber1060”

Subsection 921.01 (pg. 1049), 5-18-15, Water; Replace subsection with the following:

“For mixing concrete, use water that is reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter, and other substances injurious to the finished product. Water provided by a municipal utility may be used without testing.

All other water shall have quality results submitted in accordance with the frequency listed in Table 921.01-01. All water quality results shall adhere to Table 921.01-2.

Table 921.01-1 Testing Frequency for Mixing Water

Water Source	Testing Frequency ⁽¹⁾
Municipal	NA
Non-Municipal	Every 3 months; tested annually after 4 consecutive passing tests

(1) The frequency may vary at the discretion of the Department.

Table 921.01-2 Quality Requirements for Mixing Water

Maximum Concentration in Mixing Water	Limits	ASTM Test Method ⁽¹⁾
Chloride Ion Content, ppm	500	C114
Alkalies as (NaO ₂ + 0.658 K ₂ O), ppm	600	C114
Sulfates as SO ₄ , ppm	3000	C114
Total Solids by mass, ppm	50000	C1603
pH	4.5-8.5	⁽²⁾
Resistivity, Minimum, kohm-cm	0.500	D1125
Soluble Carbon Dioxide, ppm	600	D513
Calcium and Magnesium, ppm	400	D511
Iron, ppm	20	⁽²⁾
Phosphate, ppm	100	D4327

(1) Other methods (EPA or those used by water testing companies) are generally acceptable.

(2) No ASTM method available.

Subsection 921 (pg. 1049) 10-8-18, Miscellaneous Materials, Remove 921.03 Sodium Chloride from the Content list:

921.01 Water	1052
921.02 Calcium Chloride	1053
921.03 Sodium Chloride	1053
921.04 Lime	1053
921.05 Select Material for Soil-Cement Base	1054
921.06 Chemical Additives	1054

921.07 Masonry Stone	1056
921.08 Waterstops	1056
921.09 Grout	1059
921.10 Precast Manholes and Catch Basins	1059
921.11 Manhole Steps	1059
921.12 Geotextile and Geosynthetic Material	1060
921.13 Precast Prestressed Bridge Deck Panels	1060
921.14 Applied Textured Finish Material	1061
921.15 Fly Ash	1063
921.16 Ground Granulated Blast Furnace Slag	1063

Subsection 921.01 (pg. 1049), 5-14-18, Water; Remove Resistivity, Soluble Carbon Dioxide, Calcium and Magnesium, Iron, and Phosphate from Table 921.01-2 Quality Requirements for Mixing Water:

Table 921.01-2 Quality Requirements for Mixing Water

Maximum Concentration in Mixing Water	Limits	ASTM Test Method ⁽¹⁾
Chloride Ion Content, ppm	500	C114
Alkalies as (NaO ₂ + 0.658 K ₂ O), ppm	600	C114
Sulfates as SO ₄ , ppm	3000	C114
Total Solids by mass, ppm	50000	C1603
pH	4.5-8.5	⁽²⁾

(1) Other methods (EPA or those used by water testing companies) are generally acceptable.

(2) No ASTM method available.

Subsection 921.03 (pg. 1050) 10-8-18, Miscellaneous Materials, Remove subsection 921.03 Sodium Chloride:

~~“**921.03 Sodium Chloride**~~

~~Provide sodium chloride conforming to ASTM D632, for the type specified.”~~

Subsection 921.06 (pg.1051) 11-16-15; B. Bituminous Additives - 1. Anti-Stripping Additive, replace the ASTM C977 reference with AASHTO M 303.

“Use hydrated lime conforming to AASHTO M 303 or other heat-stable asphalt anti-stripping additive containing no ingredient harmful to the bituminous material or the workmen and that does not appreciably alter the specified characteristics of the bituminous material when added in the recommended proportions.”

Subsection 921.06 B. Bituminous Additives (pg.1052) 10-10-16; revise the 3rd paragraph to the following:

“When using an anti-stripping additive other than hydrated lime, use a dosage rate of 0.3%, unless either gravel is used as a coarse aggregate or test results indicate moisture susceptibility, in which case mix at a dosage rate of 0.5%.

Subsection 921.06 B. 2. (pg. 1052) 11-6-17; B. Bituminous Additives, 2. Silicone Additives, Remove description and add the following sentence:

“2. Silicone Additives. The amount of silicone added to asphalt cement shall not exceed 2 oz. of silicone per 5500 gallons asphalt cement.”

Subsection 921.17 (pg. 1060) 11-6-17; Ground Tire Rubber, add the following subsection:

“921.17 Ground Tire Rubber

Provide Class 30-1 Ground Tire Rubber (GTR) as defined by ASTM D5630 except for as noted in table 921.17-1. The material shall also be certified to meet the requirements of Table 921.17-01. Include certification of the GTR with the bill of lading for the modified asphalt cement.

Table 921.17-1: Requirements for Ground Tire Rubber

Property	Specification
Specific Gravity	1.15 +/- 0.05
Moisture Content	0.75% Max
Ferrous Metal Content	0.01% Max
Fiber Content	0.5% Max
Ash (ASTM E1131)	10% Max

S T A T E

O F

T E N N E S S E E

(REV. 3-30-15)

January 1, 2015

SPECIAL PROVISION

REGARDING

TENNESSEE DEPARTMENT OF TRANSPORTATION STANDARD

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION

DESCRIPTION

Any and all references concerning the March 1, 2006 Standard Specifications for Road and Bridge Construction shall be interpreted as the January 1, 2015 Standard Specifications for Road and Bridge Construction.

The following Special Provisions have been incorporated into the January 1, 2015 Standard Specifications for Road and Bridge Construction:

- 107SHP
- 407G
- 411TL
- 411TLD
- 411OGFC
- 716ST

Any reference to these Special Provisions shall refer to the January 1, 2015 Standard Specifications for Road and Bridge Construction.

S T A T E**O F****T E N N E S S E E**

(Rev. 2-17-15)

January 1, 2015

SPECIAL PROVISION**REGARDING****UNBALANCED BIDS**

The Department will review all unit prices submitted by the apparently lowest responsible bidder and will decide whether any of the unit prices are excessively above or below a reasonable cost analysis value determined by the Engineer.

In the event any unit prices are determined to be unbalanced and contrary to the interest of the Department, the right is reserved to reject such bid at the discretion of the Department or to award the Contract and limit progress payments on units of work performed on any excessively priced items to costs that are satisfactorily documented by the Contractor plus 20 percent, until 85 percent of the Contract has been completed. Upon completion of 85 percent of the Contract, the Contractor will be reimbursed in accordance with **Subsection 109.08** of the Standard Specifications for the accepted quantities of work performed on the excessively priced items.

STATE**OF****TENNESSEE**

Rev: October 10, 2016

January 1, 2015

SPECIAL PROVISION**REGARDING****EMPLOYING AND CONTRACTING WITH ILLEGAL IMMIGRANTS**

The State shall endeavor to do business only with those contractors and subcontractors that are in compliance with the Federal Immigration and Nationality Act. This policy shall apply to all State Contractors including subcontractors. This policy statement is issued to establish implementation guidance to procuring state agencies and contractors reflecting the requirements of *Tennessee Code Annotated* §12-3-309 regarding the employment of illegal immigrants in the performance of state contracts.

1. The Contractor hereby attests, certifies, warrants, and assures that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract. The Contractor shall reaffirm this attestation, in writing, by submitting to the State a completed and signed copy of the "Attestation form" provided by the Department, semi-annually during the period of this Contract.
2. Prior to the use of any subcontractor in the performance of this Contract, and semi-annually thereafter, during the period of this Contract, the Contractor shall obtain and retain a current, written attestation that the subcontractor shall not knowingly utilize the services of an illegal immigrant to perform work relative to this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant to perform work relative to this Contract.
3. The Contractor shall maintain records for its employees used in the performance of this Contract. Said records shall include a completed federal Department of Homeland Security Form I-9, *Employment Eligibility Verification*, for each employee and shall be subject to review and random inspection at any reasonable time upon reasonable notice by the State.

The Contractor understands and agrees that failure to comply with this section will be subject to the sanctions of *Tennessee Code Annotated* § 12-3-309 for acts or omissions occurring after January 1, 2007. This law requires the Chief Procurement Officer, Department of General Services, to prohibit a contractor from contracting with, or submitting an offer, proposal, or bid to contract with the State of Tennessee to supply goods or services for a period of one year after a

contractor is discovered to have knowingly used the services of illegal immigrants during the performance of this contract.

For the Purposes of this policy, “illegal immigrant” shall be defined as a non-citizen who has entered the United State of America without federal government permission or stayed in this country beyond the period allowed by a federal government-issued visa authorizing the non-citizen to enter the country for specific purposes and a particular time period.

ATTACHMENT 1

ATTESTATION REGARDING PERSONNEL USED IN CONTRACT PERFORMANCE

SUBJECT CONTRACT NUMBER:	
CONTRACTOR LEGAL ENTITY NAME:	
FEDERAL EMPLOYER IDENTIFICATION NUMBER: (or Social Security Number)	

The Contractor, identified above, does hereby attest, certify, warrant, and assure that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract.

**SIGNATURE &
DATE:**

NOTICE: This attestation MUST be signed by an individual empowered to contractually bind the Contractor. If said individual is not the chief executive or president, this document shall attach evidence showing the individual's authority to contractually bind the Contractor.

STATE**OF****TENNESSEE**

September 8, 2016

January 1, 2015

SPECIAL PROVISION**REGARDING****MEASUREMENT AND PAYMENT**

Insert the following before the penultimate paragraph in Subsection 109.01:

In lieu of platform scales, a computer controlled weighing system connected to the hydraulic lifting system on front end loaders, or similar machines, may be used for weighing rock materials obtained from the excavation as provided in Subsection 104.09 or from temporary sources established to supply stone solely to the project where approved by the Engineer, subject to the following conditions:

1. The operator of the weighing system shall be a Certified Public Weigher as prescribed in Title 47, Chapter 26, Part 8, T.C.A.
2. The accuracy of the weighing system shall be within 1% $\pm$.
3. The weighing system shall be checked for accuracy at least once each day, or as often as deemed necessary by the Engineer. Verified weights equal to the capacity of the loading equipment shall be available on the project at all times for checking the accuracy of the weighing system.

With the bucket empty, the zero reading shall be checked each day before any material is loaded and again after one or two trucks are loaded and thereafter as determined by the operator or as directed by the Engineer.

The operation and checking of the weighing equipment shall be in accordance with the recommendations of the manufacturer of the equipment. A copy of the manufacturer's Operators Manual shall be furnished the Engineer prior to beginning weighing operations.

4. If the weighing system exceeds the 1% $\pm$ tolerance during any scale check, use of the weighing equipment shall cease until the scales are brought back within required tolerance.
5. The weighing system shall have a digital display capable of displaying the following:

- a. The weight of each bucket to the nearest 0.01 metric ton (ton) as the material is loaded.
 - b. The accumulated weight loaded into each hauling unit.
 - c. The total of the accumulated weights recorded on each sheet or roll of the printout (see Item No. 7 below).
6. The computer controlled weighing equipment shall be capable of printing weigh tickets on a continuous sheet or roll which provides the following data:
 - a. Item number for rock material being weighed.
 - b. Identification number for haul unit. (Each haul unit shall have an identification number prominently displayed.)
 - c. Date and time each haul unit is loaded.
 - d. Weight of rock material in each bucket weighed to nearest 0.01 metric ton (ton).
 - e. Total weight of rock material in each haul unit.
 - f. Total weight loaded during each shift or other unit of time as may be requested by the Engineer.
7. The weigh tickets will not accompany each haul unit to the placement site but will be retained on the printout in the loading unit; and the original printout shall be given to the Engineer's representative at the conclusion of the day's work, or upon request. Each continuous sheet or roll, or portion thereof, shall have the Certified Weigher's stamp affixed along with his/her signature.
8. The Department's Inspector at the delivery site will visually inspect each load and keep a record of the haul unit number and time of arrival. In the event a discrepancy between weigh tickets and the Inspector's record arises, the Inspector's record shall govern.
9. Under normal operations the computer controlled weighing system shall be capable of calibration by means of the programming buttons, switches or keys on the control panel or keyboard without resorting to internal adjustments.
10. If at any time the Engineer deems that the computer controlled weighing system is not performing satisfactorily, he will direct the Contractor to discontinue its use and weigh the rock material on platform scales as described above in this Subsection.

STATE**OF****TENNESSEE**

(Rev. 10-7-19)

January 1, 2015

SPECIAL PROVISION**REGARDING****SLIP LINING OF ROADWAY CULVERTS****Description**

This work consists of furnishing, installing, grouting and providing all labor, material and equipment necessary to rehabilitate existing roadway culvert pipe by the slip lining method.

The required hydraulic capacity of the host pipe shall be determined and then improved or maintained by the use of slip lining products. The slip lining process will require the complete grouting of the annular void between the hosts and insert pipe unless approved otherwise. If the Engineer's hydraulic and geometric evaluation indicates that downsizing of the existing line is acceptable, a variety of materials listed below may be used for insertion.

When necessary, hydraulic advantages may be gained by improvements to inlet details on inlet controlled culverts. (See TDOT Drainage Manual 6.04.3.2 I Improved Inlets). Where improved inlets create low pressure on the culvert pipes, pipe liner joints shall be watertight, and testable to the limits of the required pressure.

See Table 607G-1 for Slip lining Pipe Dimension.

Materials

Provide materials for pipe liner that are acceptable for slip lining pipe and include one of the following;

- a. Corrugated High Density Polyethylene Pipe (HDPE),
- b. Profile Walled PVC,
- c. Corrugated Polypropylene Pipe (PP),
- d. Solid Wall High Density Polyethylene Pipe (SWHDPE),
- e. Steel Reinforced Polyethylene Pipe (SRPE),
- f. Machine Spiral Wound PVC or HDPE Pipe,
- g. Glass Fiber Reinforced Plastic Pipe, or
- h. Smooth Wall Carbon Steel Plate Pipe.

Submit manufacturer's detailed product data with complete information on pipe liner materials (pipes, joints, gaskets, fittings, entrance bells), physical properties, dimensions, installation minimum/maximum allowable parameters such as maximum recommended external grout

pressure, axial compressive stress, minimum bending radius or maximum joint angular deflection.

Pipe liner materials other than those stated above may be submitted for consideration and approval by the Engineer based on meeting the design requirements as stated.

Secure written product approval from the Manufacturer before commencing any work.

A. Corrugated High Density Polyethylene Pipe (HDPE)

1. Pipe

The pipe liner shall consist of a HDPE profile wall pipe that conforms to the requirements of AASHTO M 294 for Corrugated Polyethylene Pipe Type “S” or “D”.

2. Joints

Join HDPE profile wall pipe liner by thermal fusion (extrusion welding) per manufacturer specifications, or provide a positive mechanical joint that meets the requirements of ASTM D 3212, consist of an integrally formed bell and spigot connection with a rubber gasket meeting ASTM F477, or a connection meeting equivalent performance standards such that joints shall meet the requirements of ASTM D3212.

If mechanically restrained joints are required to line the host pipe, the pipe joints shall be restrained to allow the pipe to be pulled or pushed into the host pipe without joint separation.

B. Profile Wall Poly Vinyl Chloride (PVC)

1. Pipe

Pipe liner shall consist of PVC corrugated pipe with a smooth interior that conforms to the requirements of AASHTO M304, Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter or ASTM F 949.

Use pipe made of PVC compound with a cell classification of 1245B per ASTM D 1784.

2. Joints

Join the PVC pipe liner with a PVC coupling that uses elastomeric sealing gaskets. The assembled joint shall meet the performance requirements of ASTM D 3212.

The joint shall be able to be pulled or pushed into the host pipe without joint separation. Ensure that elastomeric seals meet the requirements of ASTM F 477.

C. Corrugated Polypropylene Pipe (PP)

1. Pipe

Polypropylene pipe and fittings shall meet the requirements contained in AASHTO M330 type “S” or “D” wall, and or ASTM F2736/ASTM F2764.

Extruded Pipe and Fittings shall be made of virgin polypropylene compounds as described in AASHTO M330 and or ASTM F2736/ASTM F2764.

Polypropylene compounds shall be comprised of the base polypropylene resin and all additives, colorants, UV inhibitors, and stabilizers.

The pipe and fittings shall be free of foreign inclusions and visible defects such as cracks, holes, foreign inclusions or other injurious defects.

2. Joints

Joints shall be water-tight over the range of head pressure expected for the pipe. Joints shall consist of an integrally formed bell and spigot connection with a rubber gasket meeting ASTM F477 or a connection meeting equivalent performance standards such that joints shall meet the requirements of ASTM D3212.

The ends of the pipe shall be square and clean so as not to adversely affect joining or connecting.

D. Solid Wall High Density Polyethylene Pipe (HDPE)

1. Pipe

High density polyethylene pipe and fittings shall meet the requirements in the AASHTO LRFD Bridge Design Specifications, Section 12, as a solid wall HDPE pipe meeting the requirements of Specification AASHTO M 326.

The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties. Pipe shall be solid wall with a smooth interior and exterior with no corrugations or ferrous elements.

Pipe and pipe fittings shall be manufactured from high density compounds in accordance with ASTM D3350, cell classification 345464C or (345474C) with a designation of PE 3408 or (PE 4710) and a minimum Standard Dimension Ratio (SDR) of 32.5.

Each pipe segment shall be marked on the outside with a coded number which identifies the manufacturer, SDR, size, materials, machine, date and shift on which the pipe was extruded.

Pipe[s] shall be specifically applicable for installation and use in the project environment.

2. Joints

Joints shall be water-tight and soil tight meeting AASHTO M 326 over the range of head pressure expected for the pipe.

Joints shall be butt-fused in accordance with ASTM F2620 and the manufacturer's recommendations or shall be capable of being joined into a continuous length by an

interlocking method such that joints meet the requirements of ASTM D3212. Screw-type or threaded joints will not be allowed unless a positive lock is included in the joint system or the perimeter of the joint is extrusion welded at the bearing assembly prior to insertion. Internal beads resulting from butt fusion shall be limited to a 0.25 inch (6 mm) projection perpendicular to the inside wall of the pipe. Trim beads larger than a 0.25 inch (6 mm) 360 degrees around the interior of the pipe. External beads resulting from butt fusion need not be trimmed unless the bead projection will negatively impact pipe installation or migration of annulus grout.

E. Steel Reinforced Polyethylene Pipe (SRPE)

1. Pipe

The pipe profile is manufactured using a high quality stress-rated thermoplastic meeting the requirements of ASTM F2562 “Standard Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage” or AASHTO Designation MP-20, Bridge Construction Section 26 & Design Section 12.

Virgin high density polyethylene stress-rated resins are used to manufacture the pipe and complimentary fabricated fittings. Resins shall conform to the minimum requirements of cell classification 345464C as defined and described in the latest version of ASTM D3350 “Standard Specification for Polyethylene Plastics Pipe and Fittings Materials”.

2. Joints

Low Head (LH) Joints (30” – 72”) shall be gasketed, stress-rated high density polyethylene bell and spigot joints (meeting the requirements set forth in the above Material Properties paragraph) that have been laboratory tested to 3 psi when tested in accordance with ASTM D3212 “Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

High Performance (HP) Joints (30” – 72”) shall be gasketed, bell and spigot joints where both the bell and spigot are reinforced with steel that is fully encased in stress-rated high density polyethylene (meeting the requirements set forth in the above Material Properties paragraph) and that have been laboratory tested to 15 psi when tested in accordance with ASTM D3212 “Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals”.

Welded Coupler (WC) Joints (36” – 120”) shall utilize plain ended pipe welded together with a polyethylene coupler by way of electro fusion welding or extrusion welding technology. The welded connections provide a true, infield watertight system. The field installed welded coupler joints shall remain watertight and can achieve zero leakage rates on appropriate applications. The welded coupler joints have been laboratory tested to 30 psi in accordance with ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals”.

F. Machine Spiral Wound PVC or HDPE Pipe**1. Profile Strip**

Provide extruded PVC profile strip in accordance with the requirements of ASTM F1697 except as noted below.

Provide extruded HDPE profile strip in accordance with the requirements of ASTM F1741 “standard Practice for Installation “OD” Machine Spiral wound PVC Pipe Liner for Rehabilitation of Existing Sewers and conduit” modified for SPR PE (HDPE) pipe liner.

Pipe made from similar grade HDPE as new sewer and drainage pipe, meeting cell classification of 335420C (or E) in accordance with ASTM D 3350.

Continuous welding process seals subsequent strip of profile creating a seamless pipe line of high stiffness, consistent material properties.

Structural stand-alone liner – does not rely upon the grout for strength but only to transfer the load.

All profile strips shall be specifically applicable for installation and use in the project.

2. Joints

Joints shall meet the requirements of ASTM D3212, and gaskets meeting the requirements of ASTM F477. The joint shall consist of a single, mechanical interlock between profile strips supplemented with sealant and is created continuously as the profile is wound into the pipe. Once wound into place within the host pipe, joints shall be considered completed and the pipe shall not be intentionally or otherwise expanded or permitted to translate in any direction at the joint. Joints shall be water-tight over the range of head pressure expected for the pipe.

The completed pipe liner shall be provided such that the outside diameter of the pipe is not increased, nor the internal diameter of the pipe is decreased at the joint.

G. Glass Fiber-Reinforced Plastic Pipe**1. Pipe**

Provide centrifugally cast fiberglass reinforcement plastic mortar pipe (CCFRMP) in accordance with ASTM D3262, cell classification Type 1, Liner 2, Grade 3. All pipes shall be specifically applicable for installation and use in the project environment. Minimum pipe stiffness shall be 36 psi (248) kPa when tested in accordance with ASTM D2412.

The glass fibers shall be a commercial grade of E-type glass fibers with the amount, location and orientation of the chopped glass-fiber reinforcement specifically designed for each application.

Sand shall be minimum 98 percent silica kiln-dried and graded.

The polyester wall resin shall be an isophthalic, orthophthalic or other approved resin with a minimum tensile elongation of 2 percent.

Fiberglass liner shall be shown by tests to be resistant to long-term corrosion. Testing shall be performed in accordance with ASTM D3681 using 1.0N sulfuric acid for sanitary sewage.

Each pipe segment shall be marked on the inside and outside to identify the manufacturer's number, diameter, stiffness, ASTM designation and lot number.

2. Joints

Provide pipe with joints designed so that neither the outside diameter of the pipe is increased, nor the internal diameter of the pipe is decreased at the joint. Joints shall be water-tight over the range of head pressure expected for the pipe. Joints shall meet the performance requirements of ASTM D4161. Field connect pipe[s] with low-profile, fiberglass bell-spigot joints or flush fiberglass bell-spigot joints, when the fit requires. Utilize elastomeric sealing gaskets as the sole means to maintain joint water-tightness. Gaskets shall meet the requirements of ASTM F477. Joints at tie-ins, when needed, may utilize gasket-sealed closure couplings.

H. Smooth Wall Carbon Steel Plate Pipe

1. Pipe

The pipe liner shall consist of arc welded straight seam pipe with .20 minimum copper content for improved corrosion resistance, for use in culvert rehabilitation and pipe linings. The pipe liner may be round, elliptical, arch shaped, or other special sections as specified. All round and non-round pipe liner sections of a smooth wall carbon steel plate pipe must conform to the following requirements:

- a. All pipe must be domestic with melted and manufactured in USA (MMU), made from new unused steel plates, and shall be straight seam pipe. Longitudinal seams welded after rolling must be welded by the automatic double submerged arc weld (DSAW) method. Joints or midwelds welded after rolling must be welded by automatic or semiautomatic DSAW, flux cored arc weld (FCAW) or gas metal arc weld (GMAW) methods, and splices and repair welds done before rolling must be welded by automatic, semiautomatic or manual DSAW, FCAW, GMAW methods.
- b. Each heat number of steel used for the pipe liner must be tested for chemical composition and tensile requirements that meet the following:

Carbon:	0.26 max
Manganese:	1.65 max, *See Note
Phosphorous:	0.035 max

Sulfur: 0.035 max
 Copper: 0.20 max
 Tensile Strength: 60,000 PSI min
 Yield Strength: 36,000 PSI min

*For each 0.01 percent reduction of carbon below the maximum concentration shown above, a 0.05 percent increase of manganese is allowed up to a maximum concentration of 2 percent manganese.

- c. Pipe liner wall thicknesses should be no less than .500 (½") wall, or as determined by ASHTO HL-93 load bearing analysis. The minimum specified wall thickness to be used for round pipe liner made to this specification shall be .500 nominal wall, and the wall thickness at any point shall not be more than 12.5% under the specified nominal wall thickness.
- d. The minimum specified wall thickness to be used for elliptical, arch, and other non-round pipe liner sections shall be .500, and the wall thickness at any point shall not be thinner than .015 under the specified wall thickness.

2. Joints

Welded steel pipe liner joints must be full penetration welds in accordance with AWS D1.1, allowing for Bevel X Plain End joint configuration.

Table 607G-1: SLIPLINING PIPE DIMENSION

Pipe Materials (Size Dimension)	Nominal Pipe Size (in.)		
	12 - 36	42 - 60	66 - 120
Corrugated HDPE (Inner)	X		
Profile Wall PVC (Inner)	X		
Corrugated PP (Inner)	X	X	
Solid Wall HDPE (Outer)	X	X	
SRPE (Inner)	X	X	X
Spiral Wound PVC	X	X	X
Spiral Wound HDPE		X	X
Glass Fiber Reinforced (Inner)		X	X
Smooth Wall Carbon Steel Plate Pipe	X	X	X

I. Grout for Annular Space

Provide grout for the annular space in accordance with this Specification and with the manufacturer's published recommendations.

The grout shall be nonstructural or structural based upon the type of slip liner system provided. If the pipe liner provided cannot meet the stated requirements for factor of safety against buckling or crushing, then a structural grout must be used regardless of the pipe lining system used in order to fulfill the factor of safety requirements as stated herein.

Utilize material specifications for solidification of the annular void between host and the inserted liner with low density flowable fill or cellular grout. The cellular grout with a density between 40 and 80 lbs. per cubic foot may be used. Reduced density flowable fill grout with a density between 80 and 120 lbs. per cubic foot may be used.

Grout shall be mixed in small quantities as needed, and shall not be re-tempered or used after it has begun to set, unless otherwise specified or directed. The grout shall consist of one part portland cement and two parts sand by volume mixed with sufficient water to form a grout of proper consistency. When non-shrinking or non-shrinking fast-setting grout is specified, it shall be formulated by the incorporation of an admixture, or a pre-mixed grout may be used. The formulation and the admixture or the premixed grout used will be subject to the approval of the Engineer, and shall be mixed and used in accordance with the recommendations of the manufacturer.

For pipe 12"-36" when justified by structural design factors the use of grout is not required.

Equipment

Provide all necessary equipment for satisfactory completion of the work including restoration of the site.

Pipe Stockpiling and Handling

Pipe and fittings shall be stockpiled in a safe manner at each contractor staging area or pit location. The stockpiling shall be arranged to cause a minimum of interference to pedestrian and stored outside the safety clear zone of vehicular traffic.

When handling slip lining pipe, take all precautions necessary to avoid damaging the pipe. Pipe with cuts greater than 10% of the wall thickness shall be rejected or replaced at no cost to the Department.

Pipe storage areas shall be approved by the Engineer.

Construction Requirements

The existing culvert pipe shall be cleaned by whatever means necessary to remove all obstructions which may be encountered that would prevent insertion of the slip liner into the host pipe as approved by the Engineer. All drainage structures and ditches shall remain open at all times.

As Directed by the Engineer, reestablish the flow-line of eroded inverts with grout meeting the requirements of Subsection 918.21 of the specifications. Premixed grout may be used subject to approval of the Engineer.

A detailed plan on holding the liner pipe on the invert of the host pipe shall be submitted to the Engineer for approval.

Where required, a bullnose device shall be pulled through the existing culvert to facilitate the slip lining installation. The bullnose device shall be of appropriate diameter to return the culvert to its approximate shape.

The annular void shall be completely grout filled without deflecting the insertion pipe greater than 1.5 percent.

Provide end seals at the open points of each run of pipe to be grouted

Penetration of the host pipe shall be permitted for host pipe constructed with Corrugated Metal Pipe (CMP) to facilitate grouting of the annular void. Multiple fill pipes will be required.

The annular void shall be grouted solid by injecting grout from one end of the pipe run and allowing it to flow toward the other end. Venting of the annular void shall be performed to assure uniform filling of the void space during the grouting process. An open ended, high point tap or equivalent vent must be provided and monitored at the bulkhead opposite to the point of grouting.

After installation of the pipe liner is complete, seal the inlet end of the pipe with a water tight seal between the pipe liner and the existing pipe. The seal shall be one recommended by the pipe manufacturer and approved by the Engineer.

All incidental work, such as brush removal, flow-line adjustments, etc., shall be accomplished by the contractor.

Upon acceptance of the installation work and testing, clean-up and restore the project area affected by operations as approved by the Engineer.

Method of Measurement

The Department will measure the pipe liner to Slip Line the existing pipe by the linear feet installed and accepted.

The Department will measure the Cement by each per 94 lb bag. If pre-mixed grout is used, the amount of cement in each bag, or other units of pre-mixed grout, must be determined and expressed in equivalent 94 pound bag units for payment purposes.

Basis of Payment

The Department will pay for accepted quantities at the contract prices as follows:

Item		Pay Unit
607-65.20	Site Preparation	Each
607-65.XX	(Desc) Pipe To Slip Line (Desc)	Linear Feet
719-03	Cement	Bag

Such payment is full compensation for furnishing and installing pipe liner, clearing, reestablishing pipe flow lines, site restoration, and all other labor, materials and any incidentals necessary to complete the work.

All cost incurred in grouting eroded inverts of existing culvert pipes shall be included in the contract bid price for cement (per 94 pound bag).

STATE**OF****TENNESSEE**

January 1, 2015

SPECIAL PROVISION**REGARDING****NON-DISCRIMINATION IN EMPLOYMENT**

Bidders are cautioned as follows:

By signing this bid, the bidder will be deemed to have signed and agreed that all persons, firms or corporations supplying goods, material, equipment or service of any kind to the State of Tennessee will not discriminate against any employee or applicant for employment on the basis of handicap, race, religion, national origin or sex and further, that while under contract with the State will show proof upon request that all employment practices including, but not limited to, promotion, rates of pay, transfers, recruitment, recruitment advertising, terminations, layoffs and training and apprenticeship programs are not discriminatory in nature. Each contractor shall be required to post in conspicuous places, available to all employees and applicants for employment, notices of non-discrimination.

C I T Y O F B R E N T W O O D

October 1, 2012

SPECIAL PROVISION REGARDING

BID PROTEST POLICY

General Provisions:

- (a) Any actual or prospective bidder, offeror, or contractor who is aggrieved in connection with the solicitation or award of a bid or contract may protest to the City of Brentwood.
- (b) The term “protest,” as used in this section, shall refer to an allegation of:
 - i. A violation of a relevant local ordinance, state law, federal statute or other regulation governing the procurement of goods and/or services by the City.
 - ii. A deficiency or impropriety in a bid notice, specifications, request for qualifications or request for proposals issued by the City, or in prequalification proceedings conducted by the City in preparation for receiving bids or proposals.
 - iii. An error or impropriety in the award of a bid or contract or other procurement decision, including an allegation that a procurement is not exempt from standard bid procedures when such an exemption is claimed by the City.
- (c) The protest and appeal procedures set forth in this section are mandatory administrative procedures, which all aggrieved actual or prospective bidders, offerors, and contractors must utilize and exhaust prior to seeking judicial review or remedy.

Timely Protest Required:

- (d) To be valid, a protest must be submitted in writing to the head of the department for which the procurement is being carried out, signed by or on behalf of an eligible protestor, and compliant with the following time and content requirements:
 - i. A protest against an alleged solicitation deficiency or impropriety must be filed within three business days of the date notice of the solicitation was published; provided that if the protestor alleges that no notice was published, the protest must be filed within three days of the date the protestor learned that bids, offers or proposals were solicited by the City.
 - ii. A protest against an award must be filed within three business days of the date the protestor is notified by the City staff of the intent to award or the date the name of the party whose bid, offer or proposal is to be recommended for acceptance is posted on the City’s website, whichever occurs earlier; provided that if such information is posted on the City’s website, the City shall

C I T Y O F B R E N T W O O D

have no obligation to provide personal notification to any party. The posting on the City's website of the name of the party whose bid, offer or proposal is to be recommended for acceptance may be accomplished by including the information in the Board of Commissioners agenda materials which are posted on the website, or by a separate posting regarding the proposed procurement.

iii. The protest must include:

- a. The name and address of the protestor.
- b. The bid or proposal name, date and any other pertinent identifying information.
- c. A statement of the reason for the protest, including allegations and evidence sufficient, if uncontradicted, to establish the likelihood of:
 - 1. A violation of a relevant local ordinance, state law, federal statute or other regulation governing the procurement of goods and/or services by the City; or
 - 2. A deficiency or impropriety in the bid notice, specifications, request for qualifications or request for proposals issued by the City, or in pre-qualification proceedings conducted by the City in preparation for receiving bids or proposals.
 - 3. An error or impropriety in the award of a bid or contract or other procurement decision, including an allegation that a procurement is not exempt from standard bid procedures when such an exemption is claimed by the City.

(e) The protestor, to be eligible for administrative protest, must show a direct economic interest in the outcome of the procurement. If the protestor is other than an individual, the protest must be signed by an officer or other individual with authority to submit the protest on behalf of the protestor.

Protest Consideration:

(f) Upon receipt of a valid, written protest, the Department Head responsible for the solicitation or proposed award, after consulting with the City Attorney, shall take one of the following actions:

- i. Reject the protest; or
- ii. Accept the protest and take appropriate corrective action; or
- iii. Request additional information or request the protestor to present more information in person. At the Department Head's discretion, in-person presentations by the protestor may include demonstrations and/or site visits. The protestor is required to respond within five days of receipt of the City's request, unless a longer time period is allowed by the Department Head. If the protestor fails to provide a response to the request for additional

C I T Y O F B R E N T W O O D

information, or fails to appear in person as requested, the Department Head may reject the protest.

(g) The protestor must submit proof that a copy of the protest has been provided to other parties who have submitted a bid, offer or proposal to the City in response to the same solicitation and who have a direct economic interest in the outcome of the protest. Failure to submit such proof shall result in dismissal of the protest. Copies of all documents and other information submitted with the protest or at the request of the Department Head shall also be provided to such other parties. The other parties shall be permitted to respond in writing to the protest, provided that such response shall be submitted within three business days after the other parties' receipt of the protest. The other parties shall also be permitted to participate in any in-person meetings conducted by the Department Head with the protestor in regard to the protest.

(h) In the event of a timely protest, the City shall not proceed further with the solicitation of bids or proposals, or with the award of the contract, unless the City Manager makes a written determination that the solicitation of bids or proposals or the award of the contract without delay is necessary to protect the best interests of the City.

(i) If a protest is not resolved by mutual agreement, the Department Head shall promptly issue a decision in writing to the protestor, with copies to be delivered simultaneously to any other parties to whom copies of the protest were provided. The decision shall state the reasons for the action taken.

(j) The Department Head's decision in response to the protest shall be final and conclusive, unless an appeal is submitted to the City Manager.

(k) The protester may proceed as if an adverse decision has been received if the protest is not resolved and the Department Head does not issue the written decision required under subsection (i) of this section within one of the time periods established below, whichever is longest:

- i. Fifteen days following receipt of the protest; or
- ii. If additional information is requested by the Department Head, 15 days following the Department Head's receipt of such additional information; or
- iii. Such alternative period as may be agreed upon by the parties.

Appeal to City Manager:

(l) An appeal of the Department Head's action in regard to a protest may be submitted to the City Manager by any person who can show a direct economic interest in the outcome of the procurement. Any appeal to the City Manager must be submitted within three business days of notification of the Department Head's action, or if no action has been taken by the Department

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Head, within three business days of the expiration of time allowed for the Department Head's action.

(m) Appeals to the City Manager must be submitted in writing and must include:

- i. The name and address of the appellant.
- ii. The bid or proposal name, date and any other pertinent identifying information.
- iii. Evidence as to why the Department Head's action was erroneous.

(n) Upon receipt of a valid, written appeal, the City Manager, after consulting with the City Attorney, shall take one of the following actions:

- i. Affirm the Department Head's decision; or
- ii. Overturn the Department Head's decision and take appropriate corrective action; or
- iii. Request additional information or request the appellant to present more information in person. At the City Manager's discretion, in-person presentations by the appellant may include demonstrations and/or site visits. The appellant is required to respond within five days of receipt of the City's request, unless a longer time period is allowed by the City Manager. If the appellant fails to provide a response to the request for additional information, or fails to appear in person as requested, the City Manager may deny the appeal.

(o) If the appellant is someone other than the original protester, the appellant must submit proof that a copy of the appeal has been provided to the original protester. Failure to submit such proof shall result in dismissal of the appeal. Copies of all documents and other information submitted with the appeal or at the request of the City Manager shall also be provided to the original protester. The original protester shall be permitted to respond in writing to the appeal, provided that such response shall be submitted within three business days after receipt of the appeal by the original protester. The original protester shall also be permitted to participate in any in-person meetings conducted by the City Manager with the appellant in regard to the appeal.

(p) The City Manager's decision in response to the appeal shall be final and conclusive, subject to:

- i. Approval or disapproval of the procurement by the Board of Commissioners, if required.
- ii. Such judicial review or remedy as may be available to a party with standing in the matter.

C I T Y O F B R E N T W O O D

(q) The appellant may proceed as if an adverse decision has been received if the appeal is not resolved and the City Manager does not issue a written decision within one of the time periods established below, whichever is longest:

- i. Fifteen days following receipt of the appeal; or
- ii. If additional information is requested by the City Manager, 15 days following the City Manager's receipt of such additional information; or
- iii. Such alternative period as may be agreed upon by the parties.

(r) The City Manager may authorize the Assistant City Manager to process and decide appeals on the City Manager's behalf.

Remedies – Solicitations:

(s) If it is determined that there has been a deficiency or impropriety in the bid notice, specifications, request for qualifications or request for proposals issued by the City, or in pre-qualification proceedings conducted by the City in preparation for receiving bids or proposals, then the bid notice, specifications, request for qualifications, pre-qualification proceedings or request for proposals may be:

- i. Cancelled or withdrawn; or
- ii. Revised to comply with the law, to alter the schedule, or to otherwise eliminate the deficiency or impropriety.

Remedies – Award Challenges:

(t) If prior to award, it is determined that a proposed award of a contract is in violation of a relevant law or regulation or otherwise erroneous or improper, then the proposed award shall be:

- i. Cancelled; or
- ii. Revised to comply with the law or to eliminate errors or improprieties.

(u) If after an award, it is determined that an award of a contract is in violation of a relevant law or regulation or otherwise erroneous or improper, then:

- i. If the person receiving the award has acted in good faith:
 - a. The award may be revised to comply with the law, or to eliminate errors or improprieties, and ratified and affirmed, provided it is determined that doing so is in the best interest of the City; or
 - b. The contract may be terminated and the person receiving the notice of award may be compensated for the actual expenses reasonably incurred under the contract, plus a reasonable profit, prior to the termination.
- ii. If the person receiving the award has acted fraudulently or in bad faith:

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- a. The award may be declared null and void; or
- b. The award may be ratified and affirmed if such action is in the best interest of the City, without prejudice to the City's rights to such damages as may be appropriate.

Deadlines:

- (v) Whenever a deadline for the filing of a protest, appeal, information requested by the City or any action to be taken by the City would otherwise fall on a weekend or City holiday, the deadline shall be extended to the next weekday that is not a City holiday.

C I T Y O F B R E N T W O O D

May 2018

**SPECIAL PROVISION
REGARDING**

**DISPUTE RESOLUTION
AND
GOVERNING LAW**

If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, or if OWNER and CONTRACTOR are unable to resolve a difference in interpretation of a Contract term, a Claim may be made therefor as provided in the contract. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Claims and Disputes

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price or Contract Time shall be prepared in accordance with the provisions of the contract. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

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ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless a request for mediation is submitted within the time limits and in accordance with these dispute resolution procedures.

If ENGINEER does not render a formal decision in writing within the time stated in the contract, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

C. *Mediation.* All disputes between OWNER and CONTRACTOR not resolved by ENGINEER's decision shall be submitted to nonbinding mediation unless the parties mutually agree otherwise. Should the OWNER or CONTRACTOR wish to submit the dispute to a mediator, such party shall send a written request to the other party, with a copy to ENGINEER, within 30 days after the date of ENGINEER's decision. If OWNER and CONTRACTOR cannot agree upon a mediator, ENGINEER shall designate a mediator. The fees and expenses of the mediator and any mediation service shall be shared equally by OWNER and CONTRACTOR unless otherwise determined in the course of the mediation.

D. *Litigation.* In the event mediation is unsuccessful in resolving a dispute, or the parties have mutually agreed to forego mediation, either party may initiate a formal proceeding to exercise such rights or remedies as such party may have with respect to such dispute in accordance with applicable law.

E. *Validity of claims.* No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with the contract. In no event shall a demand for mediation be made or proceeding initiated after the date when institution of an action at law or in equity based on such claim, dispute, or other matter in question would be barred by the applicable statute of limitations.

Controlling Law

A. This Contract is to be governed by the law of the State of Tennessee. In the event the dispute resolution procedures set forth above are unsuccessful, or the parties have mutually agreed to

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forego such procedures, venue for any litigation resulting from the dispute shall lie with the courts of Williamson County, Tennessee.

Fees and Expenses

If OWNER or CONTRACTOR bring any action at law or in equity against the other to enforce or interpret the terms of this Contract, and prevails in such action, then the prevailing party shall be entitled to reasonable attorney's fees, expenses and costs, including expert witness fees, if applicable.

C I T Y O F B R E N T W O O D

December 19, 2016

**SPECIAL PROVISION
REGARDING
IRAN DIVESTMENT ACT****IRAN DIVESTMENT ACT REQUIREMENTS**

Pursuant to *Tennessee Code Annotated* § 12-12-106 (as enacted by Chapter 817 of the Public Acts of 2016) the chief procurement officer for the State of Tennessee shall publish a list of persons determined to be engaging in investment activities in Iran. The list is posted on the website of the Tennessee General Services Department's Central Procurement Office*. When competitive bidding is required, *Tennessee Code Annotated* § 12-12-111 requires every bid or proposal submitted to a local government for goods or services to include the following statement, subscribed or affirmed by the bidder as true under the penalty of perjury:

CERTIFICATION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to *T.C.A.* § 12-12-106.

Signature_____
Date_____
Printed Name_____
Title_____
Name of Firm/Company

* https://tn.gov/assets/entities/generalservices/cpo/attachments/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106_Iran_Divestment_Act-July.pdf.

C I T Y O F B R E N T W O O D

December 29, 2016

SPECIAL PROVISION REGARDING TOPSOIL REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing topsoil at the locations shown on the Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil (Placing and Spreading of Furnishing and Spreading) provided by the CONTRACTOR shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. It shall be reasonably free from roots, hard clay, coarse gravel, stones larger than one inch in any dimension, noxious weeds, tall grass, brush, sticks, stubble or other material which would be detrimental to the proper development of vegetative growth.

Topsoil shall be obtained from naturally well drained sites where topsoil occurs at least 4-inches deep. Topsoil shall not be obtained from bogs or marshes.

B. Topsoil shall conform to the following grading:

Sieve Sizes	Percentage Passing
1-inch	100%
1/2 inch	95% - 100%
No.4	75% - 100%
No.10	60% - 100%
No.200	10% - 60%

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C. Topsoil shall contain not less than 3%, or more than 20% organic matter, by weight as determined by loss-on-ignition of oven-dried samples in accordance with ASTM T-6.

Organic material shall be decomposed and free of wood.

D. The ENGINEER shall be notified on the location from which the CONTRACTOR proposes to furnish topsoil at least 30 calendar days prior to delivery of topsoil to the Project from that location. The topsoil and its source will be inspected and tested by the ENGINEER before approval will be granted for its use.

E. Topsoil sources lacking organic matter may be used if, prior to delivery to the Project, sufficient organic matter in the form of pulverized peat moss or rich organic soil from other sources is thoroughly mixed with the topsoil to provide a product meeting the above requirements.

F. Organic material for incorporation into topsoil, if required, shall be partially decomposed fibrous or cellular stems and leaves of any of several species of Sphagnum mosses, or rotted manure. Organic material may require chopping to shredding to insure thorough mixing with the topsoil.

G. All topsoil shall be fertilized as follows: the application rates of the fertilizer and limestone per 1,000 square feet of ground area of topsoil furnished by the CONTRACTOR shall be determined by the ENGINEER, based on soil analysis tests so that the total natural and applied chemical constituents are as follows:

Nitrogen	1.0 lb. minimum - 1.5 lb. maximum per
	1,000 square feet
Phosphoric Acid	1.0 lb. minimum - 2.0 lb. maximum per
	1,000 square feet
Potassium	1.0 lb. minimum - 2.0 lb. maximum per
	1,000 square feet
Limestone	Limestone requirements shall conform

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to the following table:

LIMESTONE REQUIREMENTS

Soil pH	Limestone Tons per Acre
Above 6.0	0
5.0 - 6.0	1.5
Below 5.0	3.0

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. All areas disturbed during construction which are not covered with pavement, concrete, or base course, shall be graded to a neat, uniform gradeline and appearance, as determined by the ENGINEER, and covered with a neat uniform, four inch (minimum) to six inch (maximum) thickness of topsoil and hydroseeded, unless otherwise shown on the Drawings, or directed by the ENGINEER.

1) Cut slope in rock – Shall be over excavated allowing for an 18 – inch minimum overlay of earthen fill on top of the rock cut prior to placement of topsoil with seed or sod. Topsoil shall be a minimum depth of 6 inches, placed on top of the earthen material.

B. The topsoil shall be evenly spread on the designated areas to a depth, which, after settlement and compaction, shall be four inches, unless otherwise directed by the ENGINEER. Topsoil placement shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the WORK, as determined by the ENGINEER. Roadway and sidewalk surfaces shall be kept clean during hauling and spreading operations.

C. After spreading has been completed, large clods, stones larger than one-inch in any dimension, roots stumps, and other litter shall be raked up and removed.

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D. The final grading of the topsoil prior to installation of seed, sod or hydroseeding shall be to a tolerance that will not permit ponding of water.

E. Topsoil Finish Grading, will not be approved for start-up until the topsoil has been graded to within the tolerances given above.

1. The CONTRACTOR shall provide labor personnel experienced with landscaping work that involves fine grading of topsoil for residential or commercial lawns.
2. The ENGINEER will determine the location of those areas requiring finish grading and the time required to bring the graded topsoil to the desirable finish appearance.
3. The CONTRACTOR shall remove and dispose of all excess materials resulting from the finish grading of the topsoil. The WORK required to remove and dispose of this excess material from piles placed along the roadway will be considered incidental to other WORK under the contract.

END OF SECTION



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SPECIFICATIONS

1. WORK SCOPE

- 1.1. All work shall be done in compliance with applicable This project is to be constructed under the Standard and Supplemental Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents, and the latest edition of the MUTCD. The materials used shall be chosen from the Materials, Sources, and Devices as contained in the Qualified Product List.
- 1.2. All repairs should cause minimal loss in flow capacity and should increase the strength of the structure to maintain proper horizontal and vertical profiles of the roadway above.

2. PERFORMACE REQUIREMENTS

- 2.1. Bid price shall include all materials, hardware, supplies, tools, equipment, labor, transportation, and other necessary incidentals required for the completion of the work in an approved and satisfactory manner.
- 2.2. If required, on-site storage of job materials and/or equipment is to be coordinated with
- 2.3. the Public Works Director or authorized representative prior to the beginning of work. The security of material and equipment left on-site will be the responsibility of the contractor.
- 2.4. The performance of any work under these specifications will not be deemed complete until the contractor has satisfactorily removed all debris and cleaned up the work site. At no time during the performance of work will materials, debris or trash be allowed to accumulate in such a manner as to endanger the safe performance of the work of the safety of the traveling public.
- 2.5. This work will be performed upon completion at designated location.
- 2.6. Unit of work for debris removal will be included in the lining unit price and shall include the removal and disposal of all damaged and removed material. All material which is to be removed shall be disposed of by the contractor and these related costs should be



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reflected in the unit price. Work will include removal of various types of debris affecting the designed flow of the drainage structure. The contractor shall be required to handle all disposal of debris removal.

- 2.7. Note that the roadway pipe will be constructed of concrete.
- 2.8. The contractor will not be required to remove any trees to allow for repairs to the headwall.
- 2.9. The Contractor shall perform construction so as not to adversely impact the local environment in violation of regulations enforced by the TN Department of Environment and Conservation,
- 2.10. or the Environmental Protection Agency (EPA). If the Contractor is found to be in violations, the work will be stopped until conditions are restored to a satisfactory state.
- 2.11. The Contractor shall warrant all work against defects in materials and workmanship for
- 2.12. a period of two (2) years to ensure maximum performance of the lining. Warranty inspection
- 2.13. will be performed two (2) years from the date of acceptance at the Contractor's expense by
- 2.14. video inspection. Any defects will be corrected at the Contractor's expense.

3. MINIMUM SPECIFICATIONS

- 3.1. Foreman shall have experience including as an operator and applicator of the equipment and product required to meet the proposal. Provide manufacturer certification that the Foreman has been trained and approved in the handling, mixing, and application of the products to be used.
- 3.2. Operators and applicators shall have experience in proposed construction within storm drainage systems and shall have successfully demonstrated all the duties for which they shall have responsibility on this project. Provide four (4) references which demonstrate previous successful projects completed for the specified structural protective coating system or comparable during the last (2) years.



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- 3.3. Operator and applicators responsibilities include but are not limited to the following:
- 3.4. Ensure that all surfaces to be lined are clean and free of laitance and loose material, using air and water to blast debris from pipes/culverts/bridges.
- 3.5. Regulate material content so as to provide a proper mix that will be plastic enough to give good compaction and low percentage of rebound without sagging.
- 3.6. A procedure should be followed so that corners are filled with material to eliminate voids as much as possible in the lining and to prevent loss of drainage flow.
- 3.7. Determined necessary operating procedures for placement of the lining material in confined areas, over extended distances and/or around unusual obstructions where placement methods may need to be adjusted to provide adequate structural function.
- 3.8. Crews should be directed when to start and stop if material placement is not in conformance to the placement guidelines.
- 3.9. Ensure that any pockets of structurally unsound material are removed and replaced.
- 3.10. The lining should be constructed neatly and in a workmanlike manner.
- 3.11. Crews shall have successfully demonstrated all of the duties for which they shall be responsible on this project as specified by the product's required construction procedures.
- 3.12. Equipment Certification**
 - 3.12.1. Certification that the equipment to be used for applying the products has been manufactured or approved by the protective coating manufacturer and Application personnel have been trained and certified for the proper use of the equipment. Certification letter shall be dated within six months of the bid date.
 - 3.12.2. Equipment shall be used that is capable of installation at a rate that will provide adequate production and with an accuracy that will ensure uniformity. Weighing equipment shall be capable of batching with the accuracy specified in ASTM C-94.



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Volumetric equipment shall be capable of batching with the accuracy specified ASTM C-685.

3.13. Testing Agency Qualifications

3.13.1. Contractor shall secure, at his expense, the services of a testing laboratory meeting the requirements of ASTM E-329. The testing laboratory shall be normally engaged in the testing of concrete materials and concrete. Contractor shall submit the qualifications of the testing agency to owner for approval in accordance with the requirements for submittals contained in the specification. The materials testing laboratory shall make all tests to provide the quality control that shows that the shotcrete and shotcrete materials provided meet or exceed the requirements of this specification. As interpretations of the test results is required, contractor shall further be responsible for securing the services of an independent Professional Engineer licensed in the State of Alabama who shall review and certify the test results. Certified test results shall be submitted by contractor to owner in triplicate.

3.14. Structural Design Parameters

3.14.1. Structure condition should be considered a partially deteriorated gravity culvert.

3.14.2. Soil type should be considered saturated for maximum performance of the product.

3.14.3. Design thickness should be based on design requirements found in the design standards listed for each product/process throughout this document.

3.14.4. Ovality of the pipe shall not be greater than 10%.

3.14.5. The soil load used for design shall be 120 pounds per cubic foot.

3.14.6. The Traffic Load will be AASHTO HS-20-44 Highway.

3.14.7. Soil Modulus shall be 1000 psi

3.14.8. The Factor of Safety shall be 2.0.



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- 3.14.9. The soil cover shall be measured at the distance from the grade to the crown of the pipe.
- 3.14.10. The water table shall be considered saturated condition (same elevation as the soil cover at the top of any pipe).
- 3.14.11. The design life shall be a minimum of 50 years.
- 3.14.12. All designs must be submitted with calculations prior to performing the work. Calculations should be clear and should reference applicable American Society for Testing and Materials (ASTM), American Concrete Institute (ACI), National Association of Corrosion Engineers (NACE), and the Society for Protective Coatings (SSPC) standards.
- 3.14.13. Design calculations shall include Flexural Strength and Flexural Modulus capable of meeting all the load requirements based on the aforementioned design parameters.
- 3.14.14. Third party testing shall be used to confirm Flexural Strength used on this project.
- 3.14.15. Third party testing shall be used to confirm long term Flexural Modulus of Elasticity. This third party testing will verify the long term reduction factor (Creep Analysis) of a minimum of 50%. This long term reduction factor verification shall be conducted utilizing ASTM D2990-01 via a third party independently certified laboratory.

3.15. Approved Linings

- 3.15.1. To be designed and recommended by the bidder and certified to meet all design parameters in Section 3.14
- 3.15.2. All linings must be preceded by construction that grouts voids in the concrete culvert and rock walls and floor.
- 3.15.3. After grouting is complete, install # 4 reinforcing steel bars at 8" centers, 24" long and 2 #4 reinforcing steel bars longitudinally at the invert for the entire length of the



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concrete and rock culverts. Reinforcing steel shall meet the requirements of ASTM A-615, Grade 60.

4. PRODUCTS

- 4.1. Must meet all applicable standards (ASTM, ACI, NACE, etc) as provided in the bid package.
- 4.2. Any testing required by the provided standards will be required by a third party as previously stated prior to payment.

5. EXECUTION

5.1. Flow Control

- 5.1.1. Contractor shall provide for maintenance a flow in the affected portions of the drainage system during the installation of the shotcrete lining.

5.2. Cleaning

- 5.2.1. Prior to the installation of shotcrete lining, contractor shall thoroughly clean the pipe or culvert designated to receive the liner. Cleaning shall constitute removal of all solids, roots, deposits, and other matter which would preclude the installation of the concrete liner into the pipe line.

5.3. Inspection of Pipelines

- 5.3.1. Prior to the installation of shotcrete lining, contractor shall inspect the pipe/culvert designated to be lined.

5.4. Surface Preparation

- 5.4.1. Contractor shall remove all unsound and loose material before applying shotcrete. Contractor shall chip or scarify any area to be repaired to remove offsets which would cause an abrupt change in thickness without suitable reinforcement. All edges shall be tapered so as to leave no square shoulders at the perimeter of the cavity. After all chipping work has been completed; the entire surface shall be thoroughly



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sandblasted and cleaned with a compressed air blast and jet water blast using a cement gun to remove all dirt, debris and loose particles to permit a satisfactory bond between the existing surface and the shotcrete. Air pressure in the cement gun shall be less than 50psi.

- 5.4.2. Contractor shall sandblast existing surfaces that do not require chipping to remove paint, oil, grease, silt, slime, and other contaminants, and provide a roughened surface for proper bonding of the shotcrete. Blasting of steel surfaces shall be in compliance with SSPCSP6.
- 5.4.3. The chipped and blasted surfaces shall be dampened but without visible running water. Shotcrete shall not be placed on any area where free running water exists.
- 5.4.4. Loose bricks, in areas are not specifically mentioned, shall be removed and the void filled with shotcrete. This shall apply only to isolated situations where only a few (one to ten) are loose.
- 5.4.5. Void areas that extend beyond the outside plane of the pipe line or manhole/junction box into the surrounding soil shall be filled and stabilized using pressure injected grout to the outside plane of the pipe line.
- 5.4.6. Contractor shall fill all voids and repair deficiencies in the culvert and manhole/junction box with shotcrete.
- 5.4.7. Contractor shall repair any damage to the existing structure resulting from his cleaning or void filling operations at no cost to the owner.
- 5.4.8. Contractor shall remove and properly dispose of, as approved by the Engineer, all debris and rebound from the pipe/culvert that results from his cleaning and shotcrete placement operations. No debris shall be permitted to wash down into the drainage system.
- 5.4.9. The contractor shall contact utilities to identify all pipe and conduit in the pipe/culvert to be rehabilitated.

5.5. Placement of Lining



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5.5.1. Linings shall be placed in such a manner as to meet or improve current flow.

5.5.2. Linings shall be placed as directed by the provided design standards (ASTM, ACI, SSPC, NACE, etc) and meet the minimum parameters as verified by the engineer of record.

5.6. Surface Finish

5.6.1. Contractor shall bring the lining material to an even plane and well formed corners where applicable.

5.6.2. After the body coat has been placed, the surface shall be trued to remove high areas and expose low areas. Low areas must be filled to ensure a true, flat surface.

5.6.3. After the surface has been trued, the entire surface shall receive a treatment providing a smooth finish surface with any brush finish (if concrete) to be finished parallel to the flow.

5.7. Lateral Reinforcement or Abandonment

5.7.1. Contractor is responsible for identifying all active and abandoned laterals and their locations. The contractor shall submit a lateral abandonment plan prior to the beginning of work. The plan shall include the locations and sizes of all laterals and whether they are active or abandoned.

5.7.2. It shall be the contractor's responsibility to determine and to assure that all live laterals are connected. Laterals reinstatement shall be completed from inside the pipe. Excavation for lateral reinstatement shall be permitted.

6. PAYMENT

6.1. All incidental cost should be included in the unit prices.

6.2. Any bypass pumping, cleaning, pre and post construction televising, labor, equipment, materials, traffic control, installation, service reconnection/abandonment, safety, dust/erosion control, testing, site restoration and all other work specified or not, which is



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reasonably required to provide a completed installation shall be included in the bid prices as incidental.

6.3. Before payment is made, all test results must be submitted and confirmed that the lining meets all the aforementioned specifications.

6.4. Payment will be made after all structures are complete.

Specifications for the Rehabilitation of Corrugated Metal Pipe using Shotcrete

I. Scope

- A. The work covered by these specifications consists of furnishing all labor, equipment, appliances and materials, and performing all operations in connection with the rehabilitation of corrugated metal pipe with shotcrete, complete in drawings and subject to the terms and conditions of the contract.
- B. Shotcreting shall conform to all requirements of "Guide to Shotcrete", published by the American Concrete Institute, Detroit, Michigan, except as modified by these specifications.
- C. Reinforcement shall be incorporated in the shotcrete as required and shall be furnished and placed in accordance with the provisions of these specifications.
- D. The purpose of this specification is to obtain a dense and durable concrete having the specified strength.

II. Composition

- A. Shotcrete shall be composed of Portland cement, aggregate and water so proportioned as to produce a concrete suitable for pneumatic application.

III. Strength Requirements

- A. Shotcrete shall be supplied by Ready Mix supplier. The shotcrete shall be extremely strong, dense and resistant to weathering and abrasion. Shotcrete shall have minimum 28-day strength of 4,000 psi.

IV. Materials

- A. Portland Cement
 - 1. Cement shall be Type I/II Portland Cement conforming to all of the requirements of the American Society for Testing Materials Standard Specifications, latest serial designation C-150.

B. Fine Aggregate

1. Fine aggregate shall be natural, siliceous sand consisting of hard, clean, strong, durable and uncoated particles, conforming to the requirements of American Society for Testing Materials Standard Specifications, Latest Serial Designation C-33 for Concrete Aggregates.
2. Fine aggregate shall not contain less than three percent or more than six percent of moisture.
3. Fine aggregate shall be evenly graded from fine to coarse and shall be within the following limits:

Passing No.	3/8 Sieve	100%
Passing No.	4 Sieve	95% to 100%
Passing No.	8 Sieve	80% to 100%
Passing No.	16 Sieve	50% to 85%
Passing No.	30 Sieve	25% to 60%
Passing No.	50 Sieve	10% to 30%
Passing No.	100 Sieve	2% to 10%

C. Water

1. Water used in mixing shall be fresh, clean, and free from injurious amounts of oil, acid, alkali, vegetable, sewage, and/or organic matter.

D. Reinforcement

1. Reinforcement bars shall conform to the latest requirements of ASTM Standard Specifications, Serial Designation A-615 for Deformed Billet Steel Bars for Concrete Reinforcement. Unless shown otherwise on the plans, all bars shall be Grade 40.
2. Steel mesh reinforcement shall be electrically welded, cold drawn, mild steel fabric conforming to the latest requirements of ASTM Standard Specifications, Serial Designation A-185 for Welded Steel Wire Fabric for Concrete Reinforcement. Mesh can be fabricated from cold-drawn steel wire conforming to the requirements of the latest ASTM Standard Specifications, Serial Designation A-82. Unless otherwise shown on the plans, mesh shall be 2 x 2 - W0.9 x W0.9 (2 x 2 - 12/12) galvanized welded wire fabric.
3. Polypropylene fibers shall be used as indicated on the drawings in lieu of wire mesh. Use only 100 percent virgin polypropylene fibers containing no

reprocessed olefin materials. Fiber manufacturer must document evidence of 5-year satisfactory performance history: ASTM C-1116 (Ref.: ASTM C-1018).

V. Sampling and Testing Cement and Aggregate

- A. Where reputable cement and aggregate suppliers maintain regular recognized testing services, certified copies of such tests will be accepted by the Owner. However, in any case of doubt as to the accuracy and/or adequacy of such tests, the Owner may require that cement and aggregates be tested by a recognized commercial testing laboratory which has been selected by the Contractor and approved by the Owner. The testing laboratory shall also certify that the materials covered by the report comply in all respects with these specifications.
- B. Shotcrete is supplied by local Ready Mix suppliers and pumped via contractor's equipment. The Shotcrete is typically an existing mix developed by the Ready Mix supplier based on standard raw materials (aggregate, sand, and cement).
- C. Cylinders shall be taken during the pour from the Ready Mix truck shoot. Slump can also be tested for consistency. Cylinders, typically 4"x8", shall be cast and tested at 7 and 28 day intervals.

VI. Surface Preparation

- A. All areas to receive pneumatic concrete shall be cleaned by flushing or scouring with water and compressed air jets to assure the removal of all loose particles.
- B. To insure, the newly prepared surface shall be thoroughly moistened with water prior to application of shotcrete. In no instance shall shotcrete be applied in an area where free running water exists.

VII. Application

- A. Shotcrete shall not be placed on a frozen surface or during freezing weather, unless means are used to elevate the area temperature, which is acceptable. Shotcrete shall not be placed when anticipated the temperature during the following 24 hours will drop below 32 degrees Fahrenheit; unless temperature is maintained.
- B. Sequence of application may be from bottom to top or vice versa if rebound is properly removed.

- C. Voids shall be filled first. "Shooting" shall be from an angle as near perpendicular to the surface as practicable, with the nozzle held approximately 3 feet from the work (except in confined space). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.
- D. Shotcreting shall be suspended if:
 - 1. Air velocity separates the paste from the aggregate at the nozzle.
 - 2. Temperature approaches freezing and the newly placed shotcrete cannot be protected.
- E. Shotcrete can be applied in one or more layers to such total thickness as required restoring the area as detailed over the original lines of the adjoining surface, unless otherwise specified. All cavities, depressions, washouts and similar failures shall be rebuilt to original lines by use of shotcrete reinforced with wire mesh. Where the cavity exceeds four inches in depth, a layer of mesh shall be used for each four inches of depth of shotcrete. However, in no case shall wire mesh be placed behind existing reinforcement.
- F. The time interval between successive layers in sloping vertical or overhanging work must be sufficient to allow initial, but not final, set to develop. At the time the initial set is developing, the surface shall be cleaned to remove the thin film of laitance in order to provide a perfect bond with succeeding applications.

VIII. Construction Joints

- A. Construction joints or day's work joints shall be sloped off to a thin, clean, regular edge preferably at a 45-degree slope. Before placing the adjoining work, the slope portion of adjacent shotcrete shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.

IX. Surface Finish

- A. Nozzleman shall bring the shotcrete to an even plane and to well-formed corners be working up to ground wires or other guides, using somewhat lower placing velocity than normal.
- B. After the body coat has been placed, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with concrete to insure a true flat surface.

- C. After the concrete surface has been brought to specified depth, the surface finish shall be either a 'broom' or 'float' finish - unless a special type finish is specified per the drawings.

X. Curing

- A. Curing shall be in accordance with paragraph 8.7 ACI - 506-R, depending upon atmospheric condition.
- B. Keep water off of shotcrete until shotcrete sets – typically 12 hours.
- C. If water velocity is too great, extend introducing flow onto the shotcrete until final set is obtained.

Specifications for the Rehabilitation of Corrugated Metal Pipe with Shotcrete (Dry Mix)

I. Scope

- A. The work covered by these specifications consists of furnishing all labor, equipment, appliances and materials, and performing all operations in connection with the rehabilitation of corrugated metal pipe with shotcrete, complete in drawings and subject to the terms and conditions of the contract.
- B. Shotcreting shall conform to all requirements of "Guide to Shotcrete", published by the American Concrete Institute, Detroit, Michigan, except as modified by these specifications.
- C. Reinforcement shall be incorporated in the shotcrete as required and shall be furnished and placed in accordance with the provisions of these specifications.
- D. The purpose of this specification is to obtain a dense and durable concrete having the specified strength.

II. Composition

- A. Shotcrete shall be composed of Portland cement, aggregate and water so proportioned as to produce a concrete suitable for pneumatic application.

III. Strength Requirements

- A. Concrete ingredients shall be selected and proportioned in such a manner as will produce concrete that will be extremely strong, dense and resistant to weathering and abrasion. Concrete shall have a minimum 28-day strength of 4,000 psi.

IV. Materials

- A. Portland Cement
 - 1. Cement shall be Type I/II Portland Cement conforming to all of the requirements of the American Society for Testing Materials Standard Specifications, latest serial designation C-150.

B. Fine Aggregate

1. Fine aggregate shall be natural, siliceous sand consisting of hard, clean, strong, durable and uncoated particles, conforming to the requirements of American Society for Testing Materials Standard Specifications, Latest Serial Designation C-33 for Concrete Aggregates.
2. Fine aggregate shall not contain less than three percent nor more than six percent of moisture.
3. Fine aggregate shall be evenly graded from fine to coarse and shall be within the following limits:

Passing No.	3/8 Sieve	100%
Passing No.	4 Sieve	95% to 100%
Passing No.	8 Sieve	80% to 100%
Passing No.	16 Sieve	50% to 85%
Passing No.	30 Sieve	25% to 60%
Passing No.	50 Sieve	10% to 30%
Passing No.	100 Sieve	2% to 10%

C. Water

1. Water used in mixing at the nozzle shall be fresh, clean, and free from injurious amounts of oil, acid, alkali, vegetable, sewage, and/or organic matter.

D. Reinforcement

1. Reinforcement bars shall conform to the latest requirements of ASTM Standard Specifications, Serial Designation A-615 for Deformed Billet Steel Bars for Concrete Reinforcement. Unless shown otherwise on the plans, all bars shall be Grade 40.
2. Steel mesh reinforcement shall be electrically welded, cold drawn, mild steel fabric conforming to the latest requirements of ASTM Standard Specifications, Serial Designation A-185 for Welded Steel Wire Fabric for Concrete Reinforcement. Mesh can be fabricated from cold-drawn steel wire conforming to the requirements of the latest ASTM Standard Specifications, Serial Designation A-82. Unless otherwise shown on the plans, mesh shall be 2 x 2 - W0.9 x W0.9 (2 x 2 - 12/12) galvanized welded wire fabric.
3. Polypropylene fibers shall be used as indicated on the drawings in lieu of wire mesh. Use only 100 percent virgin polypropylene fibers containing no

reprocessed olefin materials. Fiber manufacturer must document evidence of 5-year satisfactory performance history. ISO 9002 certification of manufacturing facility, compliance with ASTM C-1116 Type III, 4.1.3, ASTM C-1116 (Ref.: ASTM C-1018).

E. Storage of Materials

1. Cement shall be stored with adequate provisions for the prevention of absorption of moisture. It shall be stored in a manner that will permit easy access for inspection and identification of each shipment.
2. Aggregate shall be stockpiled at points selected to provide maximum drainage and to prevent the inclusion of any foreign material during re-handling.
3. On delivery to the site of the work, the steel reinforcement shall be carefully bundled, tagged and stored so the bars for any position in the work may be readily identified. All reinforcing steel shall be stored on approved material above the ground.

V. Sampling and Testing Cement and Aggregate

- A. The contractor shall determine the source, kind and quality of the cement and aggregates to be used in the work in advance of the time scheduled for starting the work and, when so directed, shall submit such information for approval before starting shotcrete operations.
- B. The cost of testing cement and aggregates shall be borne by the Owner. Certified test reports and other certificates, when so directed, shall be submitted in duplicate to the Owner and to such other agencies as the Owner may designate.
- C. Where reputable cement and aggregate suppliers maintain regular recognized testing services, certified copies of such tests will be accepted by the Owner. However, in any case of doubt as to the accuracy and/or adequacy of such tests, the Owner may require that cement and aggregates be tested by a recognized commercial testing laboratory which has been selected by the Contractor and approved by the Owner. The testing laboratory shall also certify that the materials covered by the report comply in all respects with these specifications.
- D. No cement or aggregate which fails to meet the requirements of these specifications shall be incorporated into the work.

VI. Surface Preparation

- A. All areas to receive pneumatic concrete shall be cleaned by flushing or scouring with water and compressed air jets to assure the removal of all loose particles. All areas of existing surfaces that do not require chipping shall be given a wet sandblasting with the shotcrete equipment and the air pressure at the cement gun shall not be less than 50 psi.
- B. To insure perfect bond, the newly chipped and sandblasted surface shall be thoroughly moistened with water prior to application of shotcrete. In no instance shall shotcrete be applied in an area where free running water exists.

VII. Proportioning (Dry Mix)

- A. Prior to start of shotcreting, the Contractor shall submit to the Owner the recommended mix as a ratio of cement to aggregate. Recommended mix shall be based on test data from prior experience. Provided data submitted is adequate, no further testing of recommended mix will be required.
- B. If required, the Contractor shall provide all equipment necessary to control the actual amounts of all materials entering into the concrete. The types of equipment and methods used for measuring materials shall be subject to approval.

VII. Mixing (DryMix)

- A. Shotcrete shall be thoroughly mixed by machine and then passed through a sieve to remove all large particles before placing in hopper of the cement gun. The mixture shall not be permitted to become damp. Each batch should be entirely discharged before recharging is begun. The mixer should be cleaned thoroughly enough to remove all adherent materials from the mixing vanes and from the drum at regular intervals.
- B. Water in any amount shall not be added to the mix before it enters the cement gun. Quantities of water shall be controlled by a valve at the nozzle of the gun. Water content shall be adjusted as required for proper placement, but shall in no case exceed four gallons of water per sack of cement, including the water contained in the aggregate.
- C. Remixing or tempering shall not be permitted. Mixed material that has stood 45 minutes without being used shall be discarded. Rebound materials shall not be reused.

IX. Application

- A. Shotcrete shall not be placed on a frozen surface nor during freezing weather. Shotcrete shall not be placed when it is anticipated that the temperature during the following 24 hours will drop below 32 degrees, Fahrenheit.
- B. Sequence of application may be from bottom to top or vice versa if rebound is properly removed.
- C. Corners shall be filled first. "Shooting" shall be from an angle as near perpendicular to the surface as practicable, with the nozzle held approximately 3 feet from the work (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.
- D. Shotcreting shall be suspended if:
 - 1. Air velocity separates the cement from the sand at the nozzle.
 - 2. Temperature approaches freezing and the newly placed shotcrete cannot be protected.
- E. Shotcrete shall be applied in one or more layers to such total thickness as required to restore the area as detailed over the original lines of the adjoining surface, unless otherwise specified. All cavities, depressions, washouts and similar failures shall be rebuilt to original lines by use of shotcrete reinforced with wire mesh. Where the cavity exceeds four inches in depth, a layer of mesh shall be used for each three inches of depth of shotcrete. However, in no case shall wire mesh be placed behind existing reinforcement.
- F. The time interval between successive layers in sloping vertical or overhanging work must be sufficient to allow initial, but not final, set to develop. At the time the initial set is developing, the surface shall be cleaned to remove the thin film of laitance in order to provide a perfect bond with succeeding applications.

X. Construction Joints

- A. Construction joints or day's work joints shall be sloped off to a thin, clean, regular edge preferably at a 45-degree slope. Before placing the adjoining work, the slope portion of adjacent shotcrete shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.

XI. Surface Finish

- A. Nozzleman shall bring the shotcrete to an even plane and to well-formed corners be working up to ground wires or other guides, using somewhat lower placing velocity than normal.
- B. After the body coat has been placed, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with concrete to insure a true flat surface.
- C. After the concrete surface has been trued, the entire surface shall be given a flashcoat finish unless a special type finish is specified on the drawings.

XII. Curing

- A. Curing shall be in accordance with paragraph 8.7 ACI - 506-R, depending upon atmospheric condition.

XIII. Adjacent Surface Protection

- A. During progress of the work, where appearance is important, adjacent areas or grounds which may be permanently discolored, stained, or otherwise damaged by dust and rebound, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing as the surroundings permit.

XIV. Inspection

- A. Because of the importance of workmanship affecting the quality of the shotcrete, continual inspection during placing shall be maintained. Any imperfections discovered shall be cut out and replaced with sound material.

XV. Equipment (Dry Mix)

- A. Cement Gun
 - 1. The mixing and delivering equipment shall be either the vertical double chamber type or rotary type. The upper chamber of the double chamber type shall receive and pressurize the dry mix and deliver it to the lower chamber. The lower chamber shall force the pressurized mix into the delivery hose by means of a feed wheel. The type of feeder utilized should be sufficient capacity that the lower chamber may continuously furnish all required material to the delivery hose while the upper chamber receives the recharge. The rotary type cement gun shall have an enlarged hopper to feed material into a rotating-multiported cylinder. Material shall fall by gravity into

a port that shall then be rotated to a position in which equipment must be kept in good repair. The interior of drums, feed gearing and valves shall be cleaned as often as necessary (at least once every 8-hour shift) to prevent material from caking on critical parts.

B. Nozzle

1. Nozzle shall be the premixing type with perforated water feed ring inside the nozzle. The maximum length of material hose for application of shotcrete shall be approximately 150 feet, although it shall be permissible to use as much as 800 feet of material hose if the supply air pressure measured at the cement gun is increased to maintain proper velocity. The following table gives requirements for compressor size, hose size and air pressure using 150 feet of material hose.

Table I

Comp. Cap cfm	Max. Hose Dia. in Inches	Max Size Nozzle In.	Min. Air Pressure psi
365	1 - 5/8"	1 - 5/8"	60
600	2"	2"	80
750	2 - 1/2"	2 - 1/2"	90

For each 25 feet of material hose used in excess of 150 feet, the required air pressure shall be increased by 5 psi.

C. Air Compressor

1. Any standard type of compressor shall be satisfactory if it is of sufficient capacity to provide, without interruption, the pressures and volume of air necessary for the longest hose delivery. The air compressor capacity determinations shall include allowances made for the air consumed in blowing rebound, cleaning reinforcing and for incidental uses. Compressor equipment shall be of such capacity to insure air pressures at the special mixer capable of producing the required material velocities.

D. Water Supply

1. The water pressure at the discharge nozzle should be sufficiently greater than the operating air pressure to assure the water is intimately mixed with the other materials. The water pressure shall be nonpulsating.

XVI. Qualifications

A. Foremen, Nozzlemen, Gun Operators

1. Before employment on the project, above workmen must satisfy the Engineer that each has done satisfactory work in similar capacities elsewhere for a sufficient period of time to be fully qualified to properly perform the work in accordance with the requirements of the related specifications.
2. Foremen
 - a. Foremen shall have had at least four years experience on similar work.
3. Nozzlemen
 - a. Nozzlemen shall be qualified workmen, having had at least two years experience in similar work, and it shall be his responsibility to:
 - Insure all surfaces to be shot are clean and free laitance or loose material, using air and air-and-water blast from the nozzle as required.
 - Insure the operating air pressure is uniform and provides proper nozzle velocity for good compaction.
 - Regulates the water content so the mix will be plastic enough to give good compaction and a low percentage of rebound, but stiff enough not to sag.
 - Hold the nozzle at the proper distance and as nearly normal to the surface as the type of work will permit, to secure maximum compaction with minimum rebound.
 - Follow a sequence routine that will fill the corners with sound shotcrete and encase reinforcement without porous material behind the steel, using the maximum practicable layer thickness.
 - Determine necessary cooperating procedures for placement in close quarters, extended distance or around unusual obstructions where placement velocities and mix consistency must be adjusted.
 - Direct the crew when to start and stop the flow of material, and stop the work when material is not arriving uniformly at the nozzle.
 - Insure sand or slough pockets are cut out for replacement.
 - Bring the shotcrete to finished lines in a neat and workmanlike manner.

B. Gun Operator

1. Gun Operator shall operate the special pneumatic mixer and direct the work of the mixer crew. Utilizing his experience, he shall maintain proper pressure on the cement gun to insure the necessary nozzle velocity. He shall further see that the material fed to the nozzle is uniform.

XVII. Payment

- A. Payment shall be on the basis specified in the bid and may include one or more of the following:
1. Area: Contractor shall be paid per square foot of surface area of specified length.
 2. Lineal Footage: Contractor shall be paid per lineal foot of concrete pipe rehabilitated.
 3. Volume: Contractor shall be paid per cubic foot of shotcrete in place; or Contractor shall be paid per bag of cement used in the shotcrete in conformance with the approved mix design.

SHOTCRETE MS

PRODUCT No. 1229-80, 1229-88, 1229-86, 1229-83

PRODUCT DESCRIPTION

QUIKRETE® Shotcrete MS products are high performing, pneumatically applied concrete products designed for rehabilitation and new construction projects. They are ideal products for jobs requiring high quality, shotcrete placement.

PRODUCT NAMES

- 50# QUIKRETE® Shotcrete MS 1229-80
- 50# QUIKRETE® Shotcrete MS Coarse 1229-88
- 50# QUIKRETE® Shotcrete MS w/ Polypropylene Fibers 1229-86
- 50# QUIKRETE® Shotcrete MS w/ AR Glass Fibers 1229-83

PRODUCT USE

QUIKRETE® Shotcrete MS mixes are designed for use as repair materials for bridges, tunnels, parking garages, ramps, beams, piers, sewer pipes and dams. They may be used in new construction projects as well. QUIKRETE® Shotcrete MS products are well-proportioned blends of Portland cement, concrete sand (and gravel for the Coarse version), and microsilica suitable for general-use construction. Advantages include high strength, improved sulphate resistance, high adhesion, low permeability, low rebound and low sag. Other performance levels are also available to meet specific jobsite requirements, including the addition of various fibers and/or integral corrosion inhibitors. Also available without microsilica.

SIZES

QUIKRETE® Shotcrete MS products are packaged in 50 lb (22.6 kg) bags as well as 80 lb (36.2 kg) bags and 3000 lb (1361 kg) bulk bags.

YIELD

- A 50 lb bag will yield approximately 0.38 cubic feet.
 - An 80 lb bag will yield approximately 0.61 cubic feet.
 - A 3,000 lb bulk bag will yield approximately 22.8 cubic feet.
- Unit weight: ~ 125 to 145 lb/ft³

TECHNICAL DATA

APPLICABLE STANDARDS

- ASTM C 39 *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*
- ASTM C 42 *Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (AASHTO T24)*
- ASTM C 78 *Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)*
- ASTM C 109 *Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)*
- ASTM C 157 *Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete*
- ASTM C 469 *Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression*
- ASTM C 496 *Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens*

DIVISION 3

Shotcrete
03 37 13



- ASTM C 642 *Standard Test Method for Density, Absorption, and Voids in Hardened Concrete*
- ASTM C 666 *Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*
- ASTM C 882 *Standard Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete by Slant Shear*
- ASTM C 1012 *Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution*
- ASTM C 1202 *Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration*
- ASTM C 1399 *Standard Test Method for Obtaining Average Residual-Strength of Fiber Reinforced Concrete*
- ASTM C 1480 *Standard Specification for Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Applications*
- ASTM C 1583 *Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)*
- ASTM C 1604 *Standard Test Method for Obtaining and Testing Drilled Cores of Shotcrete*

PHYSICAL /CHEMICAL PROPERTIES

The performance of QUIKRETE® Shotcrete MS products in the laboratory are not representative of field results. However, laboratory data is important for quality control purposes and for making comparisons between formulations. QUIKRETE® Shotcrete MS products have been extensively tested both in the laboratory and in the field. The field test data are offered only as an example of what can be achieved with qualified operators using proper techniques. The quality of dry process shotcreting is very dependent on the skills of the operator. Table 1 shows typical laboratory data for QUIKRETE® Shotcrete MS products. Typical field results for QUIKRETE® Shotcrete MS products are shown in Table 2. The QUIKRETE® Shotcrete MS products in Tables 1 and 2 comply with either the requirements of ASTM C 1480 Type FA (Fine Aggregate) or Type CA (Coarse Aggregate). Additionally, QUIKRETE® Shotcrete

MS products comply with Grades GU (General Utility), SR (Sulfate-Resistant), and LP (Low Permeability). Consult a local QUIKRETE® representative for details.

INSTALLATION

PREPARATORY WORK / SURFACE PREPARATION

QUIKRETE® recommends that job mock-ups be prepared by the contractor and tested prior to beginning a project. QUIKRETE® recommends that American Concrete Institute (ACI) Committee 506 procedures and recommendations be followed for surface preparation. This typically includes but is not limited to removing all spalled, severely cracked, deteriorated, loose and unsound concrete from existing concrete surface by chipping, water blasting or other mechanical methods. Adequate pre-wetting of the concrete substrates should be done prior to shotcreting. Concrete surfaces receiving the Shotcrete material should be saturated surface-dry (SSD).

EQUIPMENT / METHODS / APPLICATION

QUIKRETE® recommends that American Concrete Institute (ACI) Committee 506 procedures and recommendations be followed for equipment selection, nozzleman certification, shotcrete placement, and curing procedures. Refer to the current revisions of the following publications:

- ACI 506R Guide to Shotcrete
- ACI 506.2 Specifications for Shotcrete
- ACI 506.1R Committee Report on Fiber Reinforced Shotcrete
- ACI CP-60 Craftsman Workbook for ACI Certification of Shotcrete Nozzleman

WARRANTY

NOTICE: Obtain the applicable **LIMITED WARRANTY** at www.quikrete.com/product-warranty or send a written request to The Quikrete Companies, LLC, Five Concourse Parkway, Atlanta, GA 30328, USA. Manufactured under the authority of The Quikrete Companies, LLC. © 2019 Quikrete International, Inc.

TABLE 1: TYPICAL LABORATORY PROPERTIES

	Shotcrete MS	Shotcrete MS Coarse	Shotcrete MS with Fibers
Compressive Strength, ASTM C 109 (Modified) / C 39 (Modified)			
Age	PSI (MPa)	PSI (MPa)	PSI (MPa)
1 Day	1750 (12.0)	1750 (12.0)	1750 (12.0)
7 Days	3500 (24.1)	3500 (24.1)	3500 (24.1)
28 Days	5500 (37.9)	5500 (37.9)	5500 (37.9)

TABLE 2: TYPICAL FIELD APPLIED PROPERTIES

	Shotcrete MS	Shotcrete MS Coarse
Compressive Strength, ASTM C 39		
Age	PSI (MPa)	PSI (MPa)
1 Day	3500 (24.1)	3500 (24.1)
3 Days	6000 (41.3)	6000 (41.3)
7 Days	6500 (44.8)	6500 (44.8)
28 Days	7500 (51.7)	7500 (51.7)
Flexural Strength, ASTM C 78		
Age	PSI (MPa)	PSI (MPa)
7 Days	900 (6.2)	900 (6.2)
28 Days	1100 (7.5)	1100 (7.5)
Length Change, ASTM C 157		
Age, Condition		
7 Days (Air)	≥ -0.02%	≥ -0.02%
28 Days (Air)	≥ -0.05%	≥ -0.05%
Modulus of Elasticity, ASTM C 469		
Age	PSI (GPa)	PSI (GPa)
28 Days	4.35 x 10 ⁶ (30.0)	4.35 x 10 ⁶ (30.0)
Split Tensile Strength, ASTM C 496		
Age	PSI (MPa)	PSI (MPa)
28 Days	1100 (7.5)	1100 (7.5)
Volume of Permeable Voids, ASTM C 642		
Age		
28 Days	10.0%	11.5%
Freeze Thaw Resistance, ASTM C 666		
After 300 cycles	≥ 95% DF	≥ 95% DF
Slant Shear Bond Strength, ASTM C 882 (Modified)		
Age	PSI (MPa)	PSI (MPa)
28 Days	≥ 2000 (13.7)	≥ 2000 (13.7)
Sulfate Resistance, ASTM C 1012 (Modified)		
ΔL% @ 26 Weeks	< 0.04%	< 0.04%
Rapid Chloride Ion Penetration, ASTM C 1202		
Age	coulombs	coulombs
28 Days	< 1000	< 1000

* Refer to www.quikrete.com for the most current technical data, SDS, and guide specifications



READY MIX USA
A Division of CEMEX

Mix Design Report

Client :	Date : 6/27/2019
Project/Contract :	
Placement :	
Usage :	As needed per plans
Mix Design No. : 1526514	Description : 4000 2" LP

Compressive Strength	4 000 psi at 28 Days	Submittal No.	
Aggregate Size	#78	Plant	5144-Florence, Florence
Air %	3.0% to 5.0%	Volume	27.00 ft ³
w/cm Ratio	0.42	U.W. at 4.1 % of air	143.3 lb/ft ³
Slump	4.00 to 6.00in	Slump with SuperP	

Constituents and Suppliers	Quantity (yd ³)	Sp. Gr. SSD	Volume
Cement - 1001618 - Cement ASTM C150 - Type I/II - .	504 lb	3.150	2.56 ft ³
Additive - 1083297 - Class F Flyash - Class F - .	168 lb	2.480	1.09 ft ³
Water - 1001612 - Water - ASTM C94 - .	283.7 lb (34.0 Gal)	1.000	4.54 ft ³
Stone - 1526267 - #78 - Crushed Limestone - 2.67	1293 lb	2.670	7.76 ft ³
Sand - 1275490 - Concrete Sand - Natural Sand - 2.61	1620 lb	2.610	9.94 ft ³
Admixture - 1598398 - WRR_A - ASTM C494 Type A & D - CEMEX	15.12 oz/yd ³	1.000	0.02 ft ³ /
Admixture - 1598407 - AEA_A - ASTM C260 - CEMEX	1.68 oz/yd ³	1.000	0.00 ft ³ /
Air Volume			1.11 ft ³
Total	3869 lb		27.00 ft ³
Optional Products :			

Remarks :

Prepared by : Leland Preston

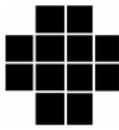
Approved by :

Date : 7/15/2014

Date : / /

5144-Florence

3214 Roberson Road Florence



David L. Federer, P.E.

Professional Engineer – Contractor

4324 Big House Road • Norcross, GA 30092 • 954 401-0818
Internet: David@Federer.us

17 October 2019

TO: Connie Dill
Proshot Concrete Inc.

RE: Calculations for flow capacity of 60" CMP
vs. Same Pipe with 2" Shotcrete Lining (56")

Ms. Dill,

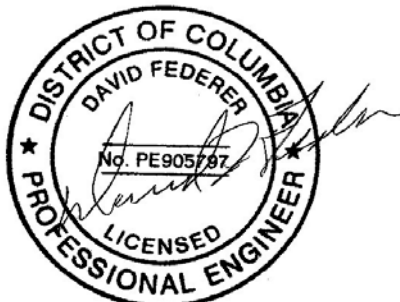
The 60" CMP pipe has a very high roughness coefficient (Manning Coefficient), which creates high friction values, and subsequent turbulence in the flow, which greatly reduces the flow capacity of the conduit. A normal Manning for CMP pipe is 0.022, which gives a flow capacity of 82.82 Million Gallons/Day (MGD)

A reduction in the diameter with a 2" shotcrete liner, reduces the cross-section of the pipe, but this is more than offset by the much smoother lining. A normal Manning for Shotcrete lined pipe is 0.011, which gives a flow capacity of 137.81 Million Gallons/Day (MGD). The capacity of the 60" pipe is almost exactly double that of the original CMP pipe.

A capacity increase of 54.99 MGD (66%) is thus realized by the very economical lining of the pipe with shotcrete.

If you have any other questions, please call me at any time, or have your client call me directly if they so wish.

Sincerely yours,

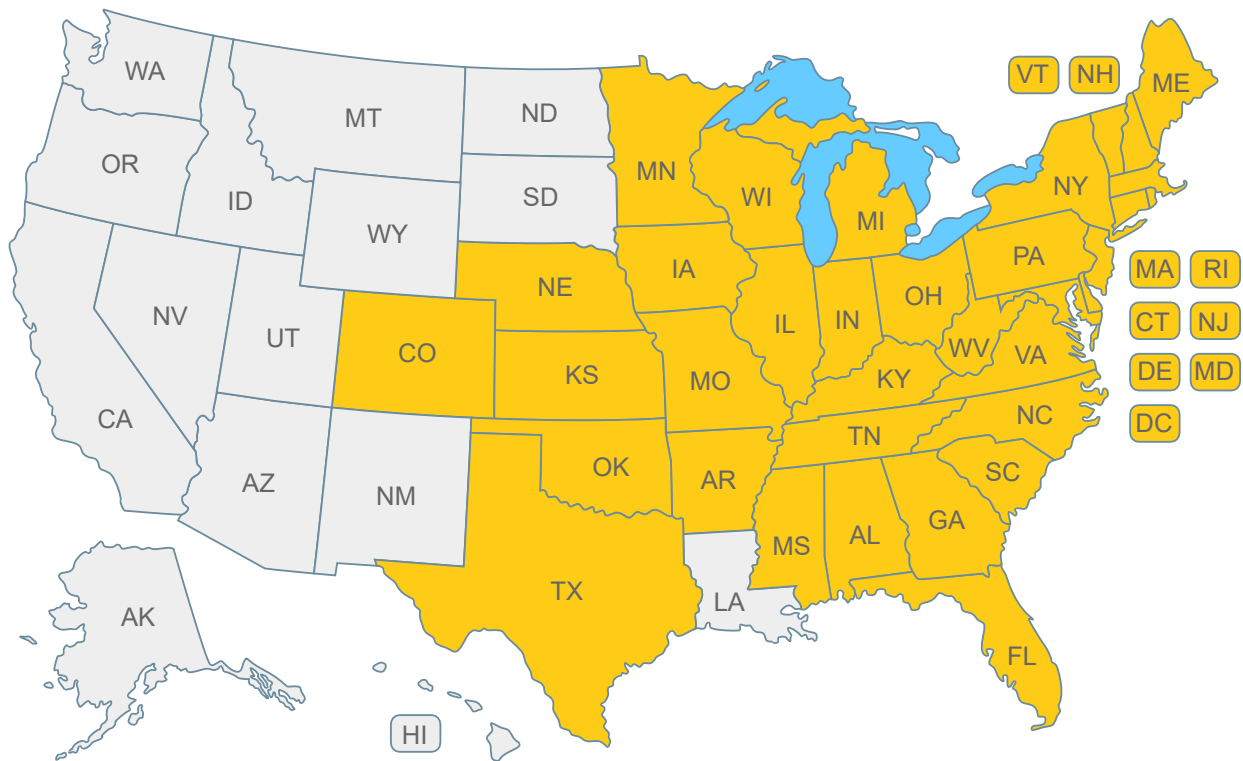


David L. Federer, PE



(<https://www.proshotconcrete.com/>)

Licensed and qualified to perform work in the following highlighted states and government agencies.



Proshot Concrete, Inc.
4158 Musgrove Drive, Florence, AL 35630
1-800-633-3141

Emergency 1-256-263-0445

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in (<https://www.linkedin.com/company/proshotconcrete/>)

ga('set', 'contentGroup1', 'Keyword Used');

We use cookies to ensure that we give you the best possible experience on our website. Find out more. (<https://www.proshotconcrete.com/privacy-policy/>)

I Accept



(<https://www.proshotconcrete.com/>)

CULVERT BROCHURE



(<https://www.proshotconcrete.com/wp-content/uploads/2018/04/culvert-brochure-1.pdf>) PRINT AND TAKE US WITH YOU!

WHY PROSHOT?

Proshot Concrete is a leader in the concrete restoration industry. Our team consists of contractors and engineers who specialize in concrete renovation and restoration for over 50 years using the application of shotcrete and gunite as well as more traditional methods of concrete restoration. This combined knowledge and vast array of skills give Proshot Concrete the ability to tackle the most difficult projects with unique and original solutions.

The Proshot team has many years of experience with culvert rehabilitation, sewer rehabilitation, bridge repair and maintenance, ditch lining, retaining walls, and other concrete restoration projects. We have built a reputation of quality and integrity that is unmatched in our industry and pride ourselves on providing a quality product using skilled craftsmanship on time and within budget.



Specializing in shotcrete rehabilitation, concrete restoration and bridge repair and maintenance, Proshot Concrete is licensed and qualified to perform work in the following states and government agencies:

AL General Contractor, AL DOT, AR General Contractor, CO DOT, CT, DE, FL General Contractor, FL DOT, FL Department of Environmental Protection, Pinellas County, FL, South FL Water Management District, GA Utility Contractor, GA Utility Manager License, GA DOT, Glynn County, GA, IL DOT, Cook County IL General Contractor, IN Construction Services—Public Works, IN DOT, Indianapolis, IN General Contractor License, IA General Contractor, IA DOT, KS DOT, KY Transportation Cabinet, ME DOT, MD General Contractor, MD State Highway Administration, MD Transportation Authority, Baltimore County MD, Carroll County MD, Charles County MD, Harford County MD, Howard County MD, Washington Suburban Sanitary Commission MD, MA DOT, MI DOT, MS Certificate of Responsibility, MS DOT, MO DOT, Metro St. Louis Sewer District, NE, NH DOT, NJ Public Work Contractor NJ DOT, New York, NY, DOT, NC General Contractor, NC DOT, OH DOT, City of Columbus, OH General Contractor's License, City of Columbus, OH Sewer Contractor License, OK DOT, PA DOT, Pittsburgh Water and Sewer Pittsburgh, PA, SC General Contractor, SC DOT, TN General Contractor, TN DOT, TX DOT, VA General Contractor, VA DOT, WA DC General Contractor, DC Water, WA DC, WV

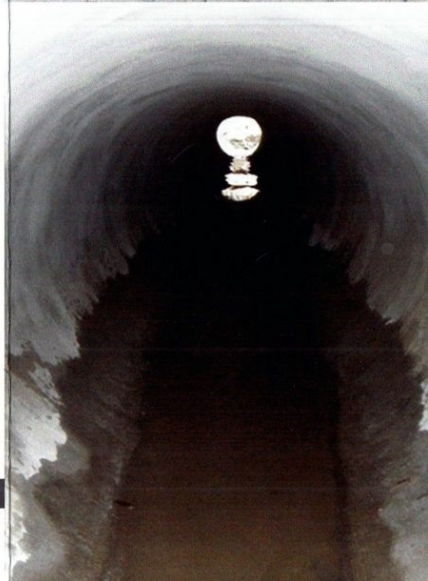
www.proshotconcrete.com

ALABAMA OFFICE
4158 Musgrove Drive Rd.
Florence, Alabama 35630
(800) 633-3141
(256) 764-5941

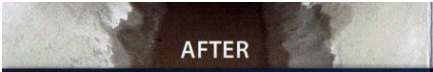
FLORIDA OFFICE



VIRGINIA OFFICE
308 West Farmington Road



**CULVERT
REHABILITATION**

	8503 Iveywood Avenue Orlando, Florida 32810 (256) 483-9092	Virginia Beach, Virginia 23454 (757) 498-9029 (757) 620-4840	www.proshotconcrete.com
<h3>ADVANTAGES OF SHOTCRETE CULVERT REHABILITATION</h3> <ul style="list-style-type: none"> • New shotcrete mix designs can produce 8,000 psi compressive strength and greater structural integrity • The smooth interior of a Shotcrete lining improves flow by reducing the roughness (Manning's) coefficient • No excavating or trenching • No major disruption to traffic, business, etc. • Eliminates the potential for settlement damage on roads and easements • Repair without interfering with existing utilities • Extremely cost effective • Can be used in any shape — circular, oval, arch, square, symmetrical, or asymmetrical • Wide range of existing pipe types and diameters are possible to repair • Environmentally friendly; special wetland permits are not required • Flood studies do not have to be performed 	<p>Corrugated metal pipes were not meant to last forever. With the deteriorating effects of weather, scouring from sand and debris, and the propensity to rust and buckle; 20 to 30 years is a metal pipe's estimated lifespan. Shotcrete can be used for the structural renewal of culverts without excavation, aboveground bypassing, traffic detours, repaving, or flooding.</p> <p>Replacement options often include digging, (with its unavoidable disruption to traffic and daily routines), expensive cured-in-place liners, or slip lining, (with reduced flow capacity). Shotcrete creates a new, structurally sound concrete pipe inside the old one. This new pipe is not only environmentally sound, it provides highly effective corrosion protection that can add over 50 years to the life of the pipe. This rehabilitation process improves water flow by reducing the roughness coefficient.</p>	 <h3>PROSHOT CONCRETE PROVIDES A WIDE VARIETY OF SERVICES</h3> <ul style="list-style-type: none"> CULVERT REHABILITATION SHOTCRETE SEWER LINING BRIDGE REPAIR AND MAINTENANCE DITCH PAVING SLOPE STABILIZATION RETAINING WALL AND PIER REPAIRS WASTE WATER TREATMENT PLANT REHABILITATION DAM AND RESERVOIR RESTORATION 	
	<h3>HOW IT WORKS</h3> <p>Shotcrete is designed for corrosion protection and complete structural renewal of culverts between 36" and above in diameter. The process begins with an engineer's inspection of the pipe to be repaired. The engineer then considers the depth and size of the pipe, depth of the local water table, point load and transfer load, and other factors to determine the thickness of the shotcrete application.</p>	<p>Preparation begins by stopping or diverting the water flow. This allows gravel, mud, roots, and other debris to be removed. Once the debris is removed, the interior is thoroughly scoured with a high-pressure washer. If buckling, leaks or voids have occurred in the existing pipe, stabilization repairs are made. The shotcrete application can be flat or contoured to the pipe's radius in order to enable flow. The shotcrete is pneumatically applied around the interior of the pipe to the thickness predetermined by the engineer, leaving behind a high-strength, fully structural pipe.</p>	
 <p>Shotcrete has a 50 year service life.</p>	<p>Shotcrete produces a material that exhibits superior hardened properties to high quality conventional concrete such as high strength, low permeability and high durability.</p>		

(<https://www.proshotconcrete.com/wp-content/uploads/2018/04/culvert-brochure-full-673x1024.jpg>)

ADDENDUM

ADDENDUM No. 1

DATE OF ISSUANCE: January 7, 2020

OWNER: CITY OF BRENTWOOD, TN.

C/o Mr. Todd Hoppenstedt
Brentwood Director of Public Works
P.O. Box 788
Brentwood, TN 37027

CONTRACT: General Construction

Project: 2020 Pipe Repair Contract
Engineers Project No. 19-012

ENGINEER: Mr. Richard Sullivan, PE, Sullivan Engineering, Inc.
317 Main Street, Suite 201, Franklin, TN 37064

You are directed to make the following changes in the Contract Documents:

Description:

I) General Comments

- A) The attached Meeting Agenda provides an overview of discussions regarding preparation of a bid and scope of work on the reference contract and is therefore, incorporated into the Project Documents. The general discussion pointed out this is a newly instituted contract and is directed toward a specific work task at this time, but will be used as needed for repairs and to assist the City in clearing back logged projects. Other items of discussion dealt with Submittal of Bid, Qualifications of Bidder, Owner & Contractor Responsibility, Coordination of work, Contract Times and Work Hours.
- B) The initial project requiring work under this agreement is located at 206 Derby Glenn. This location has a 54-inch diameter CMP, having lengths of 115 LF, 135 LF and 220 LF less 30+/- Lf of RCP for a net of 430+/- LF of CMP to be lined. A location map and brief narrative (attached) was provided to each prospective bidder and invited to review the site after the meeting. It was also explained that if a contract is awarded future projects would be based on need and funding availability. If multiple sites are approved the City intends to cluster the work, allowing flexibility to provide the necessary services while in the area and avoid multiple trips. The City will also provide this same flexibility when reviewing the sites with the contractor, thus avoiding multiple trips.

C) Items noted in Pre-bid Agenda or as noted below.

1) Schedules,

- (a) Working hours will be from 7:00 am until dark Monday through Friday. Saturday work will be allowed from 8:00 am until dark. No work will be allowed on Sunday unless it has been classified as an emergency and approved by the Director of Public Works.
- (a) The City understands the nature of the work and recognizes that conditions may warrant longer hours and will try to work with the contractor on a case-by-case basis to seek extended hours.
- (b) Certain situations and locations may require work hours to be restricted due to traffic or locations that noise associated with the construction activity would be very disruptive. If this type of situation

should occur, the City will notify the Contractor on the initial scoping site visit and adjust the time for completion accordingly.

- (c) The scheduling of pipe lining and the amount of time to complete the work is in part related to weather, and more specifically rain events. Therefore, it is understood that schedules and completion dates could be impacted. However, if a change in schedule or completion occurs the City shall be *promptly contacted to discuss any modifications to previously agreed periods.*
- (b) *Bid Form, Section 6.02 states "On-Call Services - The bidder agrees that forces shall be able to respond, mobilize and initiate construction activities on request to specific short notice (24 hours) and emergency projects within the City of Brentwood".* Although, this clause is in the contract the City does not foresee, a situation in which lining a pipe would be an emergency. However, from time to time emergency situations do occur and it may be that other resources are not available and require your assistance, and if that is the case if it is for items not covered in the contract a "Proposal Request" would be issued, identifying need, is it a task you are comfortable handling and final agreed cost prior to issuance of a work order.
- (c) All unit cost contained within this contract shall include all necessary charges for mobilization of equipment, materials and man power for work, and other items typically associated with pipe lining.

2) Owner & Contractor Responsibility

- (a) Owners Or Owners Representative Responsibilities:
 - (a) Testing of Materials,
 - (b) Construction field observations,
 - (c) Review monthly pays request,
 - (i) Send to Rich Richardson, City of Brentwood
 - (ii) Once approved the City issues payment on the 10th, 20th and last day of the month.
 - (d) City of Brentwood shall prepare the following documents
 - (i) Change Orders,
 - (ii) Change Directives,
 - (iii) Supplemental Instructions,
 - (iv) Work Orders,
 - (v) Water Quality Permits and pay associated fees,
 - (e) Review and approve all submittals and shop drawings,
 - (f) Assist contractor in preparing a Traffic Control Plan, if it is something other than would be typically anticipated.
 - (g) In the event a culverts inlet and outlet requires additional excavation to provide working room the City will have the work performed prior to the contractor arriving on site. Areas disturbed by the City will additionally be stabilized by the City.
- (b) Contractors Responsibilities:
 - (i) Employee (on staff or sub-contractor) a Registered TN Licensed Engineer as per the contract documents.
 - (ii) Employee (on staff or sub-contractor) a Registered TN Licensed Surveyor as per the contract documents.
 - (iii) Maintain Project records.
 - (iv) Prepare all field reports.
 - (v) Assist City or City's Engineer in preparing Water Quality Permits and Traffic Control plan if required.
 - (vi) Areas disturbed by the contractor in the performance of the work will be repaired in-kind by the contractor, the cost of this work will be included in cost per linear foot of pipe lining.

3) Coordination of Work

- (a) The contractor shall not only be responsible for the coordination of his work forces and his sub-contractors work forces but shall be responsible for contacting all utilities and coordinating his work efforts to coincide with theirs so as to not create any delays that could delay completion of this project.

4) Traffic Control

- (a) All unit cost contained within this contract shall include all necessary charges for basic traffic control operations such as traffic cones and basic signing. It is not anticipated that one lane flaggers would be required on a full time basis although minimal flagging may be required while cones are being placed.

II) Modifications to the Bid Form

- (a) Add the following:

COORD WITH NOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.
	209-05.01	SEDIMENT REMOVAL (CULVERTS, THE CITY WILL HAVE THE CULVERTS CLEANED PRIOR TO SCHEDULING AN ON SITE MEETING. AND ISSUANCE OF A WORK ORDER. THIS SHOULD LEAVE THE CULVERT IN A CONDITION THAT NORMALLY REQUIRED PREP WORK WOULD BE INCLUDED IN YOUR UNIT COST PER LINEAR FOOT. IN THE EVENT THE PIPE HAS EXCESSIVE SEDIMENT BUILD-UP PRIOR TO WORK BEGINNING THE CITY WILL EITHER HAVE IT REMOVED OR AUTHORIZED YOU TO PERFORM THE SERVICE.)	C.Y.	1

ATTACHMENTS: (List documents supporting addendum)

- A. Pre-Bid Agenda,
- B. Pre-Bid Sign-In Sheet, and
- C. 206 Derby Glenn site documents.

This Addendum consist of 3 page (emailed to Bidders)

END OF ADDENDUM





CITY OF BRENTWOOD
January 7, 2020
Pre-Bid Agenda
For
2020 PIPE REPAIR CONTRACT
SEI Project #19-014

1) PROJECT DESCRIPTION:

- a) Contract: General Construction
- b) Project: 2020 Pipe Repair Contract

2) THE WORK IS GENERALLY DESCRIBED AS FOLLOWS:

- a) The contractor shall provide all labor, materials and equipment necessary for Pipe Repair Projects within the City of Brentwood.
- b) This project is to be constructed under the Standard Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.
- c) The cost of this project shall be based on a unit price bid.

3) CONTRACT:

- a) Engineering Joint Council Document Committee.
- b) Unit Price Bid
 - i) Bid opening:
 - (1) **NOTICE IS HEREBY GIVEN** that the City of Brentwood, Tennessee will receive sealed bids at the office of Karen Harper, City Treasurer, Brentwood Municipal Center, 2nd Floor, 5211 Maryland Way, Brentwood, TN 37024, until **2:30 P.M. on January 14, 2020** at which time bids will be publicly opened and read aloud in the Commissioners Chambers.
 - ii) Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents. Proposed prices will remain valid for all areas, regardless of size and at all times within the contract period
 - iii) Contract unit prices shall be for a one-year period, at which time the City of Brentwood Public Works Director may elect to extend the contract for two additional one-year periods. Provided the Bidder agrees to the extension, further agreeing that all original unit price bids will be increased in accordance with the Consumer Price Index.
 - iv) Bid documents set forth in the contract shall remain in force for the duration of time as necessary until a time in which it is no longer applicable. A separate bond shall not be



required for each individual work order issued. However, the initial bond as required at the inception of this contract shall remain enforce for the duration of the contract.

- v) Bidder accepts the provisions of the Agreement as to liquidated damages as penalty in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.
- vi) Measurement and Payment of quantities shall be in accordance with Standard and Supplemental Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.

4) QUALIFICATIONS OF BIDDERS

- a) A **mandatory Pre-Bid conference will be held at 9:00 A.M. on January 7, 2020** at the office of Todd Hoppenstedt, Brentwood Director of Public Works, 1750 General George Patton Drive, Brentwood, TN 37027. Representatives of OWNER and ENGINEER will be present to discuss the Project. Bidders are required to attend and participate in the conference. ENGINEER will transmit to all prospective Bidders of record such Addenda, as ENGINEER considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.
- b) The City intends to award a contract to the lowest and best-qualified contractor.
- c) To demonstrate Bidder's qualifications to perform the Work, with the Bid, attached to the Bid form the Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.
 - i) Previous Experience (Must be two Government projects similar in nature)
 - ii) **Three References (Must be Government entities where contractor has performed pipe lining work, provide contact name, telephone number and project name.)**
 - iii) Equipment List
 - iv) Listing of all Subcontractors, per Document 00450.
 - v) Statement of License Certificate.
 - vi) Statement of current approval on the TN Department of Transportation listing of approved contractors. In the event that approval has expired notification for reinstatement on the approved list will be acceptable. This qualification does not apply to subcontractors.

5) SCHEDULES:

- a) Working hours will be from 7:00 am until dark Monday through Saturday. No work will be allowed on Sunday unless it has been classified as an emergency and approved by the Director of Public Works.
- b) Bidder agrees to begin work within fourteen (14) days after written notification of the acceptance of this Bid for each and every work order issued under this contract. Each and every project issued shall have a mutually agreed upon date of substantial completion, and completed and ready for final payment in accordance with paragraph 14.07.B of the



General Conditions within thirty (30) days of that date. The contractor further agrees that if work is not initiated and completed within the mutually agreed upon construction schedule the owner reserves the privilege to impose liquidated damages in accordance with Section 4.03 of the "Standard form of Agreement Between Owner and Contractor on the Basis of Stipulated Price".

- c) On-Call Services - The bidder agrees that forces shall be able to respond, mobilize, and initiate construction activities on request to specific short notice (24 hours) and emergency projects within the City of Brentwood.
- d) All unit cost contained within this contract shall include all necessary charges for mobilization of equipment, materials and man power for a complete installation of the services required.
- e) The bidder agrees to coordinate with the City of Brentwood 72 hours in advance of anticipated interruptions to utility service; operations which are loud or noisy; and operations which will generate disturbing quantities of structure born noise or vibrations such as jack hammering or core drilling.
- f) The Bidder shall submit upon request to the City of Brentwood Public Works Director an erosion control plan for the graded areas within each project a minimum of 48 hours prior to initiating work.
- g) Bid documents set forth in the contract shall remain in force for the duration of time as necessary until a time in which it is no longer applicable. A separate bond shall **not** be required for each individual work order issued. However, the initial bond as required at the inception of this contract shall remain in force for the duration of the contract.

6) OWNERS OR OWNERS REPRESENTATIVE RESPONSIBILITIES:

- a) Testing of Materials – City of Brentwood
- b) Construction field observations – City of Brentwood
- c) Review monthly pays request – City of Brentwood
- d) City of Brentwood shall prepare the following documents
 - i) Change Orders
 - ii) Change Directives
 - iii) Supplemental Instructions
 - iv) Work Orders
- e) Review and approve all submittals and shop drawings – City of Brentwood

7) CONTRACTORS RESPONSIBILITIES:

- a) Employee a Registered TN Licensed Engineer as per the contract documents.
- b) Employee a Registered TN Licensed Surveyor as per the contract documents.
- c) Maintain Project records.
- d) Prepare all field reports.

8) COORDINATION OF WORK:



- a) The contractor shall not only be responsible for the coordination of his work forces and his sub-contractors work forces but shall be responsible for contacting all utilities and coordinating his work efforts to coincide with theirs so as not create any delays which could delay completion of this project.

9) SUBSTITUTE AND “OR-EQUAL” ITEMS:

- a) The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or those substitute or “or-equal” materials and equipment approved by ENGINEER and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or “or-equal” item. No item of material or equipment will be considered by ENGINEER as a substitute or “or-equal” unless written request for approval has been submitted by Bidder and has been received by ENGINEER at least 5 days prior to the date for receipt of Bids. Each such request shall conform to requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. ENGINEER’s decision of approval or disapproval of a proposed item will be final. If ENGINEER approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.
- b) Products on the TN Dept. of Transportation, Qualified Product List are pre-approved for this contract. If bidders seek to have other items approved all substitutions shall be sent to Paul Collins, Sullivan Engineering, Inc. for review and approval.**

10) TRAFFIC CONTROL:

- a) The Bidder shall submit to the City of Brentwood Public Works Director, upon request a traffic control plan for the roadways within each project area a minimum of 48 hours prior to initiating work. .
- b) The contractor shall be responsible for maintaining traffic in accordance with “The Manual on Uniform Traffic Control Devices for Streets Highways.” The traffic control plan submitted and approved for each construction work order shall be the minimum required and the contractor shall keep the engineer informed of any changes in this plan throughout the construction process. This note supersedes section 712.08 of “Tennessee Department of Transportation, Standard Specifications for Road and Bridge Construction – Dated January 1, 2015”.

11) EROSION CONTROL:

- a) The Bidder shall submit to the City of Brentwood Public Works Director, upon request an erosion control plan for the graded areas within each project a minimum of 48 hours prior to initiating work.



- b) **Prior to issuance of a work order, the nature of this work makes it difficult to ascertain what if any special permits or erosion features will be required. Therefore, permit preparation, submittal, and payment of fees will be handled by the City of Brentwood. Items other than what would be typically installed for concrete pipe lining for erosion control shall be selected from those contained within this contract or the TN Department of Transportation, Qualified Product List. In the event an erosion control item not included in the plans is required the City shall prepare a “Proposal Request” to determine a unit cost and if approved will be incorporated in the contract.**
- c) The contractor is required to regularly inspect and maintain erosion controls to insure that all water quality features function properly to reduce from leaving the construction site. The Tennessee Department of Transportation “Standard Specifications for Road and Bridge Construction, January 1, 2015 and all applicable Special Provisions for Erosion and Sediment Control will be strictly enforced.

12) DISCUSSION OF CONTRACT:



**City of Brentwood
2020 PIPE REPAIR CONTRACT
SEI Project #19-014**

**January 7, 2020
Pre-Bid Sign-In**

COMPANY NAME & CONTACT PERSON	ADDRESS	PHONE/FAX	Email
Paul Collins Sullivan Engineering, Inc.	317 Main Street, Suite 201 Franklin, TN 37064	615.642.5822 (M)	pcollins@sullivanengineering.com
Todd Hoppenstedt City of Brentwood	Gen. George Patton Drive P.O. Box 788 Brentwood, TN 37027	615.371.0080 (W) 615.371.2225 (F)	Todd.hoppenstedt@brentwoodtn.gov
Tony Mc Dwyle Proshot Angie Box	4158 Musgrave Dr	256-627-0044 731-817-3539	tony @ proshotconcrete.com angie box @ att.net
C.L. Masonry Scott Kennedy	P.O. Box 2333 Nashville, TN 37202	615-424-7268 615-6005-1400	Scott Kennedy @ C.L. masonry.com
Rich Williams	P.O. Box 788 Brentwood, TN 37027	615-371-0080	Rich.Williams @ Brentwoodtn.gov
Gerson Davis	PO Box 2529, Mt Pleasant, SC 29465	252-671-0577	grey @ nupipeus.com
Ashby Johnson	"	843-764-7053	ashby @ nupipeus.com
Davis Duncan	P.O. Box 90266 Nashville, TN 37209	615-356-0600	duncan @ SessionsPaving.com
Marcus Henderson	1801 3rd AVE N, BENDEN TN 37012	410-463-5673	marcus @ constructionite.com

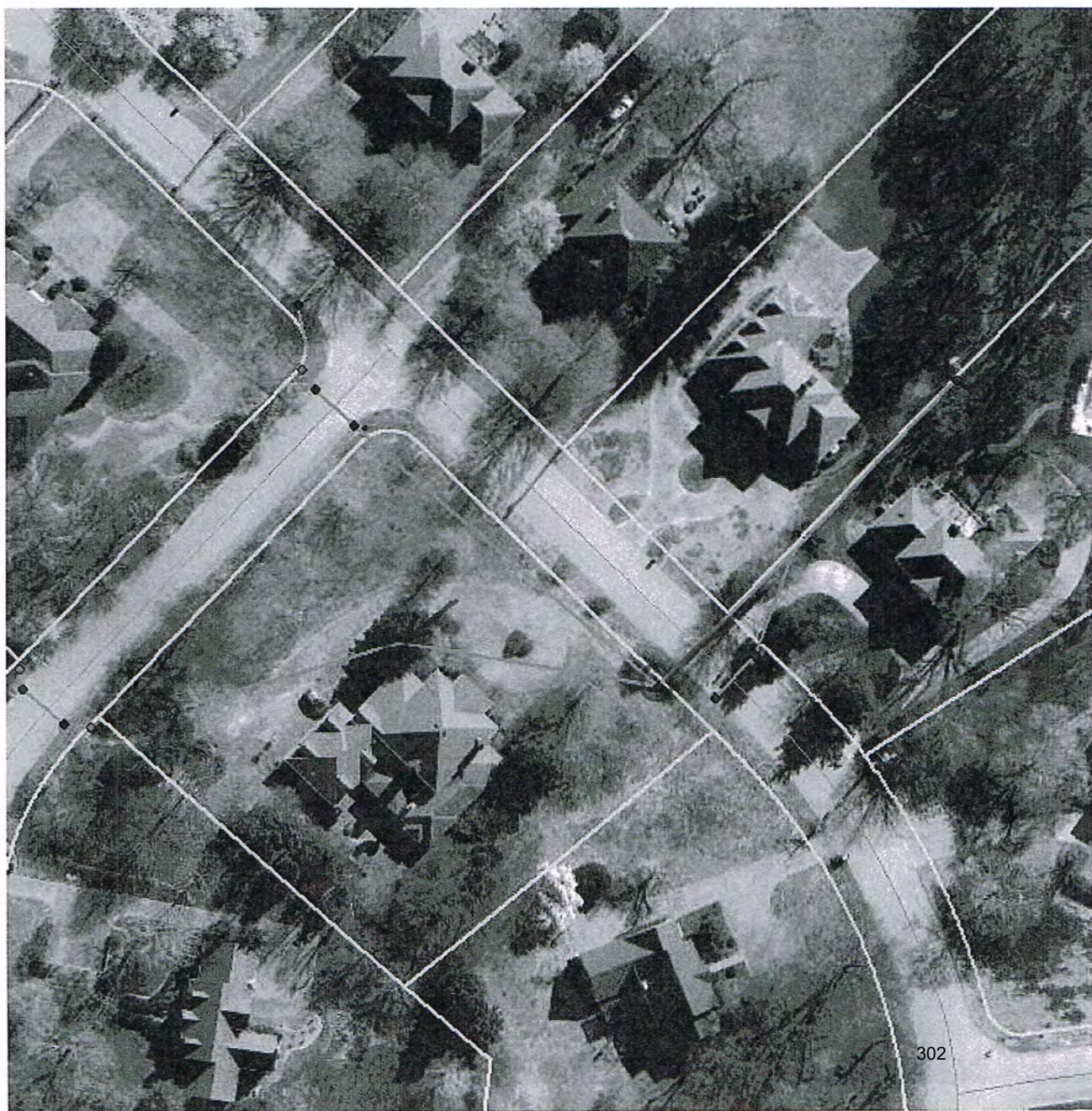
NOTICE IS HEREBY GIVEN that the City of Brentwood, Tennessee will receive sealed bids at the office of Karen Harper, City Treasurer, Brentwood Municipal Center, 2nd Floor, 5211 Maryland Way, Brentwood, TN 37024, until 2:30 P.M. on January 14, 2020 at which time bids will be publicly opened and read aloud in the Commissioners

Segment #1, From the inlet at Suffolk Crest to the area drain in front of the house at 206 Derby Glenn.
115 +/- LF

Segment #2, From the area drain at 206 Derby Glen to the junction chamber. 135 +/- LF

Segment #3, From the junction chamber to the outlet. 220 +/- LF

The pipes are relatively clean, with only minor deterioration for their age of 32+/- years. However, given the first two segments meet at the corner of a large house, I think we need to take some preventative action.



BID FORM

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

SULLIVAN ENGINEERING, INC.

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

A practice division of the

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National Society of Professional Engineers

1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council

1015 10th Street, N.W., Washington, DC 20005

American Society of Civil Engineers

345 East 47th Street, New York, NY 10017

EJCDC No. 1910-18 (1996 Edition)

PROJECT IDENTIFICATION:

2020 Pipe Repair Contract

CONTRACT IDENTIFICATION AND NUMBER:

Sullivan Engineering Project No. 19-014

Dated: January 14, 2020

THIS BID IS SUBMITTED TO:

City of Brentwood, TN
C/o Karen Harper, City Treasurer
P.O. Box 788
Brentwood, TN 37024-0788

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 75 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of OWNER.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged.

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition, if any, which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does **not** consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

CONSTRUCTION ESTIMATE

This project is to be constructed under the Standard and Supplemental Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		ROUND PIPE LINER				
	1	18-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	2	24-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	3	30-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	4	36-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	5	42-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	6	48-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	7	54-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	8	60-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	9	66-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	10	72-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	11	78-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	12	84-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	13	90-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES	L.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		WIRE MESH REINFORCEMENT				
	14	96-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
		ARCH PIPE LINER		1		
	100	21" X 15" PIPE ARCH (18-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	101	28" X 20" PIPE ARCH (24-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	102	35" X 24" PIPE ARCH (30-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	103	42" X 31" PIPE ARCH (36-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	104	49" X 38" PIPE ARCH (42-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	105	53" X 41" PIPE ARCH (48-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	106	60" X 46" PIPE ARCH (54-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	107	66" X 51" PIPE ARCH (60-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	108	73" X 55" PIPE ARCH (66-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	109	81" X 59" PIPE ARCH (72-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	110	87" X 63" PIPE ARCH (78-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH	L.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		REINFORCEMENT				
	111	95" X 67" PIPE ARCH (84-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	112	103" X 71" PIPE ARCH (90-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	113	112" X 75" PIPE ARCH (96-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	114	117" X 79" PIPE ARCH (102-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	115	128" X 83" PIPE ARCH (108-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	116	137" X 87" PIPE ARCH (114-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
	117	142" X 91" PIPE ARCH (120-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
		MISCELLEANOUS ITEMS				
	200	PRESSURE GROUT VOIDS	S.F.	1		
	201	SEAL END AND WINGWALL, 2-INCH THICK 5,000 PSI MIX, INCLUDES COVERAGE WITH WIRE MESH	S.F.	1		
	202	CLEAN ALL PIPES AND STRUCTURES (SOLID DEBRIS REMOVAL)	C.Y.	1		
	203	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/WIRE MESH	S.F.	1		
	204	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/#4 RE-BAR	S.F.	1		
	205	MODIFICATION TO DELETE WIRE MESH AND REPLACE WITH #4 RE-BAR	S.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		TN DEPT OF TRANSPORTATION ITEMS				
	203-07	FURNISHING AND SPREADING TOPSOIL	CY	1		
1 & 4	204-07	BEDDING MATERIAL (PIPE) CLASS B	CY	1		
	209-05.01	SEDIMENT REMOVAL (CULVERTS, THE CITY WILL HAVE THE CULVERTS CLEANED PRIOR TO SCHEDULING AN ON SITE MEETING. AND ISSUANCE OF A WORK ORDER. THIS SHOULD LEAVE THE CULVERT IN A CONDITION THAT NORMALLY REQUIRED PREP WORK WOULD BE INCLUDED IN YOUR UNIT COST PER LINEAR FOOT. IN THE EVENT THE PIPE HAS EXCESSIVE SEDIMENT BUILD-UP PRIOR TO WORK BEGINNING THE CITY WILL EITHER HAVE IT REMOVED OR AUTHORIZED YOU TO PERFORM THE SERVICE.)	C.Y.	1		
	615-04.10	NON-SHRINK GROUT	CF	1		
	712-08.06	UNIFORMED POLICE OFFICER	HR	1	\$50.00	\$50.00
3 & 6	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1		
	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1		
TOTAL BASE BID						

FOOTNOTES

- (1) BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH TDOT STANDARD DRAWING D-PB-1 AND D-PB-2.

(2) INCLUDES REMOVAL AND DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL GUIDELINES. NECESSARY PERMITS WIL BE OBTAINED BY THE CITY OF BRENTWOOD.

(3) TO BE USED FOR ADDITIONAL PIPE BEDDING MATERIAL AS DIRECTED BY THE PUBLIC WORKS DIRECTOR OR AUTHORIZED REPRESENTATIVE.

(4) AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)

GENERAL NOTES (ALL ITEMS)

(1) WORKING HOURS WILL BE FROM 7:00 AM UNTIL DARK MONDAY THROUGH SATURDAY. NO WORK WILL BE ALLOWED ON SUNDAY UNLESS IT HAS BEEN CLASSIFIED AS AN EMERGENCY AND APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

(2) BONDS WILL BE REQUIRED AS NOTED IN THE CONTRACT DOCUMENTS. HOWEVER, BONDS WILL NOT BE REQUIRED FOR INDIVIDUAL WORK ORDERS ISSUED. A RETAINER WILL NOT BE WITHHELD FROM EACH WORK ORDER ISSUED.

(3) UNIT PRICE BID FOR ALL ITEMS SHALL INCLUDE ALL MOBILIZATION AND LAYOUT FOR A COMPLETE SYSTEM. SPECIALTY PERMITS SUCH AS CORP OF ENGINEERS, TN DEPT OF ENV, RAILROAD, ASBESTOS, ETC. SHALL BE OBTAINED BY THE CITY OF BRENTWOOD. PERMITS SUCH AS ELECTRICAL OR REVIEW FEES SHALL BE PAID BY THE CONTRACTOR AND REIMBURSED BY THE CITY OF BRENTWOOD.

(4) MEASUREMENT AND PAYMENT OF QUANTITIES SHALL BE IN ACCORDANCE WITH THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED: JANUARY 1, 2015 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE CONSTRUCTION DOCUMENTS.

(5) ALL ITEMS WITHIN THIS CONTRACT INCLUDE INSTALLATION OF NECESSARY TRAFFIC AND EROSION CONTROL IN THE UNIT PRICE BID, IN ACCORDANCE WITH FEDERAL, STATE AND CITY OF BRENTWOOD REQUIREMENTS. TEMPORARY LANE LINE AND SPECIALTY MARKINGS WILL NOT BE REQUIRED AND SHALL BE THE RESPONSIBILITY OF THE CITY OF BRENTWOOD.

(6) TDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 104 SCOPE OF WORK, ARTICLE 104.02 CHANGES IN PLANS OR IN CHARACTER OF CONSTRUCTION, SUB-SECTION C AND 604.31 UNIT COST PRICE ADJUSTMENT, HAVE BEEN DELETED AND NOT APPLICABLE TO THIS CONTRACT.

TOTAL OF ALL UNIT PRICES:

	Dollars and	Cents,	(\$		)
(use words)					(figure)

Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents. Proposed prices will remain valid for all areas, regardless of size and at all times within the contract period.

- 6.01** Bidder agrees begin work within fourteen (14) days after written notification of the acceptance of this Bid for each and every work order issued under this contract. Each and every project issued shall have a mutually agreed upon date of substantial completion, and completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions. The contractor further agrees that if work is not initiated and completed within the mutually agreed upon construction schedule the owner reserves the privilege to impose liquidated damages in accordance with Section 4.03 of the "Standard form of Agreement Between Owner and Contractor on the Basis of Stipulated Price".
- 6.02** On-Call Services - The bidder agrees that forces shall be able to respond, mobilize and initiate construction activities on request to specific short notice (24 hours) and emergency projects within the City of Brentwood.
- 6.03** All unit cost contained within this contract shall include all necessary charges for mobilization of equipment, materials and man power for a complete installation of the services required.
- 6.04** The bidder agrees to coordinate with the City of Brentwood 72 hours in advance of anticipated interruptions to utility service; operations which are loud or noisy; and operations which will generate disturbing quantities of structure born noise or vibrations such as jack hammering or core drilling.
- 6.05** The Bidder shall submit upon request to the City of Brentwood Public Works Director a traffic control plan for the roadways within each project area a minimum of 48 hours prior to initiating work.
- 6.06** The Bidder shall submit upon request to the City of Brentwood Public Works Director an erosion control plan for the graded areas within each project a minimum of 48 hours prior to initiating work.
- 6.07** Bidder accepts the provisions of the Agreement as to liquidated damages as penalty in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.
- 6.08** Measurement and Payment of quantities shall be in accordance with the Standard Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.
- 6.09** Contract unit prices shall be for a one-year period, at which time the City of Brentwood Public Works Director may elect to extend the contract for two additional one-year periods. Provided the Bidder agrees to the extension, further agreeing that all original unit price bids will be increased or decreased in accordance with the Consumer Price Index, as determined by the US Department of Labor Statistics for the zone in which the City of Brentwood, TN is located.
- 6.10** Bid documents set forth in the contract shall remain in force for the duration of time as necessary until a time in which it is no longer applicable. A separate bond shall **not** be required for each individual work order issued. However, the initial bond as required at the inception of this contract shall remain in force for the duration of the contract.

7.01 The following documents are attached to and made a condition of this Bid:

- A. Required Bid security;
- B. A tabulation of all Subcontractors, Suppliers [and other] individuals and entities required to be identified in this Bid;
- C. Required bidder qualifications statement with supporting data; and

8.01 The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

SUBMITTED on _____, _____.

State Contractor License No. _____.

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

Business address: _____

Phone No.: _____ FAX No.: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

Phone No.: _____ FAX No.: _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____
(Signature of Corporate Secretary)

Business address: _____

Phone No.: _____ FAX No.: _____

Date of Qualification to do business is _____.

A Joint Venture

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ FAX No.: _____

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ FAX No.: _____

Phone and FAX Number, and Address for receipt of official communications:

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

ADDENDUM

ADDENDUM No. 3

DATE OF ISSUANCE: January 10, 2020

OWNER: CITY OF BRENTWOOD, TN.

C/o Mr. Todd Hoppenstedt
Brentwood Director of Public Works
P.O. Box 788
Brentwood, TN 37027

CONTRACT: General Construction

Project: 2020 Pipe Repair Contract
Engineers Project No. 19-012

ENGINEER: Mr. Richard Sullivan, PE, Sullivan Engineering, Inc.
317 Main Street, Suite 201, Franklin, TN 37064

You are directed to make the following changes in the Contract Documents:

Description:

I) Modifications to the Bid Form

(a) Added Footnotes and revised Item Description. The changes are noted below.

Revised Item

		ESTIMATED QUANTITIES		
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.
		ROUND PIPE LINER		
6	1	18-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	2	24-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	3	30-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	4	36-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	5	42-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	6	48-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	7	54-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	8	60-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	9	66-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	10	72-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	11	78-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1

		ESTIMATED QUANTITIES		
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.
6	12	84-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	13	90-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	14	96-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
		ARCH PIPE LINER		1
6	100	21" X 15" PIPE ARCH (18-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	101	28" X 20" PIPE ARCH (24-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	102	35" X 24" PIPE ARCH (30-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	103	42" X 31" PIPE ARCH (36-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	104	49" X 38" PIPE ARCH (42-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	105	53" X 41" PIPE ARCH (48-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	106	60" X 46" PIPE ARCH (54-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	107	66" X 51" PIPE ARCH (60-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	108	73" X 55" PIPE ARCH (66-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	109	81" X 59" PIPE ARCH (72-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	110	87" X 63" PIPE ARCH (78-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	111	95" X 67" PIPE ARCH (84-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	112	103" X 71" PIPE ARCH (90-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	113	112" X 75" PIPE ARCH (96-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	114	117" X 79" PIPE ARCH (102-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	115	128" X 83" PIPE ARCH (108-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1

		ESTIMATED QUANTITIES		
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.
6	116	137" X 87" PIPE ARCH (114-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
6	117	142" X 91" PIPE ARCH (120-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1
		MISCELLEANOUS ITEMS		
	200	PRESSURE GROUT VOIDS	S.F.	1
	201	SEAL END AND WINGWALL, 2-INCH THICK 5,000 PSI MIX, INCLUDES COVERAGE WITH WIRE MESH	S.F.	1
	202	CLEAN ALL PIPES AND STRUCTURES (SOLID DEBRIS REMOVAL)	C.Y.	1
	203	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/WIRE MESH	S.F.	1
	204	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/#4 RE-BAR	S.F.	1
	205	MODIFICATION TO DELETE WIRE MESH AND REPLACE WITH #4 RE-BAR	S.F.	1
		TN DEPT OF TRANSPORTATION ITEMS		
	203-07	FURNISHING AND SPREADING TOPSOIL	CY	1
1 & 3	204-07	BEDDING MATERIAL (PIPE) CLASS B	CY	1
2	209-05.01	SEDIMENT REMOVAL (CULVERTS, THE CITY WILL HAVE THE CULVERTS CLEANED PRIOR TO SCHEDULING AN ON SITE MEETING. AND ISSUANCE OF A WORK ORDER. THIS SHOULD LEAVE THE CULVERT IN A CONDITION THAT NORMALLY REQUIRED PREP WORK WOULD BE INCLUDED IN YOUR UNIT COST PER LINEAR FOOT. IN THE EVENT THE PIPE HAS EXCESSIVE SEDIMENT BUILD-UP PRIOR TO WORK BEGINNING THE CITY WILL EITHER HAVE IT REMOVED OR AUTHORIZED YOU TO PERFORM THE SERVICE.)	C.Y.	1
	615-04.10	NON-SHRINK GROUT	CF	1
5	712-08.06	UNIFORMED POLICE OFFICER	HR	1
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1

FOOTNOTES

- (1) BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH TDOT STANDARD DRAWING D-PB-1 AND D-PB-2.
- (2) INCLUDES REMOVAL AND DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL GUIDELINES. NECESSARY PERMITS WIL BE OBTAINED BY THE CITY OF BRENTWOOD.
- (3) TO BE USED FOR ADDITIONAL PIPE BEDDING MATERIAL AS DIRECTED BY THE PUBLIC WORKS DIRECTOR OR AUTHORIZED REPRESENTATIVE.

- (4) AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)
- (5) PRIOR APPROVAL MUST BE OBTAINED FROM THE PUBLIC WORKS DIRECTOR TO SCHEDULE THIS WORK.
- (6) COORDINATE WITH ITEM #206.

Added Item

		ESTIMATED QUANTITIES		
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.
7	206	ADDITIONAL WOVEN WIRE MESH, AS DIRECTED BY THE ENGINEER	L.F.	1

FOOTNOTES

- (7) THE CITY INTENDS TO UTILIZE WIRE MESH REINFORCEMENT IMBEDDED IN THE 2-INCH (MIN) CEMENTITIOUS LINER ON A CASE BY CASE BASIS. THIS WORK WILL BE AS DIRECTED BY THE ENGINEER OR AUTHORIZED CITY REPRESENTATIVE.

ATTACHMENTS: (List documents supporting addendum)

A. Revised Bid Form

This Addendum consist of 4 page (emailed to Bidders)

END OF ADDENDUM



BID FORM

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

SULLIVAN ENGINEERING, INC.

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

A practice division of the

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

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1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council
1015 10th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
345 East 47th Street, New York, NY 10017
EJCDC No. 1910-18 (1996 Edition)

PROJECT IDENTIFICATION:

2020 Pipe Repair Contract

CONTRACT IDENTIFICATION AND NUMBER:

Sullivan Engineering Project No. 19-014

Dated: January 14, 2020

THIS BID IS SUBMITTED TO:

City of Brentwood, TN
C/o Karen Harper, City Treasurer
P.O. Box 788
Brentwood, TN 37024-0788

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 75 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of OWNER.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged.

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition, if any, which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does **not** consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

CONSTRUCTION ESTIMATE

This project is to be constructed under the Standard and Supplemental Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
		ROUND PIPE LINER				
6	1	18-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	2	24-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	3	30-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	4	36-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	5	42-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	6	48-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	7	54-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	8	60-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	9	66-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	10	72-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	11	78-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	12	84-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
6	13	90-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	14	96-INCH ROUND PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
		ARCH PIPE LINER		1		
6	100	21" X 15" PIPE ARCH (18-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
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6	104	49" X 38" PIPE ARCH (42-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	105	53" X 41" PIPE ARCH (48-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
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		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
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6	110	87" X 63" PIPE ARCH (78-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	111	95" X 67" PIPE ARCH (84-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	112	103" X 71" PIPE ARCH (90-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
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6	114	117" X 79" PIPE ARCH (102-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	115	128" X 83" PIPE ARCH (108-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	116	137" X 87" PIPE ARCH (114-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
6	117	142" X 91" PIPE ARCH (120-INCH ROUND EQUILEVANT) PIPE LINER 5,000 PSI, 2-INCH THICK (MIN), DOES NOT INCLUDES WIRE MESH REINFORCEMENT	L.F.	1		
		MISCELLEANOUS ITEMS				
	200	PRESSURE GROUT VOIDS	S.F.	1		
	201	SEAL END AND WINGWALL, 2-INCH THICK 5,000 PSI MIX, INCLUDES COVERAGE WITH WIRE MESH	S.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
	202	CLEAN ALL PIPES AND STRUCTURES (SOLID DEBRIS REMOVAL)	C.Y.	1		
	203	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/WIRE MESH	S.F.	1		
	204	ADDITIONAL 1-INCH THICK LINING (5,000 PSI MIX) THICKNESS W/#4 RE-BAR	S.F.	1		
	205	MODIFICATION TO DELETE WIRE MESH AND REPLACE WITH #4 RE-BAR	S.F.	1		
7	206	ADDITIONAL WOVEN WIRE MESH, AS DIRECTED BY THE ENGINEER	L.F.	1		
		TN DEPT OF TRANSPORTATION ITEMS				
	203-07	FURNISHING AND SPREADING TOPSOIL	CY	1		
1 & 3	204-07	BEDDING MATERIAL (PIPE) CLASS B	CY	1		
2	209-05.01	SEDIMENT REMOVAL (CULVERTS, THE CITY WILL HAVE THE CULVERTS CLEANED PRIOR TO SCHEDULING AN ON SITE MEETING. AND ISSUANCE OF A WORK ORDER. THIS SHOULD LEAVE THE CULVERT IN A CONDITION THAT NORMALLY REQUIRED PREP WORK WOULD BE INCLUDED IN YOUR UNIT COST PER LINEAR FOOT. IN THE EVENT THE PIPE HAS EXCESSIVE SEDIMENT BUILD-UP PRIOR TO WORK BEGINNING THE CITY WILL EITHER HAVE IT REMOVED OR AUTHORIZED YOU TO PERFORM THE SERVICE.)	C.Y.	1		
	615-04.10	NON-SHRINK GROUT	CF	1		
5	712-08.06	UNIFORMED POLICE OFFICER	HR	1	\$50.00	\$50.00
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1		

		ESTIMATED QUANTITIES				
FOOTNOTES	ITEM NO.	ITEM DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL
4	740-11.03	TEMPORARY SEDIMENT TUBE 18 INCH (TO BE USED FOR EROSION CONTROL OF "V-DITCH", AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT SHALL BE AT THE CONTRACTORS EXPENSE.)	L.F.	1		
TOTAL BASE BID						

FOOTNOTES

- (1) BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH TDOT STANDARD DRAWING D-PB-1 AND D-PB-2.
- (2) INCLUDES REMOVAL AND DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL GUIDELINES. NECESSARY PERMITS WIL BE OBTAINED BY THE CITY OF BRENTWOOD.
- (3) TO BE USED FOR ADDITIONAL PIPE BEDDING MATERIAL AS DIRECTED BY THE PUBLIC WORKS DIRECTOR OR AUTHORIZED REPRESENTATIVE.
- (4) AFTER THE INITIAL INSTALLATION ALL COST ASSOCIATED WITH REPAIR, MAINTENANCE AND REPLACEMENT DURING THE LIFE OF THIS CONTRACT SHALL BE AT THE CONTRACTORS EXPENSE.)
- (5) PRIOR APPROVAL MUST BE OBTAINED FROM THE PUBLIC WORKS DIRECTOR TO SCHEDUL THIS WORK.
- (6) COORDINATE WITH ITEM #206.
- (7) THE CITY INTENDS TO UTILIZE WIRE MESH REINFORCEMENT IMBEDDED IN THE 2-INCH (MIN) CEMENTITIOUS LINER ON A CASE BY CASE BASIS. THIS WORK WILL BE AS DIRECTED BY THE ENGINEER OR AUTHORIZED CITY REPRESENTATIVE.

GENERAL NOTES (ALL ITEMS)

- (1) WORKING HOURS WILL BE FROM 7:00 AM UNTIL DARK MONDAY THROUGH SATURDAY. NO WORK WILL BE ALLOWED ON SUNDAY UNLESS IT HAS BEEN CLASSIFIED AS AN EMERGENCY AND APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
- (2) BONDS WILL BE REQUIRED AS NOTED IN THE CONTRACT DOCUMENTS. HOWEVER, BONDS WILL NOT BE REQUIRED FOR INDIVIDUAL WORK ORDERS ISSUED. A RETAINER WILL NOT BE WITHHELD FROM EACH WORK ORDER ISSUED.
- (3) UNIT PRICE BID FOR ALL ITEMS SHALL INCLUDE ALL MOBILIZATION AND LAYOUT FOR A COMPLETE SYSTEM. SPECIALTY PERMITS SUCH AS CORP OF ENGINEERS, TN DEPT OF ENV, RAILROAD, ASBESTOS, ETC. SHALL BE OBTAINED BY THE CITY OF BRENTWOOD. PERMITS SUCH AS ELECTRICAL OR REVIEW FEES SHALL BE PAID BY THE CONTRACTOR AND REIMBURSED BY THE CITY OF BRENTWOOD.
- (4) MEASUREMENT AND PAYMENT OF QUANTITIES SHALL BE IN ACCORDANCE WITH THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED: JANUARY 1, 2015 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE CONSTRUCTION DOCUMENTS.
- (5) ALL ITEMS WITHIN THIS CONTRACT INCLUDE INSTALLATION OF NECESSARY TRAFFIC AND EROSION CONTROL IN THE UNIT PRICE BID, IN ACCORDANCE WITH FEDERAL, STATE AND CITY OF BRENTWOOD REQUIREMENTS. TEMPORARY LANE LINE AND SPECIALTY MARKINGS WILL NOT BE REQUIRED AND SHALL BE THE RESPONSIBILITY OF THE CITY OF BRENTWOOD.
- (6) TDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 104 SCOPE OF WORK, ARTICLE 104.02 CHANGES IN PLANS OR IN CHARACTER OF CONSTRUCTION, SUB-SECTION C AND 604.31 UNIT COST PRICE ADJUSTMENT, HAVE BEEN DELETED AND NOT APPLICABLE TO THIS CONTRACT.

TOTAL OF ALL UNIT PRICES:

(use words)	Dollars and	Cents,	(\$ _____)	(figure)
-------------	--------------------	---------------	-------------	----------

Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents. Proposed prices will remain valid for all areas, regardless of size and at all times within the contract period.

- 6.01** Bidder agrees begin work within fourteen (14) days after written notification of the acceptance of this Bid for each and every work order issued under this contract. Each and every project issued shall have a mutually agreed upon date of substantial completion, and completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions. The contractor further agrees that if work is not initiated and completed within the mutually agreed upon construction schedule the owner reserves the privilege to impose liquidated damages in accordance with Section 4.03 of the "Standard form of Agreement Between Owner and Contractor on the Basis of Stipulated Price".
- 6.02** On-Call Services - The bidder agrees that forces shall be able to respond, mobilize and initiate construction activities on request to specific short notice (24 hours) and emergency projects within the City of Brentwood.
- 6.03** All unit cost contained within this contract shall include all necessary charges for mobilization of equipment, materials and man power for a complete installation of the services required.
- 6.04** The bidder agrees to coordinate with the City of Brentwood 72 hours in advance of anticipated interruptions to utility service; operations which are loud or noisy; and operations which will generate disturbing quantities of structure born noise or vibrations such as jack hammering or core drilling.
- 6.05** The Bidder shall submit upon request to the City of Brentwood Public Works Director a traffic control plan for the roadways within each project area a minimum of 48 hours prior to initiating work.
- 6.06** The Bidder shall submit upon request to the City of Brentwood Public Works Director an erosion control plan for the graded areas within each project a minimum of 48 hours prior to initiating work.
- 6.07** Bidder accepts the provisions of the Agreement as to liquidated damages as penalty in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.
- 6.08** Measurement and Payment of quantities shall be in accordance with the Standard Specifications of the Tennessee Department of Transportation Dated: January 1, 2015 and additional specifications and special provisions contained in the construction documents.
- 6.09** Contract unit prices shall be for a one-year period, at which time the City of Brentwood Public Works Director may elect to extend the contract for two additional one-year periods. Provided the Bidder agrees to the extension, further agreeing that all original unit price bids will be increased or decreased in accordance with the Consumer Price Index, as determined by the US Department of Labor Statistics for the zone in which the City of Brentwood, TN is located.
- 6.10** Bid documents set forth in the contract shall remain in force for the duration of time as necessary until a time in which it is no longer applicable. A separate bond shall **not** be required for each individual work order issued. However, the initial bond as required at the inception of this contract shall remain in force for the duration of the contract.

7.01 The following documents are attached to and made a condition of this Bid:

- A. Required Bid security;
- B. A tabulation of all Subcontractors, Suppliers [and other] individuals and entities required to be identified in this Bid;
- C. Required bidder qualifications statement with supporting data; and

8.01 The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

SUBMITTED on _____, _____.

State Contractor License No. _____.

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

Business address: _____

Phone No.: _____ FAX No.: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

Phone No.: _____ FAX No.: _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____
(Signature of Corporate Secretary)

Business address: _____

Phone No.: _____ FAX No.: _____

Date of Qualification to do business is _____.

A Joint Venture

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ FAX No.: _____

Joint Venturer Name: _____ (SEAL)

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone No.: _____ FAX No.: _____

Phone and FAX Number, and Address for receipt of official communications:

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-11 - Agreement with JDHQ Hotels LLC d/b/a Embassy Suites by Hilton Cool Springs for 2020 Employee Dinner

Submitted by: Mike Worsham, Human Resource

Department: Human Resource

Information

Subject

Resolution 2020-11 - Authorizing an Agreement with JDHQ Hotels LLC d/b/a Embassy Suites by Hilton Cool Springs for 2020 Annual Employee Recognition Dinner

Background

The Board of Commissioners of the City Manager have a long-standing tradition of providing and hosting an employee appreciation dinner at the beginning of the annual holiday season. The purpose of this event is to celebrate all employees' contribution to the success of the City and recognize individual employees who passed significant service anniversaries with the City during the year.

In 2018 and 2019, this event was held at the Ravenswood Mansion in Brentwood. For many years prior to this, it was held at the Embassy Suites in Cool Springs.

Following last year's event, a satisfaction survey was provided to employees requesting their feedback regarding the event, including suggestions for improvement. The majority of employees completing the survey requested that future events be moved back to a hotel venue, primarily due to the size of our group, which was considered a little too crowded, along with other issues of holding the event in the tent outside of the Ravenswood Mansion.

There are realistically only two other facilities available in Williamson County (Embassy Suites and Marriott at Cool Springs) that have the capability of accommodating our group and that are also within a reasonable travel distance of Brentwood.

As mentioned above, for many years prior to 2018 this event was held at the Embassy Suites in Franklin, Tennessee. The overwhelming feedback from attendees of these events has been very positive on all aspects, including the quality of the food, room arrangement and entertainment. Because of the Embassy Suites' long record of providing quality accommodation for the Employee Appreciation Dinner, staff recommends that this event be held there again in 2020.

Based on anticipated attendance of 275 employees and guests, the Embassy Suites quoted a cost of approximately \$14,000 plus a 25% service charge. The total estimated cost is approximately \$17,500, however, the final cost will be determined by the actual number of attendees. This amount is included in the Human Resources Department FY 2021 Operating Budget.

Staff Recommendation

To ensure the Embassy Suites can be reserved for the preferred date of **October 30, 2020** it is recommended that approval be granted for the City to enter into an agreement with Embassy Suites to host the 2020 Annual Employee Recognition Dinner.

Fiscal Impact

Attachments

Resolution 2020-11

Contract No. 2020-013

RESOLUTION 2020-11

A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE AUTHORIZING THE MAYOR TO EXECUTE AN AGREEMENT BY AND BETWEEN THE CITY OF BRENTWOOD AND JDHQ HOTELS LLC D/B/A EMBASSY SUITES BY HILTON COOL SPRINGS FOR 2020 ANNUAL EMPLOYEE RECOGNITION DINNER, A COPY OF SAID AGREEMENT BEING ATTACHED HERETO AND MADE A PART OF THIS RESOLUTION BY REFERENCE

BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the Mayor is hereby authorized to execute an agreement by and between the City of Brentwood and JDHQ Hotels LLC d/b/a Embassy Suites by Hilton Cool Springs for 2020 annual employee recognition dinner, a copy of said agreement being attached hereto and made a part of this resolution by reference.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR

Rhea E. Little, III

ADOPTED: _____

Approved as to form:

RECORDER

Holly Earls

CITY ATTORNEY

Kristen L. Corn



January 28, 2020

GROUP SALES EVENT AGREEMENT (Catering Only)

This **Group Sales Event Agreement** ("Agreement") is by and between **City of Brentwood** ("Group" or "you" or "your(s)") and **JDHQ Hotels LLC, d/b/a Embassy Suites by Hilton Cool Springs** (the "Hotel" or "we" or "us" or "our"). Group and Hotel are each a "Party" and, collectively, the "Parties").

Especially Prepared for:		Event & Hotel Information:	
Client Contact Name:	Mike Worsham	Name of "Event":	City of Brentwood Employee Appreciation Dinner
Title:	Planner	Date(s) of Event:	Friday, October 30, 2020
Responsible Party (Company Name or Individual):	City of Brentwood	Post to Reader Board as:	City of Brentwood Employee Appreciation Dinner
Address:	5211 Maryland Way PO Box 788	Hotel Contact:	Cynthia Vera
City, State, Zip:	Brentwood, TN 37024-0788	Title:	Director of Event Sales
		Property Address:	820 Crescent Centre Drive Franklin, TN 37067
Phone:	(615) 371-7004	Phone:	(615) 515-5200
Email	robin.wright@brentwoodtn.com	Email:	cynthia.vera@atriumhospitality.com

The Hotel will provide your requested function space in accordance with and at the rates set forth in the following Schedule of Events. The Hotel reserves the right to adjust function space at the reservations due date if attendance projects lower than contracted. Please ensure that the Schedule of Events includes all space necessary to accommodate your set-up and break-down times, all audio-visual needs, head tables and displays. Diagrams and identification of the Hotel's meeting space to be used for your Event may not be disseminated by the Group without the Hotel's prior approval.

SCHEDULE OF EVENTS

Date	Time	Event Name	Room	Setup	AGR	Rental
Fri, 10/30/20	4:00 PM - 5:30 PM	Setup	Embassy Ballroom	Special Setup Instructions	275	\$0
Fri, 10/30/20	5:30 PM - 6:30 PM	Registration	Embassy Ballroom	Special Setup Instructions	275	\$0
Fri, 10/30/20	5:45 PM - 10:00 PM	Cash Bar	Embassy Ballroom	Existing Setup	275	\$0
Fri, 10/30/20	6:00 PM - 10:00 PM	Cocktail Reception	Embassy Ballroom	Special Setup Instructions	275	\$0
Fri, 10/30/20	6:30 PM - 9:00 PM	Dinner & Casino Night	Embassy Ballroom	Existing Setup	275	\$0

Specific meeting rooms cannot be guaranteed and are subject to change

The use of the Hotel's exhibit space will be governed by the attached "Terms and Conditions Governing Use of Exhibit Space" which is incorporated herein by this reference.

GUARANTEED ATTENDANCE AND MENU SELECTIONS: Though this number will not affect the Agreed Minimum Food and Beverage Revenue figure noted below, the final attendance for your function must be received in writing by the event services office NO LATER THAN 12:00PM, three (3) working days before the date of the function. This will be the number for whom the Hotel will prepare food for the function. The Hotel cannot be responsible for service, accommodations or guaranteeing the same menu items for more than three percent over your guaranteed number of people. If a guarantee is not given to the Hotel by the specified time and date, the original estimated attendance would be considered the final guarantee. Your final menu selections must be made no later than 10 days prior to commencement of your Event. A Banquet Event Order will be sent to you to confirm all final arrangements and prices. If you do not advise Hotel of any corrections or changes to the Banquet Event Order by the date requested by Hotel, the Banquet Event Order will be considered accepted by you as correct. Group will be responsible for the charges listed on the Banquet Event Order or the Agreed Minimum Food and Beverage Revenue figure, whichever is greater, plus applicable tax and service charges. Diagrams and identification of the Hotel's meeting space to be used for your Event may not be disseminated by the Group without the Hotel's prior approval.

ALL RESERVATIONS AND THIS AGREEMENT are subject to the rules and regulations of Hotel and the following conditions:

SERVICE CHARGE: A service charge of 25% (or the current service charge in effect on the day of the Event) will be assessed on all charges relating to your Event including, but not limited to, food and beverage, audio visual, connectivity, meeting room rental, labor fees and any other charges relating to your Event, plus any applicable state and/or local taxes. This service charge is not a gratuity and is the property of Hotel to cover discretionary and administrative costs of the Event. We will endeavor to notify you in advance of your Event of any increases to the service charge should different amounts be in effect on the day of your Event.

PARKING: Your attendees will receive complimentary parking.

AGREED MINIMUM FOOD AND BEVERAGE REVENUE: Based on the above Schedule of Events, the "Agreed Minimum Food and Beverage Revenue" is \$11,000.00. This amount does not include service charges or taxes, if applicable, which are noted separately herein, and any additional requested function space or food and beverage shall be extra. If the Agreed Minimum Food and Beverage Revenue Figure is not met, any balance will be posted as a food and beverage attrition charge to your Master Account, plus applicable taxes and service charges.

FACILITIES AND SERVICES COMMITMENT: When you contract for meeting facilities and for food and beverage services, those facilities and services are removed from our inventory and considered sold to you, and the Hotel makes financial plans based upon the revenues it expects to achieve from your full performance of this Agreement. It is impossible for the Hotel to know in advance whether or under what circumstances or at what rates it would be able to resell your contracted services or facilities if you do not use them, either as the result of a cancellation of your Event ("cancellation") or as the result of usage of less than your contracted food and beverage services for the above Schedule of Events ("attrition"). In most instances, when groups do not use their contracted facilities or services, the Hotel is unable to resell those facilities or services and even when the facilities or services are resold, they are generally not resold at the same rates, may be resold to groups which would have utilized the Hotel at another time, are resold to groups that do have the same needs as the original group, etc. Even when facilities or services may be resold, it is costly to re-market the facilities and services, and such efforts divert the attention of our sales staff from selling the Hotel's facilities and services for other times. And we may have turned away more lucrative groups in order to meet our commitment to you.

For all these reasons and others, the Parties agree that in the event of cancellation or attrition, the following charges, which represent a reasonable effort on behalf of the Hotel to establish its loss prospectively, shall be due as liquidated damages. Because the Hotel reasonably expects to derive revenue from your Event above and beyond the revenue derived from the provision of food and beverage services, and because it is difficult to estimate the actual revenue which may be derived from your Event, the amounts due as and for liquidated damages are intended to compensate the Hotel for all of its losses associated with cancellation and/or attrition.

CANCELLATION: It is understood that Hotel loses substantial revenue upon the Group's cancellation of an event. The amount of those losses is often difficult or impossible to determine. Hotel has set forth the following fee schedule in the event of cancellation. The parties agree that these fees are a fair and reasonable estimation of Hotel's loss as a result of cancellation. Group shall pay the cancellation fee as liquidated damages, plus applicable taxes, if Group cancels or is deemed to have cancelled the Event.

If any single function is cancelled, the Group is responsible for the meeting room rental and any other applicable charges associated with that function. The Group is still expected to meet the Agreed Minimum Food and Beverage Revenue. Group agrees to notify Hotel in writing within five (5) business days of any decision to cancel. If the entire Event is cancelled Group agrees to pay Hotel, as follows:

CANCELLATION FEES:

Cancellation Fee is based on Agreed Minimum Food and Beverage Revenue, all other applicable Event charges (e.g., meeting room rental, setup charges, audio visual charges, etc.), service charge and applicable taxes for a total amount of \$15,090.63

Cancelled more than 181 days prior to arrival	50% or \$7,545.31
Cancelled 91 - 180 days prior to arrival	70% or \$10,563.44
Cancelled within 90 days prior to arrival	90% or \$13,581.56

Your written notice of cancellation must be delivered to Hotel and may be made by facsimile or electronic transmission. Cancellation date will be considered the date such notification was received by Hotel. Liquidated damages resulting from cancellation shall be due and payable at the time of cancellation.

DEPOSIT AND PAYMENT REQUIREMENTS: If you wish to apply for credit, please complete the enclosed direct bill application form and return it with the signed Agreement. If you wish to pay by credit card, please complete the enclosed Credit Card Authorization form and return it with the signed Agreement. Please note that any credit approvals will expire after 24 months. In addition, Hotel reserves the right to withdraw a prior credit approval if Group fails to pay in full charges associated with any prior event at the Hotel or any other hotel owned or operated by Atrium Hospitality or its affiliates, or if there is any material adverse change in Group's credit standing. If credit approval is withdrawn or expires, Group must make deposit payments in accordance with the below schedule, with Group paying any previously scheduled deposit amounts by the earlier of (A) five (5) days after the Hotel notifies Group of the withdrawal or expiration of credit, or (B) three (3) days prior to the date of the Event.

If credit is not established in advance by Group with Hotel and maintained, you must make payments in accordance with the below payment schedule. All deposits will be credited to Group's Master Account. **If direct bill approved, client will not have to pay deposits.**

Date	Deposit Due
Upon return of signed Agreement to Hotel	\$3772.66
Two weeks prior to Event	\$10563.44
Three days prior to Event*	\$13581.56

* Final deposit payment must be by cash, credit card, certified or official bank check, bank transfer or money order.

Checks and money orders should be made payable to Embassy Suites by Hilton Cool Springs and be delivered to:

Embassy Suites by Hilton Cool Springs
Attention: Accounting Department
820 Crescent Centre Drive
Franklin, TN 37067

If any deposit payment is not made when due, Hotel may, at its option, deem the Event to be canceled, in which case cancellation charges will apply as noted above and the Hotel will retain any deposits on hand and apply them to the cancellation charges.

In addition to any other amounts authorized by this Agreement, the following items shall be charged to the Master Account: food and beverage charges, meeting space rental charges, service charges, attrition charges, cancellation charges, and any other charges billed to the Master Account at the request of the authorized representative of the Group, as designated by the Group in advance of the Event, plus applicable taxes and governmental charges. Group further agrees that all charges associated with use of the grounds, function space, facilities and services of the Hotel by its vendors shall be posted to the Master Account.

During the course of your Event, we would be pleased to meet with you each day at a mutually agreed upon time to review the charges applied to your Master Account and to keep it accurate and up to date. Please inform your Event Services Manager of a convenient time that you wish to establish for a daily meeting.

If credit was not established and maintained, any Master Account balance is due at the conclusion of the Event. Where credit was established and maintained, the Master Account balance will be invoiced to the Group within 10 days after the Event concludes and shall be due and payable by Group within 10 days after the date of invoice. Master Account charges may be paid in the form of cash, check or bank transfer. All deposits, balances or charges not paid when due will bear interest at the lesser of 1.5% per month or the maximum rate permitted by law. Should the Hotel, in its sole discretion, deem collection action necessary in regard to any amounts payable by Group under this Agreement, all costs associated with that collection action, including attorney's fees, shall be payable by Group and may be posted to the Master Account.

TAX EXEMPT STATUS: If Group maintains a tax exempt status, Hotel must be provided with a valid exemption certificate no later than thirty (30) days prior to Group's arrival in order to be exempt from taxes. **Please note, tax exempt status pertains to the Master Account only.** Individual attendees are not tax exempt. Tax exempt status applies to sales tax only; other taxes may apply.

AUDIO-VISUAL EQUIPMENT: agrees to work exclusively with Hotel or Hotel's exclusive audio-visual provider for Group's audio-visual needs. Any exceptions require Hotel approval and shall be subject to a Hotel fee of \$250.00, plus tax. Applicable service charges and taxes will apply to all charges for audio-visual services, whether provided by the Hotel or Hotel's exclusive provider.

INSURANCE AND INDEMNIFICATION: Hotel and Group each agree to carry and maintain and provide evidence of liability and other insurance in amounts sufficient to provide coverage against any claims arising out of its activities or relating to its respective obligations under this Agreement, with liability coverage of not less than \$1,000,000.00 per occurrence. With respect to any claims or other liability for which Group is responsible, Group's insurance will be primary and not contributory to any insurance maintained by the Hotel Parties. Damage caused by the Group or its attendees or contractors will be the Group's responsibility. The Hotel is not responsible for any loss or damage no matter how caused, to any samples, displays, properties, or personal effects brought into the Hotel, and/or for the loss of equipment, exhibits or other materials left in meeting rooms. Group will carry workers compensation coverage as required by law.

The Group shall indemnify, defend and hold harmless **JDHQ Hotels LLC, d/b/a Embassy Suites by Hilton Cool Springs** and Atrium Hospitality LP and their respective officers, directors, partners, agents, members and employees from and against any and all demands, claims, damages to persons or property, losses and liabilities, including reasonable attorney's fees (collectively "Claims") arising out of or caused by the Group's and/or its attendees', members', agents', employees', independent contractors' or exhibitors' negligence, including but not limited to claims arising out of the Group's distribution of pre-keyed room key cards, rooming lists or any other confidential information relating to its attendees.

The provisions of this section apply only to the extent permitted by Tennessee Law, and the Group does not waive any defenses it may have with respect to such claims.

ELECTRICAL/PHONE SETUP: All electrical services and utilities, including phone and riggings, must be contracted for through the Hotel's Event Services Department.

OUTSIDE FOOD AND BEVERAGE: Due to applicable law, you may not bring alcoholic beverages into the Hotel for your Event. You must obtain our prior approval before you bring any food or non-alcoholic beverages from outside sources into our Hotel. Service fees will apply to any outside food or beverage served in our function space, regardless whether Hotel labor is required.

ENTIRE AGREEMENT: This Agreement, including the below-referenced **Additional Terms and Conditions**, and the appendices, attachments, addenda and exhibits attached hereto and hereby incorporated herein, constitutes the entire agreement between the Parties superseding any and all prior proposals, negotiations, representations, commitments and other communications between the Parties, whether oral or written, concerning the Event. This Agreement shall be deemed "accepted" and binding on the Parties only after it has been signed and delivered by a representative of the Group and thereafter by a representative of the Hotel. No representative of the Hotel is authorized to make any representation which varies from the express terms of this Agreement. This Agreement cannot be amended or supplemented except in writing signed by a representative of the Group and the Hotel's Director of Sales or General Manager. Group shall present Hotel an executed version signed by Group's representative prior to **Thursday, January 09, 2020**.

ADDITIONAL TERMS AND CONDITIONS: By signing where indicated below, you are agreeing that in addition to the terms and conditions of this Agreement as set forth above, this Agreement also includes the general terms and conditions set forth in the Additional Terms and Conditions (collectively, the "Additional Terms and Conditions") located on the following website, which terms and conditions are hereby incorporated into and made a part of this Agreement: <https://atriumhospitality.com/terms-and-conditions/>

The undersigned expressly agree and warrant that they are authorized to sign and enter into this Agreement on behalf of the party for which they sign and if applicable on behalf of Group/Client named above.

ACCEPTED AND AGREED TO:

City of Brentwood

HOTEL:

JDHQ Hotels LLC

d/b/a Embassy Suites by Hilton Cool Springs

Group: City of Brentwood Employee Appreciation Dinner

By

By:

Name: Rhea E. Little, III, Mayor

Dated:

Name: Cynthia Vera, Director of Event Sales

Dated:

By: _____

Name: Cynthia Vera, Director of Event Sales

Dated:

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-13 - Authorizing Installation of a Speed Hump on Eastwood Drive in the Reserve at Raintree Forest

Submitted by: Jay Evans, Administration

Department: Administration

Information

Subject

Resolution 2012-13 - Authorizing the installation of three (3) speed humps on Eastwood Drive in the Reserve at Raintree Forest subdivision.

Background

The Reserve at Raintree Forest Homeowners Association (HOA) has requested installation of three speed humps along Eastwood Drive in an effort to address concerns with speeding and to improve the safety of pedestrians and bicyclists in this area.

Installation of two speed humps was a condition of approval (subject to HOA/resident approval) for the Final Plat for Section Four of the Reserve at Raintree Forest that was approved by the Planning Commission on November 5, 2018. Therefore, two of the requested humps will be funded by the developer. The third speed hump is a request of the HOA, funding for which would be provided 60% by the HOA and 40% by the City, per the City's adopted speed hump policy.

The suitable locations for the speed humps were determined by the City and its engineer, RG Phillips Consulting, LLC, with input from HOA representatives (see attached maps). The potential locations were greatly limited by the grade of Eastwood Drive, curves in the road, and proximity to intersections. After locations were identified, the HOA petitioned the affected residents within 1,000 feet of each site. Staff reviewed the petitions and each site meets the required 2/3 (66.66%) resident approval required by the speed hump policy (summary attached).

If approved, the estimated cost of each hump is \$4,000. The approximate share paid by the developer of Section Four, the Reserve at Raintree Forest HOA, and the City will be \$8,000, \$2,400, and \$1,600, respectively. While the City's cost is less than the \$10,000 limit usually required for City Commission approval, the speed hump policy requires Commission approval for any new installations.

Please contact the Assistant City Manager with any questions.

Staff Recommendation

Staff recommends approval of the attached resolution.

Fiscal Impact

Amount : \$1,600

Source of Funds: General Fund - Public Works

Account Number: 110-43120-82640

Fiscal Impact:

Adequate funds are available in the FY 2020 budget for this purpose.

Attachments

Resolution 2020-13

Attachment A - Location Maps

Letter of Request

Summary of Petition Results

RESOLUTION 2020-13

**A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE TO APPROVE THE
INSTALLATION OF SPEED HUMPS ON EASTWOOD DRIVE IN THE RESERVE AT
RAINTREE FOREST SUBDIVISION**

WHEREAS, the Reserve at Raintree Forest Homeowners Association has proposed installation of three speed humps on Eastwood Drive, along with a petition in support of the proposed speed humps signed by at least two-thirds of the residents within 1,000 feet of the proposed locations along Eastwood Drive; and

WHEREAS, the developer of Section Four of the Reserve at Raintree Forest is obligated by the conditions of approval for the final plat to pay for the installation of two speed humps along Eastwood Drive; and

WHEREAS, the criteria for the placement and construction of speed humps, as set forth in the amended policy for the installation of speed humps adopted by Resolution 97-14, will be met at the proposed locations.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1.

- a. That the speed humps must be installed in accordance with the City's adopted policy on speed humps.
- b. Two of the speed humps must be paid for by the developer of Section Four of the Reserve at Raintree Forest.
- c. Sixty percent of the direct cost of one of the speed humps shall be paid by the Reserve at Raintree Forest Homeowners Association.

SECTION 2. That the speed humps shall be in the approximate location as shown on the maps shown on Attachment A to this Resolution.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR Rhea E. Little, III

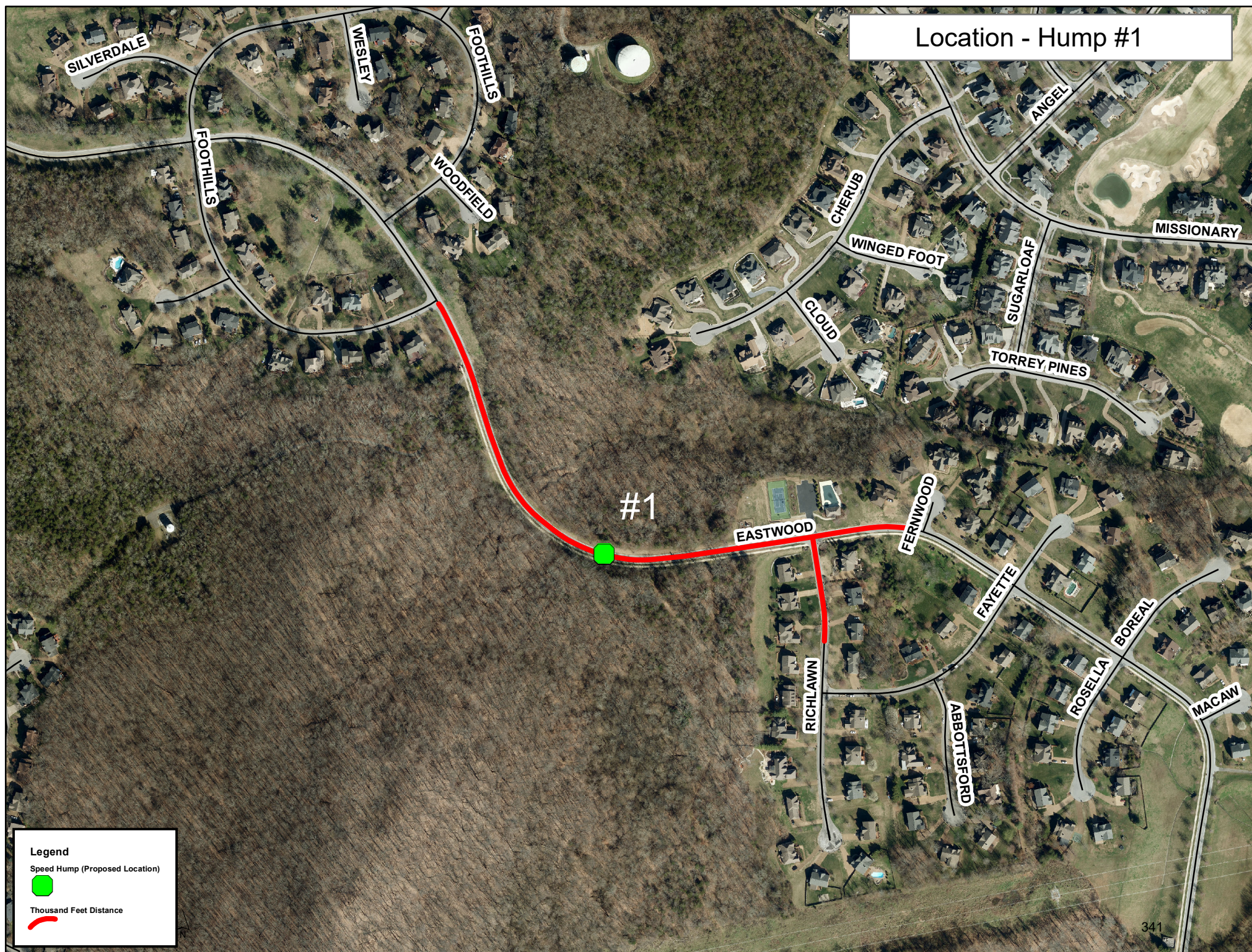
ADOPTED: _____

Approved as to form:

RECORDER Holly Earls

CITY ATTORNEY Kristen L. Corn

Location - Hump #1



Legend

Speed Hump (Proposed Location)



Thousand Feet Distance



Location - Hump #2



Location - Hump #3



THE RESERVE AT RAINTREE FOREST

January 10, 2020

Dear City of Brentwood,

Thank you for your time and effort collecting the necessary speed study data to establish a need for speed control measures in Reserve at Raintree. Many of your officers, including Asst. Chief Tommy Walsh, have worked with us for more than a decade to try to curtail the problem of speed and loss of control of vehicles. We have had 12 vehicles run off the road along Eastwood Drive in the last 13 years, hitting mailboxes, street signs, light poles, fences, running through neighbor's yards, flipping and landing upside down, etc. We have had many close calls with vehicles nearly hitting people. We have neighbors who have told us they've stopped using our sidewalks because of this pervasive problem. Thank you for helping us bring safety back to Reserve at Raintree so that all families feel comfortable using our sidewalks.

Enclosed you will find petitions for all 3 proposed speed bumps. We have collected more than 2/3rds approval for all 3 locations. We only had 2 people dissent. Our neighborhood overwhelmingly supports speed control measures and would welcome even more ideas to make the area around our pool, tennis & basketball amenities safer which falls at the base of the steep hill where most cars have lost control. This hotspot will need further attention moving forward, but we are grateful to get started on speed bumps throughout the neighborhood and we thank you for your help in facilitating this.

The Reserve at Raintree Board of Directors would like to formally request the City of Brentwood install all three speed bumps at the proposed locations which the city has identified. The Reserve at Raintree fully commits to cost sharing 60% (\$2,400) of the estimated \$4,000 cost for speed hump #1 at the top of the hill. The Reserve at Raintree also has the understanding that the developer will fund speed bumps 2 & 3 as outlined in the "Condition of Approval" on the final plat for the Reserve at Raintree, Section 4 highlighted on page 3 of that document.

Kindly,

Stacy Case
Reserve at Raintree HOA President



PETITION RESULTS - HUMP 1

Yes	No	PROP_STREE	OWNER1	OWNER2
X		1532 RICHLAWN DR	SUNDARAM SHANMUGA	RANGANATHAN SOUNDARAM
X		1533 RICHLAWN DR	HONG DOUG M	HONG YUN B
		1534 RICHLAWN DR	MOSS DIANE G	DAUGHDRILL ANDREA MOSS
X		1531 RICHLAWN DR	TYAGI VIPUL	TYAGI SHWETA
X		1530 RICHLAWN DR	POWERS DAVID C	POWERS LENA M
X		1529 RICHLAWN DR	WEINER ELIZABETH E	GORDON JEFFRY S
		1527 RICHLAWN DR	PATEL ANAND R	
X		1528 RICHLAWN DR	RIZK JEAN-CLAUDE	RIZK ANDREA
		GRAND HAVEN DR	RAINTREE CAPITAL LLC	
X		1525 FERNWOOD CT	MCCLELLAN JOE M JR	MCCLELLAN ALICE

Toal Homes: 10

Total Approvals: 7

Percent approve: 70%

PETITION RESULTS - HUMP 2

Yes	No	PROP_STREE	OWNER1	OWNER2
X		1522 BOREAL CT	SPRADLIN DWAYNE H	SPRADLIN MICHELLE L
X		1522 FERNWOOD CT	ERICKSEN BENJAMIN J III	ERICKSEN MICHELLE L
		1523 BOREAL CT	CLAYTON GEORGE	
X		1523 FERNWOOD CT	SHARP THOMAS P JR	SHARP MARY T
X		1524 BOREAL CT	NICASTRO CHRISTOPHER R	NICASTRO LINDA P
X		1524 FERNWOOD CT	LYNCH ROBERT J	LYNCH TESSIE G
X		1525 BOREAL CT	CLAYTON GEORGE H	CLAYTON PAMELA T
		1525 FERNWOOD CT	MCCLELLAN JOE M JR	MCCLELLAN ALICE
		1525 MACAW CT	SCOVEL MOLLY KROUPAL	
		1526 BOREAL CT	XIE HUA	XU HONG
X		1526 FERNWOOD CT	ALLISON KURT M	ALLISON KELLY
		1526 MACAW CT	SCHIRALDI STEVEN	SCHIRALDI DEBORAH A
X		1527 BOREAL CT	NGUYEN MY-KHANH	NGUYEN CANH
X		1527 MACAW CT	PITTS TIM L	PITTS JENNIFER R
		1527 RICHLAWN DR	PATEL ANAND R	
X		1528 BOREAL CT	BAIRD SHAWN S	BARID ALYSA D
X		1528 MACAW CT	MCATEE JOHN	HONG-MCATEE IRENE
X		1528 RICHLAWN DR	RIZK JEAN-CLAUDE	RIZK ANDREA
X		1529 MACAW CT	RHEINS JEFFREY S	RHEINS CYNTHIA
X		1529 RICHLAWN DR	WEINER ELIZABETH E	GORDON JEFFRY S
X		1530 BOREAL CT	SURATI RAMESH	SURATI RANJAMA
X		1530 MACAW CT	SCOBAY KATHLEEN	
X		1530 RICHLAWN DR	POWERS DAVID C	POWERS LENA M
X		1531 RICHLAWN DR	TYAGI VIPUL	TYAGI SHWETA
X		1531 ROSELLA CT	BAKER BRANDON	BAKER HOLLY
X		1532 RICHLAWN DR	SUNDARAM SHANMUGA	RANGANATHAN SOUNDARAM
		1532 ROSELLA CT	SHI CHANJUAN	XIONG WEI
X		1533 RICHLAWN DR	HONG DOUG M	HONG YUN B
X		1533 ROSELLA CT	WINKLER JOHN BURKETT JR	WINKLER KELLY ANN
		1534 RICHLAWN DR	MOSS DIANE G	DAUGHDRILL ANDREA MOSS
X		1534 ROSELLA CT	ROLAND BRIAN	ROLAND KRISTA
X		1535 RICHLAWN DR	SHWAB GEORGE A IV	SHWAB SANDRA L
X		1535 ROSELLA CT	KEEFE KEVIN M	KEEFE LINA
		1536 ABBOTTSFORD DR	SEBASTIAN RICHARD W	SEBASTIAN LYNDIA D
X		1536 RICHLAWN DR	HORRELL DAVID	HORRELL SHANNON
		1536 ROSELLA CT	WEI SHOUZUO	JIN YAN
X		1537 ABBOTTSFORD RD	LONG CHARLES SCOTT	
		1537 RICHLAWN DR	LEEPER CHRISTOPHER L	LEEPER SHAYE
		1537 ROSELLA CT	SONG DAVID I	SONG GYESOOK
X		1538 ABBOTTSFORD RD	WAECHTER ROBERT H JR	WAECHTER JENNIFER L
X		1538 ROSELLA CT	NELSON JAMIE L	NELSON W HUGH II
X		1539 ABBOTTSFORD RD	CONRY STEVEN	CONRY KELLY

X	1539 ROSELLA CT	FIFE HAVA	
X	1540 ABBOTTSFORD RD	AYERS MICHAEL VAUGHAN	AYERS YVONNE SMEIKAL
X	1540 ROSELLA CT	LUTZ BRANDON	
X	1541 ABBOTTSFORD RD	KINGREE RACHEL MARIE	KINGREE MATTHEW DOW
X	1541 ROSELLA CT	DHOLAKIA TEJAS	DHOLAKIA AMITA
	1542 ABBOTTSFORD RD	LIUZZI TONINO	LIUZZI LILIANA
	1543 ABBOTTSFORD RD	BOND TANNIA R	
X	9526 FAYETTE DR	MANKAMYER VAN	MANKAMYER STEPHANY C
X	9528 FAYETTE DR	PARSONS J CHRISTINE	
X	9529 FAYETTE DR	RECTOR ALEXANDER L	RECTOR EMILY S
X	9530 FAYETTE DR	STOUT CHRISTOPHER	CASE STACY
X	9531 FAYETTE DR	COBB STANLEY D	COBB JENNIFER K
X	9532 FAYETTE CT	KADIVAR NADER	KADIVAR RAHELEH F
	9533 FAYETTE CT	MCGRATH JON W	MCGRATH BRIDGETTE M
X	9534 FAYETTE CT	SPENCE JOSEPH C	SPENCE SANDRA C
X	9535 FAYETTE CT	CHETYRKIN SERGIY	KOLOBOVA ELENA
X	9536 FAYETTE CT	WYRZYKOWSKA IWONA	WYRZYKOWSKA DARIUSZ
X	9537 FAYETTE CT	NAMAZIRAD MOHAMMADHADI	MANOUCHEHRI ROYA
X	9538 FAYETTE CT	KANE CHARLES ROBERT	KANE MARIANNE HAMILTON
X	9539 FAYETTE CT	REEVES PAUL	REEVES MICHELLE

Toal Homes: 62

Total Approvals: 47

Percent approve: 75.8%

PETITION RESULTS - HUMP 3

Yes	No	PROP_STREE	OWNER1	OWNER2
X		1527 BOREAL CT	NGUYEN MY-KHANH	NGUYEN CANH
X		1528 BOREAL CT	BAIRD SHAWN S	BARID ALYSA D
		1529 MACAW CT	RHEINS JEFFREY S	RHEINS CYNTHIA
X		1530 BOREAL CT	SURATI RAMESH	SURATI RANJAMA
X		1530 MACAW CT	SCOBAY KATHLEEN	
X		1531 ROSELLA CT	BAKER BRANDON	BAKER HOLLY
		1532 ROSELLA CT	SHI CHANJUAN	XIONG WEI
X		1533 ROSELLA CT	WINKLER JOHN BURKETT JR	WINKLER KELLY ANN
X		1534 ROSELLA CT	ROLAND BRIAN	ROLAND KRISTA
X		1535 ROSELLA CT	KEEFE KEVIN M	KEEFE LINA
		1536 ROSELLA CT	WEI SHOUZUO	JIN YAN
X		1572 EASTWOOD DR	WALLS NICHOLAS S	WALLS AMBER D
X		1574 EASTWOOD DR	SHAW GREGORY O	SHAW LAURA M
X		9520 GRAND HAVEN DR	HARVEY GREGORY	HARVEY ANDREA
		9521 GRAND HAVEN DR	SMITH GUY A	SMITH PATRICIA A
X		9522 GRAND HAVEN DR	TAYLOR PAUL E	TAYLOR DONNA J
		9523 GRAND HAVEN DR	LAMARCHINA ANTHONY F	
X		9524 GRAND HAVEN DR	HUMM LAURYSSA L	
X		9525 GRAND HAVEN DR	VESSEL BETH EVANS	VESSEL MICHAEL T
		9526 GRAND HAVEN DR	NIPP WILLIAM	NIPP JENNIFER
	X	9528 GRAND HAVEN DR	MINIAS RAYMOND	
X		9531 FAYETTE DR	COBB STANLEY D	COBB JENNIFER K
		9533 FAYETTE CT	MCGRATH JON W	MCGRATH BRIDGETTE M

Total Homes: 23

Total Approvals: 16

Percent approve: 69.5%

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Ordinance 2020-01 - An Ordinance Rezoning Approximately 28 Acres of Land Located on the North Side of Split Log Road from R-2 to OSRD on First Reading

Submitted by: Jeff Dobson, Planning & Codes

Department: Planning & Codes

Information

Subject

Ordinance 2020-01 requests the rezoning of approximately 28 acres of land located on the north side of Split Log Road, approximately 0.35 miles westerly of its intersection with Ragsdale Road. Specifically, the property is located at 9520 Split Log Road. The requested change is from the R-2 (Suburban Residential) zoning district to the OSRD (Open Space Residential Development) zoning district.

Background

The attached ordinance proposes the rezoning of approximately 28 acres of property owned by Ken and Mary Jo Allen, which is located at 9520 Split Log Road.

SUMMARY OF THE PROPOSED DEVELOPMENT PLAN

The subject property proposed for rezoning presently includes rolling pastureland used for raising cattle. There are small pockets of steep topography scattered around the property. Tree cover is minimal. There is a 180-foot-wide Columbia Gulf Gas Transmission Line easement that encumbers the northwestern corner of the property. Three gas lines lie within the easement. The proposed design incorporates the existing Allen residence, which will remain and be incorporated into the project. The existing house will sit on a 6.23-acre tract (Lot 18). The lot will be designated as a Hillside Protection (HP) lot due to the slope in several areas. According to the Williamson County Property Assessor, the house was built in 1991 and includes an area of approximately 3,428 square feet. There are also several accessory structures on the tract.

Adjacent to the property to the north and west is the Glen Abbey subdivision, zoned OSRD. To the east are two larger single-family tracts having approximate areas of nine to 11 acres, zoned R-2. Across Split Log Road to the south lies the Taramore and Morgan Farms subdivisions which are almost completely developed and also zoned OSRD.

The developer has provided an R-2 concept plan that envisions how the property might be developed in accordance with the underlying zoning district. The plan estimates that a

total of 20 lots could be obtained if a divided Lot 18 is used as part of the subdivision design. The area of Lot 18 was used in the calculation of the number of lots that might be obtained under the R-2 zoning district, even though it is shown as one lot on the proposed development plan. Note that ownership of this lot will be retained by the Allens, and will not be owned by the developer. Without including this 6.23-acre lot, the proposal would not meet the minimum acreage required for an OSRD project, which is 25 acres (Sec. 78-184(a)1).

A total of 18 lots are shown on the proposed OSRD Development Plan. Lot 18 will be zoned OSRD and could have the potential to provide additional lots, over and above the maximum number shown on the R-2 concept plan, in the event that it sells in the future. Access to the additional lots could come directly from Split Log Road. However, the preference from a planning standpoint would be an internal street connection extended east from Borrow Lane through Open Space 26. The proposed OSRD plan does not reflect a stub road in this location. Of course, any changes to a previously approved OSRD Development Plan must be reviewed by the Planning Commission and the Board of Commissioners, per the requirements of Section 78-185 of the Municipal Code. However, if the property is rezoned OSRD now, the ability to deny a technically compliant future subdivision of Lot 18 will be legally limited.

Access to the development is provided by a single street from Split Log Road that winds through the subdivision and connects to the north to Glenfiddich Trace in Section Two of the Glen Abbey subdivision which was stubbed to the property line in anticipation of this future connection. At the intersection with Split Log Road, the plan proposes a divided street with a median section separating the flow of traffic. Engineering staff has recommended that the entrance from Split Log Road be widened to align with Ivy Crest Drive, across Split Log Road to promote improved visibility and driver decision making accommodating both entrance and exit flow. This was also a recommendation from the City's traffic consultant based upon his review of the plan.

The plan also shows the proposed location of the Cluster Box Units (CBUs) as required for mail delivery by the United States Postal Service in an area east of Borrow Lane and south of proposed Lot 17.

The specifics of the proposed development plan are shown in the following tables:

<i>FEATURE</i>	<i>AREA (SF)</i>	<i>AREA (AC)</i>
Average Lot Area	23,190	0.53
Smallest Lot area	17,600	0.40
Largest Lot area	271,276*	6.23
Open Space Required	138,573	3.18
Open Space Provided	495,137	11.37

*Please note that the calculation of the average lot size does not include the area of Lot 18 (6.23 acres) because the average areas of the smaller lots would be skewed showing larger areas.

<i>ALLEN PROPERTY REZONING</i>	
<i>OPEN SPACE CALCULATIONS 1-21-2020</i>	
Total Site Area (AC)	27.99
Less R.O.W. dedication -- Internal streets	1.79
TOTAL	26.20
Less Areas in 25% Slopes	0.15
Plus 25% of slopes over 25%	0.04
Less Areas in Floodway	3.51
Plus 25% Areas in Floodways	0.88
Total Usable Land Area (AC)	23.46
Less area in lots>1 acre	5.32
TOTAL LAND AREA AVAILABLE	18.14
Total Land Area Required @ 1 DUPA (AC)	18
Land Area in Lots	14.82
Open Space Required	3.18
Open Space Provided	11.37
Dedicated Open Space	8.19

The plan provides the required arterial road buffer, which is 150 feet wide as measured from the right-of-way of Split Log Road. The buffer extends to the east across Lot 18. Plantings will be added within the buffer to be consistent with those existing in Glen Abbey, which will meet Code requirements. If the plan is approved, and upon submittal of the preliminary plan for Planning Commission review, the developer will request that 70 trees be permitted to be relocated from the buffer to a planting strip between the sidewalk and the back of the curb to serve as street trees. This request is consistent with Section 78-512(b)5c of the Municipal Code.

Finally, the plan shows a perpetual scenic easement, as permitted by Section 78-186(c)2 of the Municipal Code, around a jurisdictional wetland and a stream at the front of the subdivision. The perpetual scenic easement will be left undisturbed and in its natural state. The City becomes a party to the easement once it is recorded.

WATER AND SEWER

The proposed project lies within the Owl Creek Drainage Basin. However, because all lots will be required to provide grinder pumps, the effluent will be pumped over to a gravity line in the Glen Abbey Subdivision and through the Northumberland Subdivision in the Little Harpeth River Drainage Basin. Staff has confirmed that this tract was originally included in the Little Harpeth River sewer basin for modeling and master planning purposes. The existing house will also be required to tie to sewer, also via grinder pump. All lots will be required to participate in the City's Grinder Pump Maintenance Program and will be properly labeled as grinder pump lots. If the rezoning proposal is approved and before a final plat for the property can be recorded the contractor will be required to pay a grinder pump installation fee of \$1,900.00 per lot.

SCHOOLS

The proposed plan was provided to Williamson County Schools (WCS) for an assessment of the impact of the proposed development on the schools in the area. Schools serving the subdivision include Jordan Elementary, Sunset Middle and Ravenwood High School.

Based upon the WCS review, the approximate student enrollment at build-out for the Allen Property subdivision is as follows:

Jordan Elementary -- 7 students
Sunset Middle -- 2 students
Ravenwood High -- 2 students

As background, the current capacity and enrollment numbers for the 2019/2020 school year, according to WCS data for the three impacted schools as of April 2019 are as follows: Jordan Elementary (890 capacity/494 Students projected), Sunset Middle (869 capacity/578 students projected), and Ravenwood High (1,649 capacity/1,635 students projected). Note that the projected figures are for the first month of the 2019/2020 school year.

If the proposed ordinance is approved on first reading, the applicant will be required to conduct a community meeting to explain the particulars of the request and to answer questions from citizens. Property owners within a 1,000-foot radius will be invited to attend. The community meeting is tentatively scheduled for Thursday February 27, 2020 at 6:00 p.m. at the Library in Meeting Room B. The Planning Commission would then review the request and provide its recommendations at its March 2, 2020 meeting. The public hearing before the Board of Commissioners is scheduled for March 9, 2020. Second and final reading is scheduled for March 23, 2020.

Should you have any questions or require additional information, please contact the Planning and Codes Director.

Staff Recommendation

Staff has reviewed the proposed rezoning application and the associated plans and has found that they comply with the applicable provisions of the Zoning Ordinance for consideration by the Board of Commissioners.

Previous Commission Action

There has been no recent action related to the property by the Board of Commissioners.

Fiscal Impact

Attachments

Ordinance 2020-01

Cover Sheet -- 1-24-2020

Attachment B -- Bound & Topo

Attachment B -- Survey

Attachment B -- Site Layout

Attachment B -- Grading & Drainage

Attachment B -- Slope Analysis

Attachment B -- Road Profiles

Attachment B -- Entrance Features

Attachment B -- Utility Layout

Attachment B -- Landscaping

R-2 Concept Plan

Application for Water/Sewer Availability

Application Package

ORDINANCE 2020-01

AN ORDINANCE OF THE CITY OF BRENTWOOD, TENNESSEE TO AMEND THE ZONING ORDINANCE, SAME BEING CHAPTER 78 OF THE CODE OF ORDINANCES OF THE CITY OF BRENTWOOD, BY CHANGING THE PRESENT ZONING CLASSIFICATION ON CERTAIN PROPERTY LOCATED ON THE NORTH SIDE OF SPLIT LOG ROAD, APPROXIMATELY 0.35 MILES WEST OF ITS INTERSECTION WITH RAGSDALE ROAD AND SOUTH AND EAST OF THE GLEN ABBEY SUBDIVISION, FROM THE R-2 (SUBURBAN RESIDENTIAL) ZONING DISTRICT TO THE OSRD (OPEN SPACE RESIDENTIAL DEVELOPMENT) ZONING DISTRICT, SAID PROPERTY BEING MORE SPECIFICALLY DESCRIBED IN THE PROPERTY DESCRIPTION ATTACHED HERETO AND MADE A PART OF THIS ORDINANCE BY REFERENCE, AND SHOWN ON THE MAP ATTACHED HERETO AND MADE A PART OF THIS ORDINANCE BY REFERENCE; AND TO AMEND THE OFFICIAL ZONING MAP ACCORDINGLY

BE IT ORDAINED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the present zoning classification on certain property located on the north side of Split Log Road, approximately 0.35 miles west of its intersection with Ragsdale Road, and south and east of the Glen Abbey Subdivision, be and the same is hereby changed from the R-2 (Suburban Residential) zoning district to the OSRD (Open Space Residential Development) zoning district, said property being more particularly described in the property description attached hereto as Attachment “A,” and being more particularly shown on Attachment “B,” said attachments being made a part of this ordinance by reference.

SECTION 2. That the official zoning map be and the same is hereby amended accordingly.

SECTION 3. That the development plan attached hereto as Attachment “B” is hereby approved as the basis for design and layout of the subdivision plat, pursuant to Section 78-185 of the Code of Ordinances of the City of Brentwood.

SECTION 4. That this ordinance shall take effect from and after its final passage, or fifteen days after its first passage, whichever occurs later, the general welfare of the City of Brentwood, Williamson County, Tennessee, requiring it.

PASSED:	1st reading	_____	PLANNING COMMISSION	_____
	2nd reading	_____	NOTICE OF PASSAGE	
			Notice published in:	_____
			Date of publication:	_____
PUBLIC HEARING				
	Notice published in:	<u>Williamson A.M.</u>		
	Date of publication:	_____		
	Date of hearing:	_____	EFFECTIVE DATE	_____

_____ MAYOR	_____ Rhea E. Little III	_____ RECORDER	_____ Holly Earls
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Approved as to form:

_____ CITY ATTORNEY	_____ Kristen L. Corn
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ATTACHMENT A
ORDINANCE 2020-01

A tract of land located in the City of Brentwood, Williamson County, Tennessee of record in Deed Book 5772, Page 450 R.O.W .C, TN., and more specifically described as follows;

Beginning at an iron pin (new) being the southwest corner of subject tract and in the northern Right-of-Way of Split Log Road, said iron pin being a common corner with the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN.,

Thence; Leaving said Right-of-Way and with the common line of the North 072 56' 25" East, a distance of 836.41 feet to an iron pin (new). Said iron pin being located in the rear property line of Lot 45 of the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN.,

Thence; With the rear property of Lot 45 North 432 43' 47" East, a distance of 138.70 feet to an iron pin (new) in the rear property line of Lot 44 of the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN.,

Thence; Continuing with said common line a long rear property line of Lots 44, 43 and 42 North 232 10' 30" East a distance of 445 .58 feet to an iron pin (new). Said iron pin being a common corner in the rear property line of Lot 42 of the Glen Abbey Subdivision, Section One and Lot 25 of Glen Abbey Section Two of record in Plat Book P60, Page 121 R.O.W.C., TN.,

Thence; Continuing with the common property line of the Glen Abbey Subdivision, Section Two and Section Three of record in Plat Book P62, Page 106 along the rear lot lines of Lots 25, 65, 66 and 67 South 792 34' 45" East a distance of 755 .76 feet to an iron pin (existing) . Said existing iron pin being a common corner of Kendall Kellar Allen and Mary Jo Allen of Record in Deed Book 5772, Page 450 R.O.W .C, TN., lot 67 of the Glen Abbey Subdivision, Section Three and the Trena Payne Property of record in Deed Book 7099, Page 472 R.O.W.C. TN.,

Thence; With the common line of the Trena Payne Property South 072 27' 02" West, a distance of 1,238 .29 feet to an iron pin (new) passing through an Existing iron pin at 1,236.89 feet . Said iron pin (new) being in the northern Right-of- Way of Split Log Road,

Thence; With said Right-of-Way with a curve to the right having an arc length of 582.98 feet, a radius of 1,879 .86 feet, a chord length of 580.64 feet and a chord bearing of South 872 58' 31" West, to an iron pin (new),

Thence; Continuing with said Right-of-Way North 832 08' 26" West, a distance of 392.02 feet and passing through an existing concrete monument at 2.49 feet, to the point of beginning and containing 1,219,445 sq. ft . or 27,995 acres more or less.

The above-described tract of land is subjected to all easements of record.

This property description was prepared by Tori D. Cassidy RLS #2467 in accordance with the Boundary Survey prepared by Delta Associates, Inc., dated October 01, 2019.

With the John Tom Griggs Jr. Tr. property South 84° 43' 17" East, 681.93 feet to an existing iron pin, said iron pin being the common corner of the John Tom Griggs Jr. Tr. property and with the George M. Cawthon, Jr. property (no record deed found), Thence;

With the common line of Cawthon property South 07° 42' 20" West, a distance of 643.35 feet to an existing iron pin. Said iron pin being the common corner with Cawthon property and the City of Brentwood water tank property (no record deed found), Thence;

With the common line of the City of Brentwood South 07° 57' 11" West, a distance of 210.41 feet to an existing iron pin, Thence;

Continuing with the common line of Cawthon property the next three calls. South 06° 13' 58" West, a distance of 459.51 feet to an existing fence post in stone wall, Thence;

South 06° 06' 35" West, a distance of 56.57 feet to an existing iron pin, Thence;

South 06° 07' 41" West, a distance of 48.43 feet to an iron pin (new), said iron pin being a common corner with the Cawthon, Jr. Tr. property and the James P. O'Rourke property of record in Deed Book 1869, Page 666 R.O.W.C., TN., Thence;

With the common line on the O'Rourke property South 06° 15' 19" West, a distance of 154.02 feet to an existing metal post. Said metal post being a common corner with Cawthon property, O'Rourke property and the Iris Ann Lee Rosenfield property of record in Deed Book 5794, Page 222 R.O.W.C., TN., Thence;

With the common line with the Rosenfield property North 83° 57' 54" West, a distance of 345.60 feet to an existing iron bolt, said iron bolt being the common corner with the Taylor property and the Kenneth E. Payne property of record in Deed Book 5993, Page 940 R.O.W.C., TN., Thence;

With the common line of the Payne property North 82° 04' 59" West, a distance of 345.00 feet to an existing iron pin, said iron pin being the common corner with the Kendall Keller Allen property of record in Deed Book 5772, Page 450 R.O.W.C., TN., Thence;

Continuing with the common line of the Payne property with the next two calls, South 08° 26' 23" West, a distance of 136.78 feet to an existing iron pin, Thence;

South 07° 27' 02" West, a distance of 125.92 feet to a point, said point being the beginning of the proposed subdivided line through the Allen property for the next three calls, Thence;

North 79° 34' 45" West, a distance of 755.77 feet to a point; Thence;

South 23° 10' 30" West, a distance of 445.58 feet to a point, Thence;

South 43° 43' 47" West, a distance of 138.70 feet to a point, said point being in the common line with the Taylor property, Thence;

With the common line of the Taylor property South 07° 56' 25" West, a distance of 836.41 feet to an iron pin (new), said point being a common corner with Taylor and Allen properties and being in the north Right-of-Way of Split Log Road, Thence;

With the said Right-of-Way North 83° 08' 26" West, a distance of 513.70 feet, to an iron pin (new), Thence;

Continuing with said Right-of-Way with a curve to the left with a radius of 1,457.89 feet, an arc length of 54.24 feet, a chord length of 54.24 feet and a chord bearing of North 84° 12' 23" West, Thence;

Continuing with said Right-of-Way line North 85° 16' 20" West, a distance of 107.16 feet to an iron pin (new), Thence;

Continuing with said Right-of-Way North 82° 38' 25" West, a distance of 42.05 feet to the point of beginning and containing 2,851,885 Sq. Ft. or 65.47 acres more or less.

The above-described property is subject to all easements of record.

This description prepared by Ronnie Lowery RLS #1685 is based on Boundary Survey prepared by Delta Associates, Inc., Dated May 06, 2013

PRELIMINARY PLAN

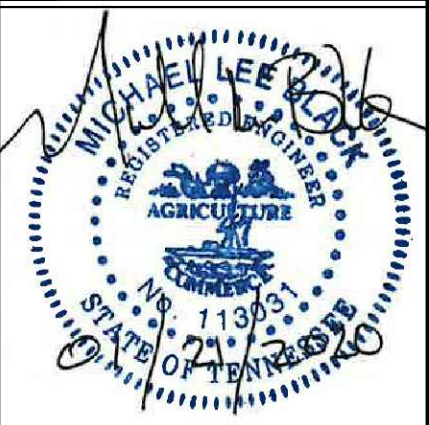
ALLEN PROPERTY

OSRD ZONING

PREPARED FOR:
TURNBERRY HOMES



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OSRD SITE DATA

DEVELOPMENT SITE TABLE:				
Allen Property , BRENTWOOD, TENNESSEE				
LOSE DESIGN NO: 19182				
GENERAL NOTES AND INFORMATION				
1. The subject property consists of Parcel 35.03 of Map 55				
2. Zoning: OSRD (Open Space Residential Development)				
3. Total site area = 27.99 +/- Acres				
4. Boundary and topographic information for Parcel 35.03 was provided by Delta Associates, Inc. Lose Design accepts no responsibility for inaccuracies of base information provided.				
5. Total lots proposed: 18				
6. Proposed density: 0.75 DUA (Maximum allowed = 1 DUA)				
7. Minimum lot width at building setback: 110' for standard lots				
8. Minimum Building Setbacks:				
Front:	50'	Rear abutting boundary:	35'	
Rear:	30'	Side abutting street:	30'	
Side:	15'/25' or 20'/20'			
9. All electric service for the proposed development shall be underground. All public utilities shall be subject to the approval of the applicable utility provider.				
10. The existing vegetation in the open space is to remain preserved. It is the intent to also preserve the existing vegetation within the proposed lot areas as much as possible in order to promote a mature neighborhood environment.				
11. Optionee, Developer and Applicant:				
Turnberry Homes		Engineer:		
Mr. Nicky Wells		Lose Design		
210 Jamestown Park Drive		Mr. Michael Black		
Suite 102		2809 Foster Avenue		
Brentwood, TN 37027		Nashville, TN 37208		
12. A review of FIRM map number 47187C0230F, revised 09-29-2006, Brentwood, Williamson County, Tennessee and unincorporated areas, revealed that no portion of the subject property lies within 100 year flood plain.				
13. All areas of the proposed development having a slope greater than 25% shall remain in permanent open space. No lots shall contain any contiguous portion of slopes greater than 24.9% slope.				
14. In accordance with section 78-512(b)(5)b. of the Brentwood Municipal Code, the remaining evergreen plants required within the road frontage buffer have been dispersed throughout the other open spaces areas of the development due to the lack of usable land for plantings.				
15. An asterisk (*) denotes transitional lots.				

LOT DATA		
LOT NO.	LOT SIZE (S.F.)	(ACRES)
1	19,077	0.438
2	24,690	0.567
3	23,780	0.546
4	21,385	0.491
5	30,136	0.692
6	22,393	0.514
7	19,013	0.436
8	19,013	0.436
9	21,458	0.493
10	19,241	0.442
11	17,600	0.404
12	17,600	0.404
13	17,768	0.408
14	22,979	0.528
15	27,172	0.624
16	23,453	0.538
17	27,473	0.631
18	271,276	6.228
645507	TOTAL S.F. AREA IN LOTS	
14.82	TOTAL AC. OF AREA IN LOTS	

TOTAL	
LOTS	18
SF	645,507
AC	14.82

TOTAL OPEN SPACE		
Open Space #	SF	AC
20	162758.0000	3.736
21	51108.0000	1.173
22	43539.0000	1.000
23	138495.0000	3.179
24	10717.0000	0.246
25	27488.0000	0.631
26	12797.0000	0.294
27	48235.0000	1.107
TOTAL	495,137.0000	11.37

OSRD CALCULATIONS		SIZE (S.F.)	ACRES
TOTAL SITE AREA:		1219449.47	27.99
LESS RIGHT OF WAY:		-78069.00	-1.79
TOTAL:		1141380.47	26.20
LESS AREA IN 25% OR GREATER SLOPES:		-6424.00	-0.15
PLUS 25% OF AREA IN 25% OR GREATER SLOPES:		1606.00	0.04
LESS AREA IN ELECTRICAL, NATURAL & GAS EASEMENTS:		-153075.35	-3.51
PLUS 25% AREA IN ELECTRICAL, NATURAL & GAS ESMTS:		38268.84	0.88
TOTAL USEABLE LAND AREA:		1021755.96	23.46
LESS AREA IN LOTS > 1 ACRE:		-227716.00	-5.23
TOTAL LAND AREA AVAILABLE:		794039.96	18.23
TOTAL LAND AREA REQUIRED AT 1 DPU PER ACRE		784080.00	18.00
TOTAL LAND AREA PROVIDED IN LOTS		-645507.00	-14.82
TOTAL OPEN SPACE REQUIRED:		138573.00	3.18
TOTAL OPEN SPACE PROVIDED:		495137.00	11.37
EXCESS OPEN SPACE PROVIDED:		356564.00	8.19

OWNER/DEVELOPER

TURNBERRY HOMES
210 JAMESTOWN PARK DRIVE, SUITE 102
BRENTWOOD, TN 37027
(615) 376-7001
CONTACT: NICKY WELLS, P.E.

DESIGNER

LOSE DESIGN
LANDSCAPE ARCHITECTURE/ARCHITECTURE/CIVIL
ENGINEERING/PLANNING

2809 FOSTER AVENUE
NASHVILLE, TENNESSEE 37210
PHONE: 615-242-0040
CONTACT: MICHAEL BLACK, P.E.

LOCATION MAP



CONTACTS

SURVEYOR:
DELTA ASSOCIATES, INC.
7121 CROSSROADS BLVD, SUITE 102
BRENTWOOD, TN 37027
(615) 850-3506
RONL@DELTAASSOCIATESINC.COM

UTILITY:
COLUMBIA GULF TRANSMISSION
5422 GREEN GROVE ROAD
HARTSVILLE, TN 37074
(615) 374-2166
MCOTHRON@NISOURCE.COM

WATER.....CITY OF BRENTWOOD.....(615) 371-0080
SANITARY SEWER....CITY OF BRENTWOOD.....(615) 661-7061
GAS.....ATMOS ENERGY.....(615) 794-2596
TELEPHONE.....BELLSOUTH.....(615) 451-4336
CABLE.....COMCAST.....(615) 244-5900

SHEET INDEX

- C0.00 COVER SHEET
- C0.01 GENERAL NOTES
- C0.02 SITE SURVEY
- C0.03 REZONING REQUEST
- C1.00 SITE LAYOUT PLAN
- C2.00 GRADING & DRAINAGE PLAN
- C2.01 SLOPE ANALYSIS
- C3.00 ROAD PLAN & PROFILE SERIES
- C3.01 ROAD PLAN & PROFILE SERIES
- C4.00 SITE DETAILS
- C4.01 SITE DETAILS
- C5.00 UTILITY LAYOUT PLAN
- L1.00 TREE REMOVAL PLAN
- L1.01 OVERALL LANDSCAPE PLAN
- L1.02 ROADWAY BUFFER LANDSCAPE PLAN
- L1.10 LANDSCAPING NOTES & DETAILS

ALLEN PROPERTY
OSRD ZONING
TURNBERRY HOMES
BRENTWOOD

SUBMITTALS / REVISIONS		
NO.	DATE	DESCRIPTION

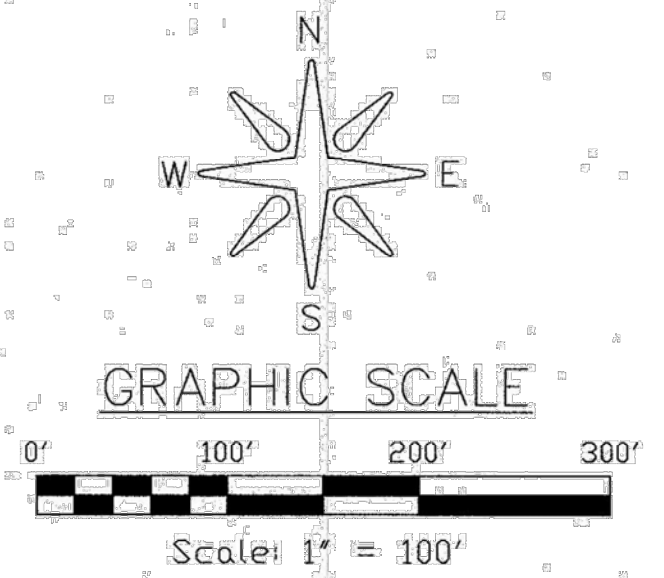
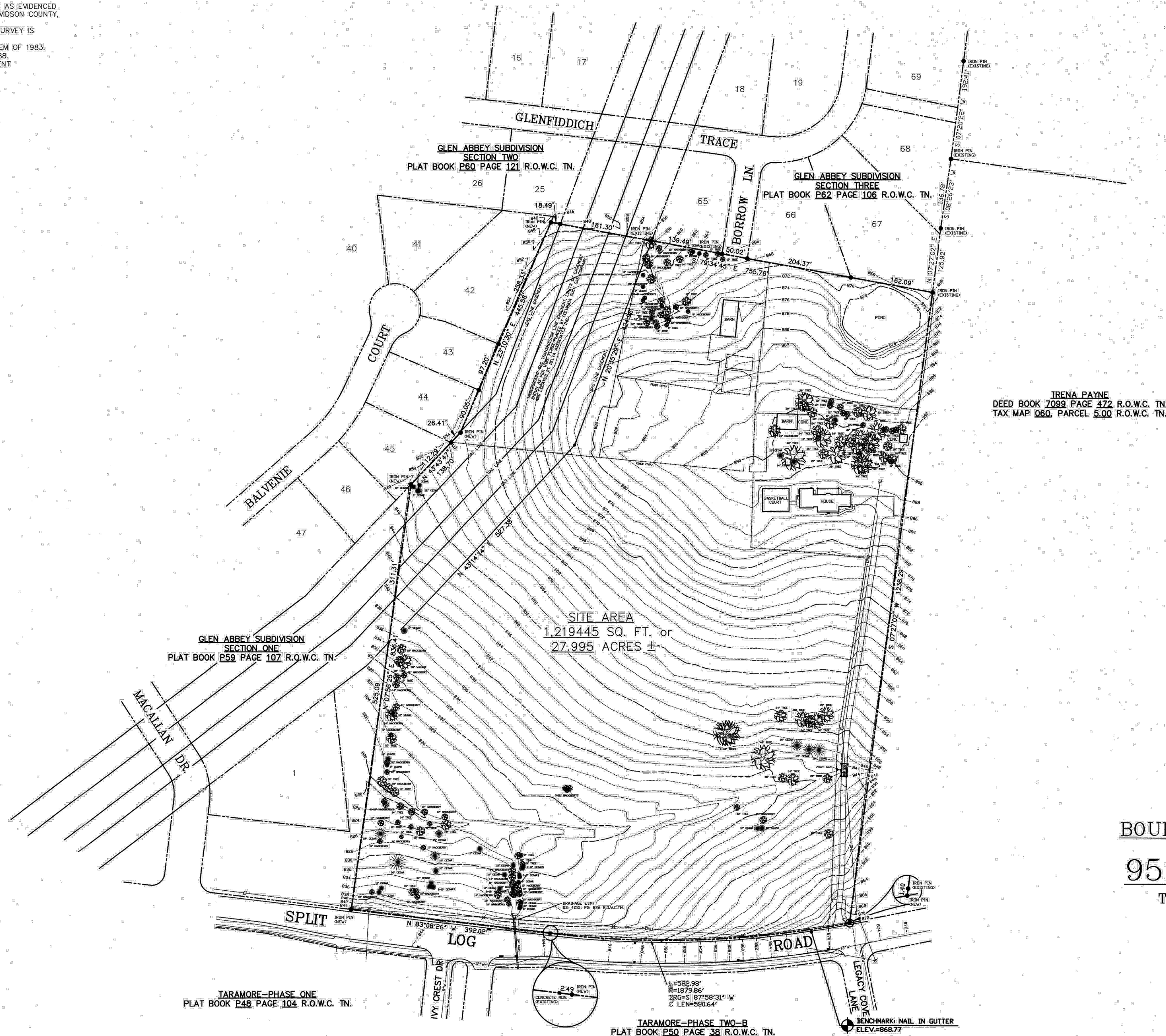
SHEET TITLE	
COVER SHEET	

PROJECT NO. 19182	DATE 01/21/2020
DRAWN BY BB	SCALE NTS
CHECKED BY MB	
SHEET NO.	

C0.00

GENERAL NOTES:

1. THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THIS SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.
2. THIS PROPERTY DOES NOT LIE WITHIN THE 100 YEAR FLOOD ZONE AS EVIDENCED ON F.E.M.A. PANEL 471870230F, OF BRENTWOOD, WILLIAMSON, DAVIDSON COUNTY, TENNESSEE, DATED 9-29-2006.
3. NO TITLE REPORT FURNISHED THIS SURVEYOR. THEREFORE, THIS SURVEY IS SUBJECT TO THE FINDINGS OF AN ACCURATE TITLE SEARCH.
4. BEARINGS BASED ON TENNESSEE STATE PLANE COORDINATE SYSTEM OF 1983.
5. ELEVATIONS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
6. ALL DISTANCES BASED ON A SURVEY MADE USING E.D.M. EQUIPMENT AND ARE ADJUSTED FOR TEMPERATURE.
7. MEANDERING FENCE ALONG BOUNDARY AS SHOWN.



CERTIFICATE OF SURVEY
I HEREBY CERTIFY THAT THIS IS A CATEGORY I SURVEY
AND THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY IS
1:13,900 ± AS SHOWN HEREON
Jon D. Cassidy
SURVEYOR
TENN. REG. NO. 2467

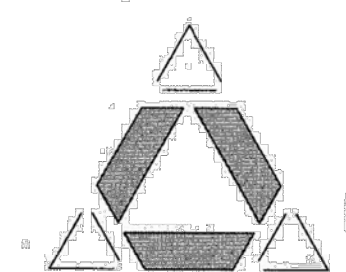


BOUNDARY & TOPOGRAPHIC SURVEY

OF
9520 SPLIT LOG ROAD

TAX MAP 55, PARCEL 35.03 R.O.W.C. TN.

16th CIVIL DISTRICT
BRENTWOOD, WILLIAMSON COUNTY, TENNESSEE



Delta Associates
INCORPORATED
Design - Surveying

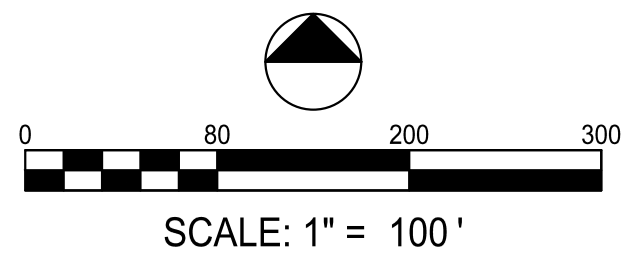
7121 Crossroads Blvd., Brentwood, TN 37027
PHONE: (615) 850-3501

PROPERTY TITLE REFERENCE

PROPERTY BEING PARCEL 35.03 ON TAX MAP 55 WILLIAMSON COUNTY, TENNESSEE, AND BEING
PROPERTY CONVEYED TO KENDALL KELLER ALLEN & MARY JO ALLEN BY DEED RECORDED IN
BK 5772, PG 450, R.O.W.C. TENNESSEE.

SCALE: 1" = 100'	DRAWN BY: TDC	DATE: 10-1-19	DRAWING NO.
CHECKED BY: TDC	JOB NO. 19-505SL-9520	1 OF 1	

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DESIGN

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MICHAEL LEE
ARCHITECT
AGRICULTURE
NOV 11 1993
STATE OF TENNESSEE

ALLEN PROPERTY
OSRD ZONING

TURNBERRY HOMES

BRENTWOOD

SUBMITTALS / REVISIONS

NO.	DATE	DESCRIPTION

SHEET TITLE

REZONING REQUEST

PROJECT NO.
19182

DATE
01/21/2020

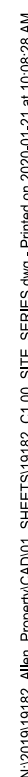
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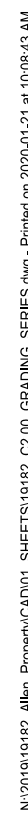
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MB

SHEET NO.
C0.03

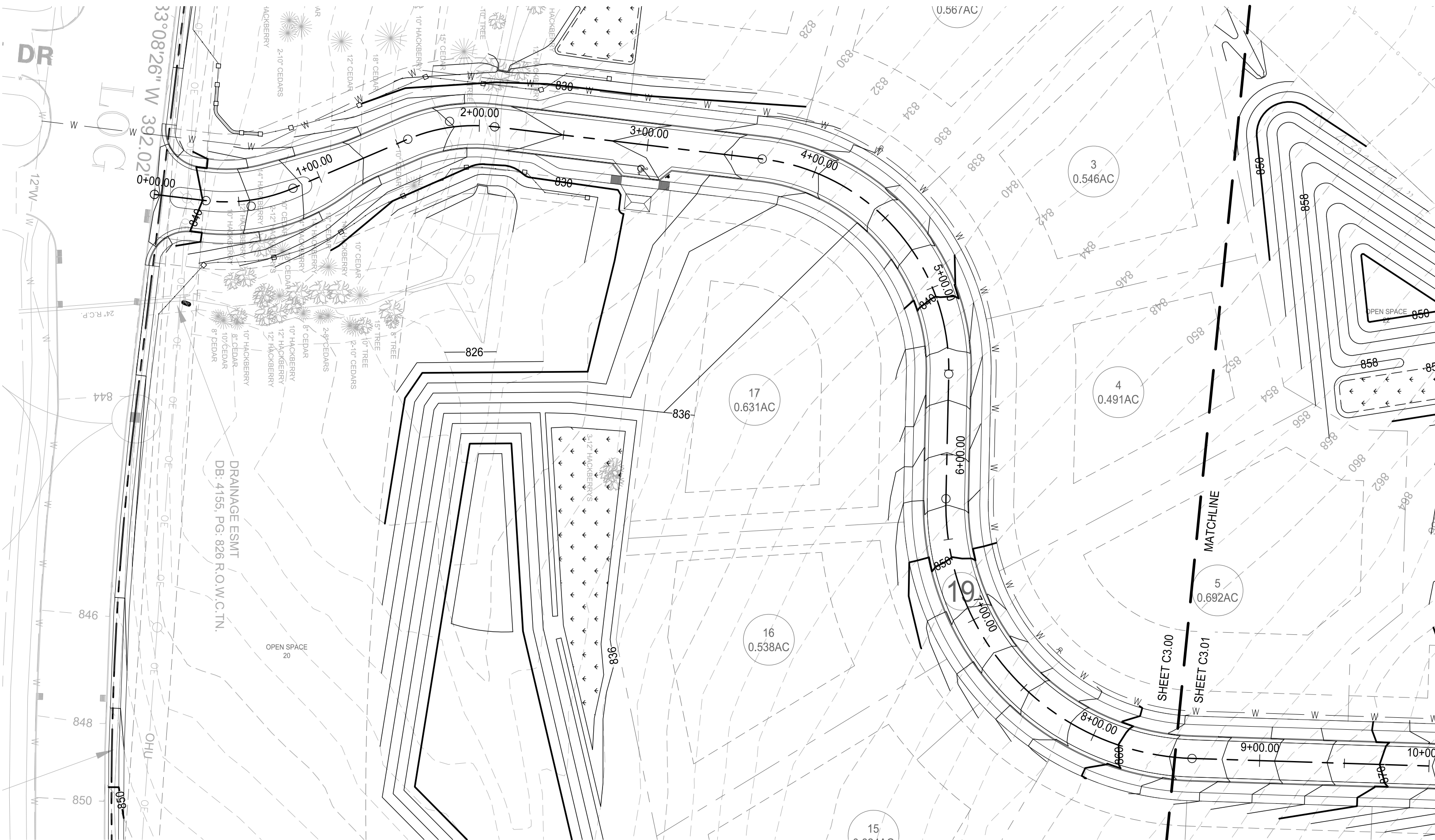
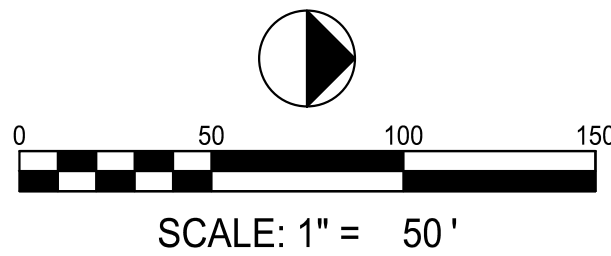
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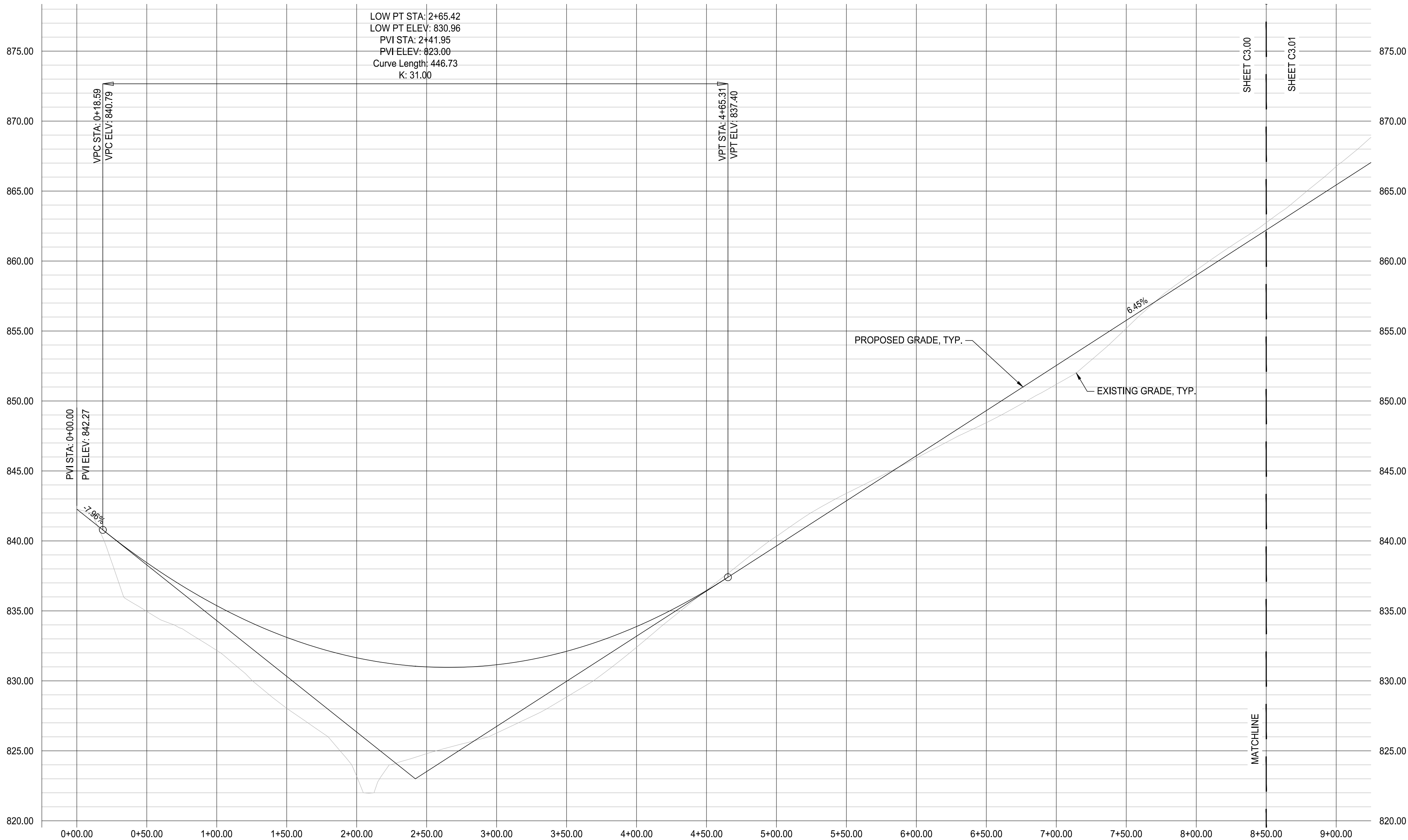


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PROFILE VIEW OF BORROW LANE



SCALE
VERTICAL: 1" = 5'
HORIZONTAL: 1" = 50'

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DESIGN
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TURNBERRY HOMES

BRENTWOOD

SUBMITTALS / REVISIONS		
NO.	DATE	DESCRIPTION

SHEET TITLE
ROAD PLAN & PROFILE
SERIES

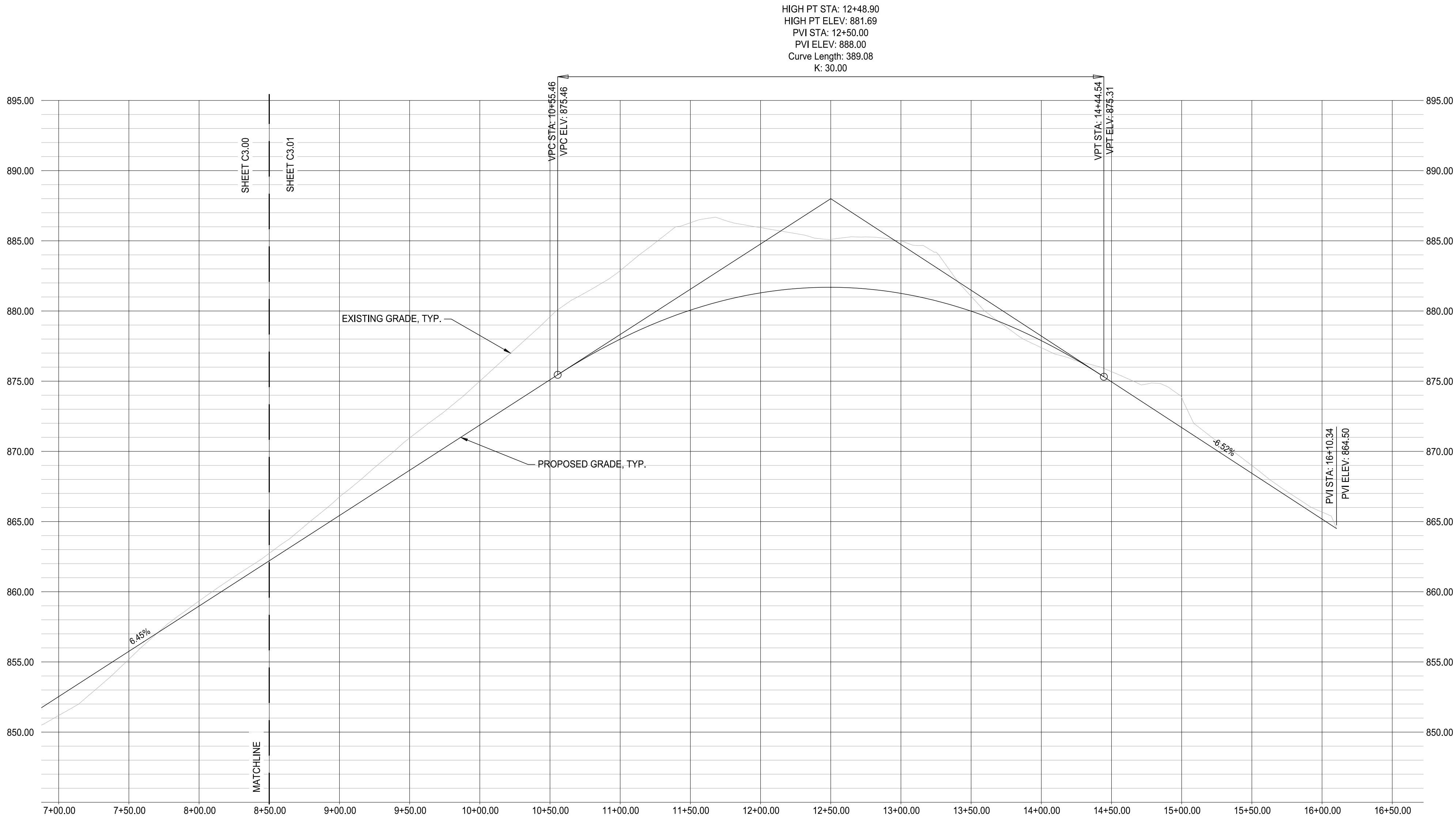
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PROFILE VIEW OF BORROW LANE



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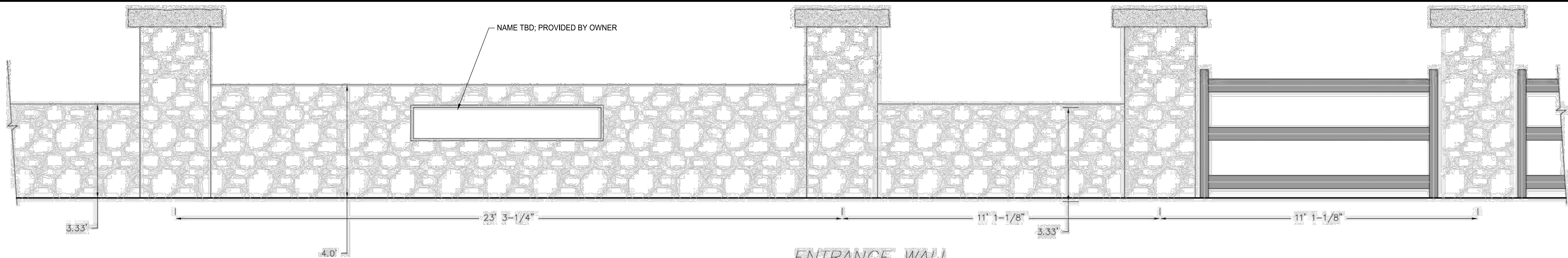
ALLEN PROPERTY
OSRD ZONING
TURNBERRY HOMES

BRENTWOOD
TN

SUBMITTALS / REVISIONS		
NO.	DATE	DESCRIPTION

SHEET TITLE
**ROAD PLAN & PROFILE
SERIES**

PROJECT NO. 19182	DATE 01/21/2020
DRAWN BY BB	SCALE XX = XXX
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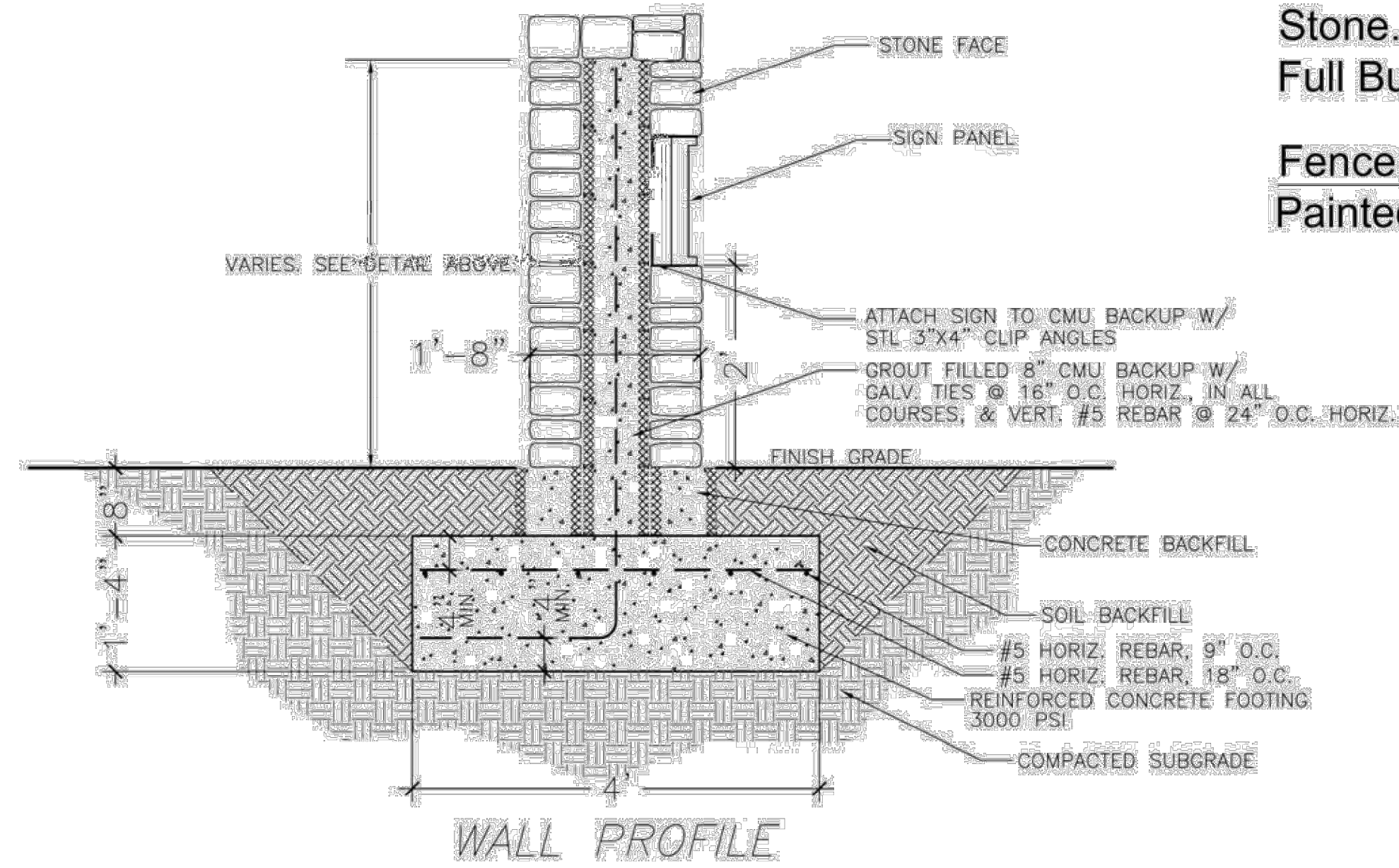


ENTRANCE WALL

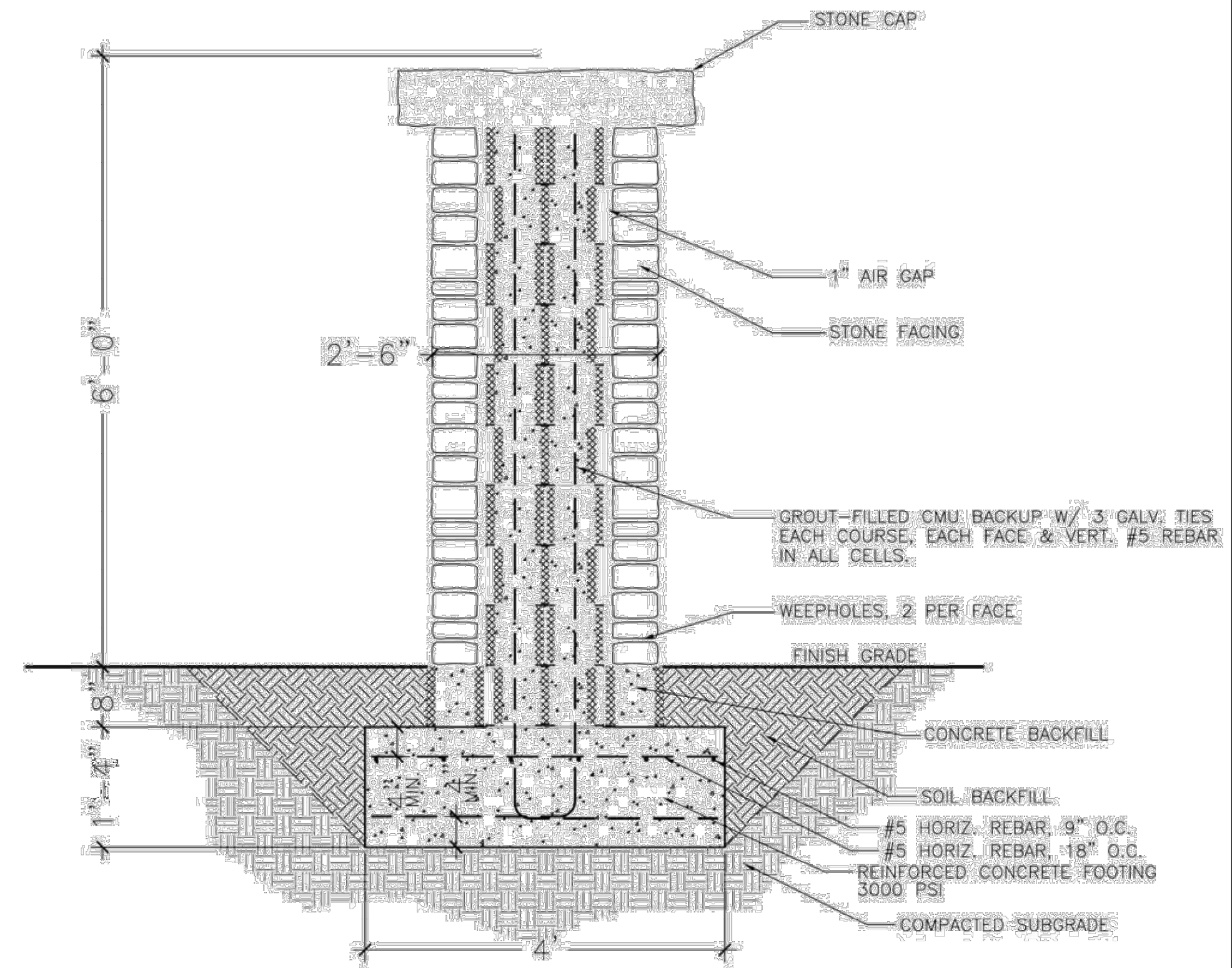
Material Selections

Wall and Columns:
Arriscraft Weathered Wood
Stone. Style to be Chalet.
Full Buff Mortar.

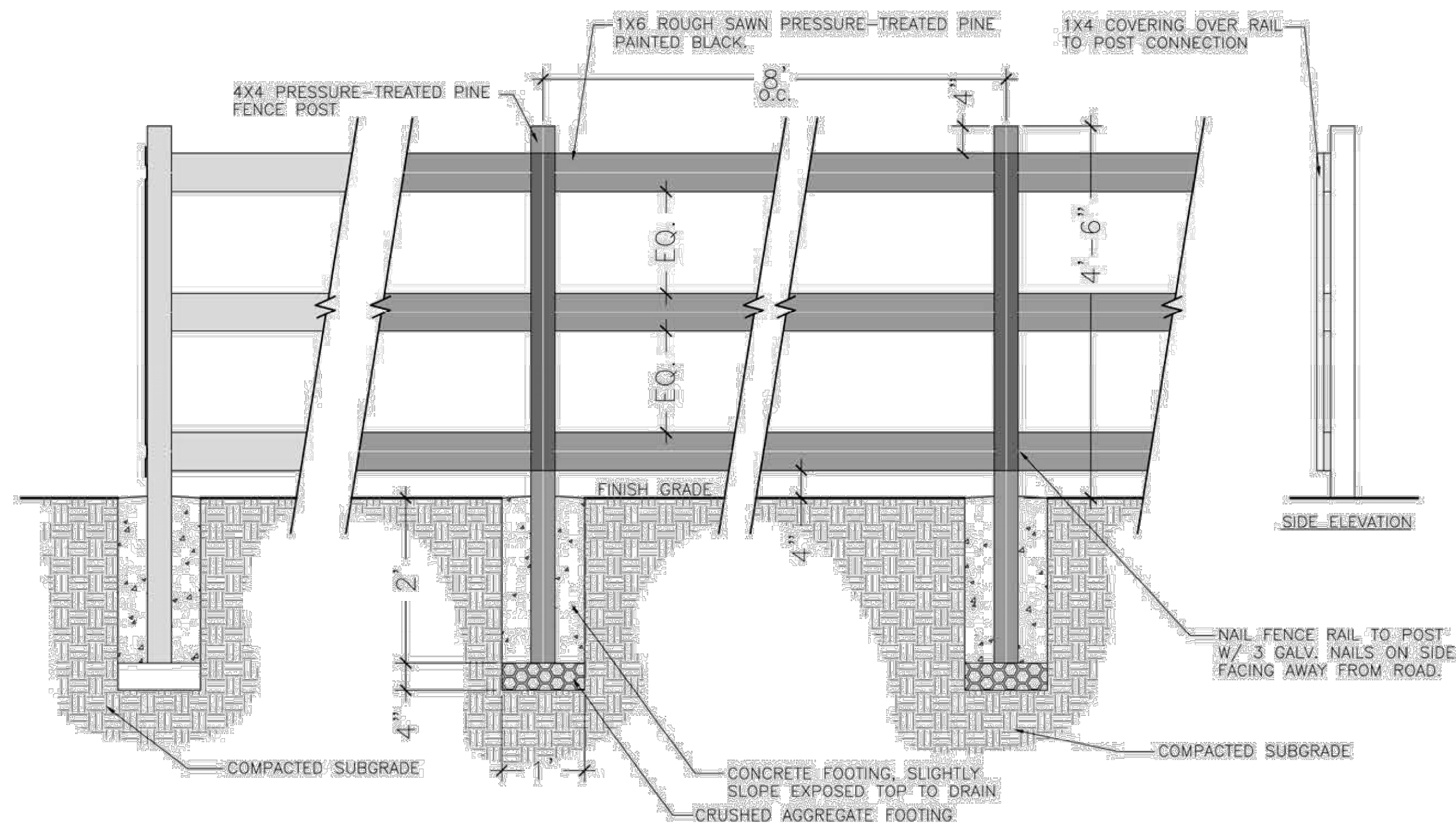
Fence:
Painted Black.



WALL PROFILE



COLUMN PROFILE



WOOD FENCE



SUBMITTALS / REVISIONS

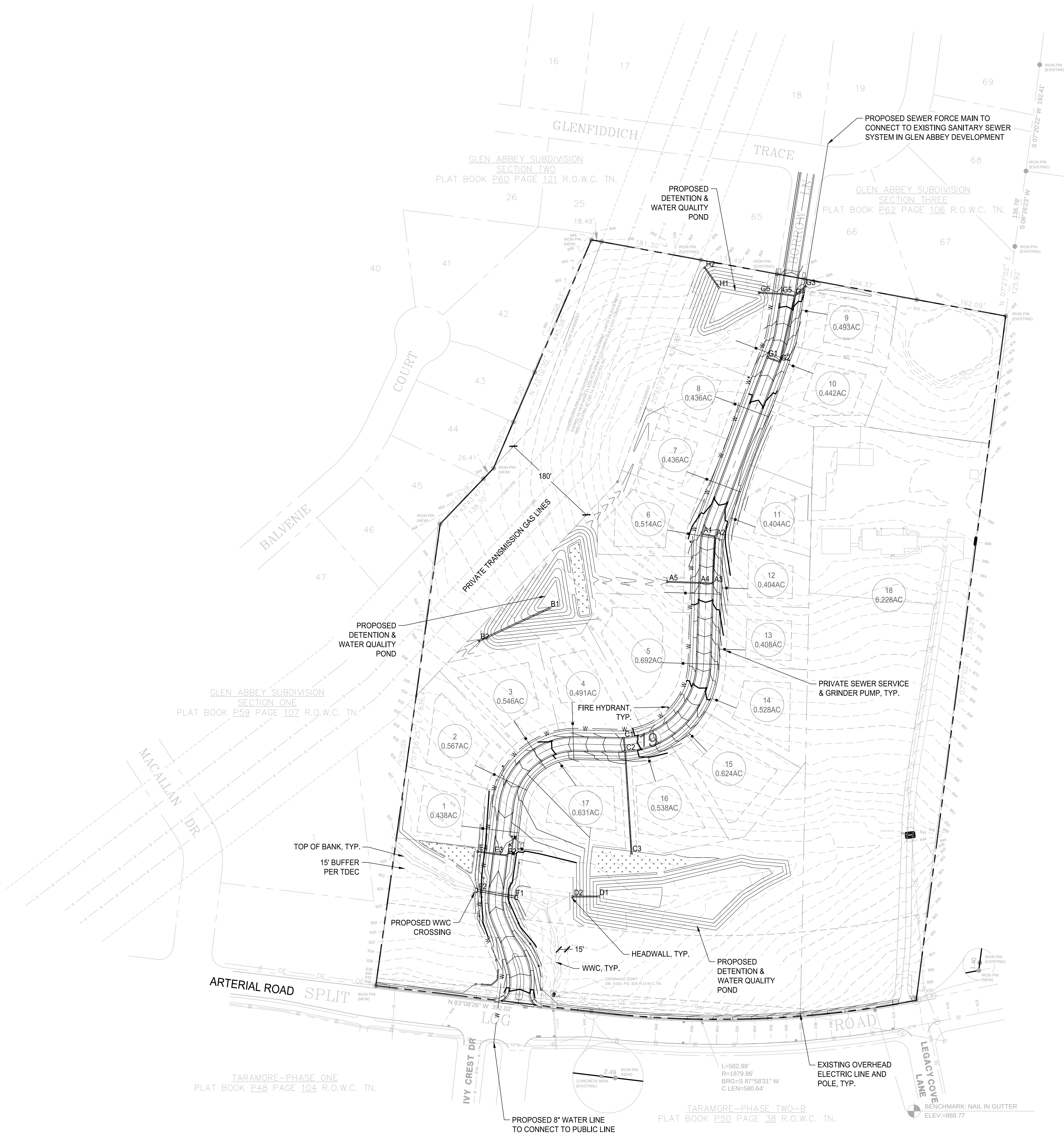
NO.	DATE	DESCRIPTION

SHEET TITLE

SITE DETAILS

PROJECT NO. 19182	DATE 01/21/2020
DRAWN BY BB	SCALE XX = XXX
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SHEET NO.	

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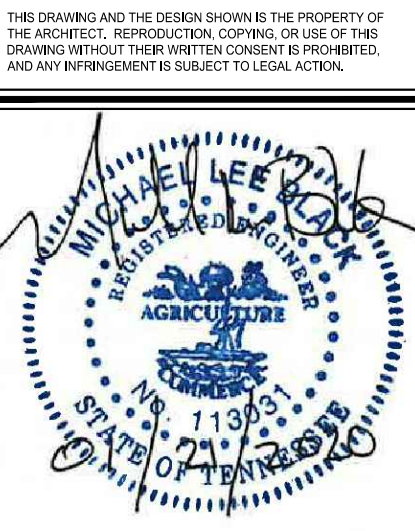


SANITARY SEWER NOTES:

- ALL WASTEWATER PIPE CONSTRUCTION MUST CONFORM TO ALL REGULATED CITY UTILITIES DEPT. SEWER STANDARDS AND SPECIFICATIONS.
- CONSTRUCTION PERMIT AND A MANDATORY PRE-CONSTRUCTION CONFERENCE, WITH INSPECTOR BY APPOINTMENT ONLY, ARE REQUIRED PRIOR TO ANY SEWER WORK.
- COMPACTION OF THE BACKFILL OF ALL TRENCHES SHALL BE COMPACTED TO THE DENSITY OF 96% OF THE THEORETICAL MAXIMUM DENSITY. BACKFILL MATERIAL SHALL BE FREE FROM ROOTS, STUMPS OR OTHER FOREIGN DEBRIS AND SHALL BE PLACED AT OR NEAR OPTIMUM MOISTURE. CORRECTION OF ANY TRENCH SETTLEMENT WITHIN A YEAR FROM DATE OF APPROVAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR TO FIELD VERIFY LOCATION AND INVERT ELEVATIONS OF WASTEWATER PIPE FOR CONNECTION TO EXISTING WASTEWATER SYSTEMS.
- FOR ALL CONSTRUCTION ALONG AND/OR ACROSS WATERWAYS, BANK STABILIZATION AND PROTECTION SHALL BE REQUIRED AS PER EROSION CONTROL REQUIREMENTS AND THE LAWS OF CITY OF BRENTWOOD AND THE STATE OF TENNESSEE.
- ALL PROPOSED SANITARY SEWER PIPING IS TO BE INSTALLED AT A MINIMUM SLOPE OF 1.0%, UNLESS OTHERWISE STATED (SEE SANITARY SEWER PROFILES FOR ADDITIONAL INFORMATION).
- SEWERS SHOULD BE LAID AT LEAST 10' HORIZONTALLY AND 18" VERTICALLY FROM ANY EXISTING OR PROPOSED WATER MAIN WITH THE WATER MAIN ABOVE THE SEWER PIPE. SEWERS CROSSING WATER MAINS SHALL BE ARRANGED SO THAT THE SEWER THE SEWER JOINTS WILL BE EQUAL DISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS. WHERE A WATER MAIN CROSSES UNDER A SEWER, EITHER THE WATER MAIN OR THE SEWER SHOULD BE DUCTILE IRON OR SHALL BE ENCASED IN DUCTILE IRON OR CONCRETE FOR A MINIMUM OF ONE FULL JOINT LENGTH ON EACH SIDE OF THE CROSSING.
- ALL SANITARY SEWER FORCE MAIN LESS THAN 4" SHALL BE PVC SDR 21.
- ALL SANITARY SEWER FORCE MAIN FROM 4" TO 12" SHALL BE DR 25, C900 PVC, GREEN IN COLOR.

WATER NOTES:

- ALL CONSTRUCTION METHODS AND MATERIALS USED IN THE WATER SYSTEM MUST COMPLY IN ALL REGULATED CITY OF BRENTWOOD PUBLIC UTILITIES DEPT. STANDARDS, SPECIFICATIONS AND INSPECTION REQUIREMENTS.
- THRUST BLOCKS TO BE USED AT ALL BENDS, PLUGS, AND TEES ON LINES 4" AND LARGER.
- FIRE HYDRANTS SHOWN IN THE RADIUS OF A CURVE SHALL BE FIELD ADJUSTED SO THAT THE ACTUAL INSTALLATION OF FIRE HYDRANTS WILL BE A MIN. OF 3' OUTSIDE IF CURVE RADIUS.
- ANY CHANGES TO THE WATER DRAWINGS MUST BE APPROVED BY THE REGULATED CITY OF BRENTWOOD UTILITIES DEPARTMENT.
- ALL FIRE HYDRANTS SHALL BE "MUELLER SUPER CENTURION 250 A-423" AND MUST MEET THE SPECIFICATIONS OF THE REGULATED CITY OF BRENTWOOD UTILITIES DEPARTMENT.
- ALL WATER SERVICE LINES SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES.



ALLEN PROPERTY
OSRD ZONING
TURNBERRY HOMES

TN

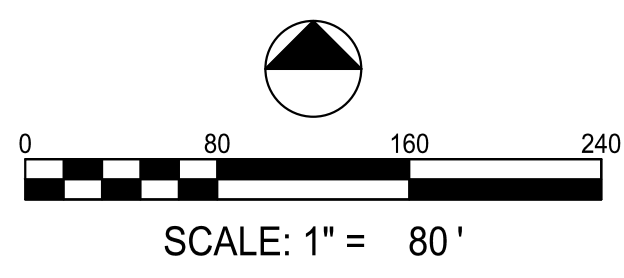
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SUBMITTALS / REVISIONS		
NO.	DATE	DESCRIPTION

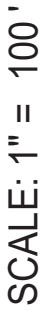
SHEET TITLE
UTILITY LAYOUT PLAN

PROJECT NO. 19182	DATE 01/21/2020
DRAWN BY BB	SCALE 1" = 100'
CHECKED BY MB	
SHEET NO.	

C5.00



PLANT SCHEDULE STREET TREES							
DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	CONT	CAL	HT	REMARKS
ULM PRI	70	ULMUS AMERICANA	'PRINCETON'	B&B	3" CAL	12' - 14' HT	STRONG CENTRAL LEADER, MATCHING.



SITE TREE REQUIREMENTS		
DESCRIPTION	CALIPER INCHES	COMMENTS
CALIPER INCHES ON SITE	2780	
CALIPER INCHES PROTECTED	2005	
CALIPER INCHES REMOVED	775	
CALIPER INCHES TO REPLACE	398	
CALIPER INCHES REQUIRED PER ACRE	700	
TOTALS		
PROPOSED	340	
PROTECTED	2005	
TOTAL	2345	

<div> <div>SHEET TITLE</div> <div>OVERALL LANDSCAPE PLAN</div> </div>	PROJECT NO.		DATE
	19182		01/21/2020
	DRAWN BY	SCALE	
	ZK	1" = 100'	
	CHECKED BY		
	AA		
SHEET NO.			

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TURNBERRY HOMES

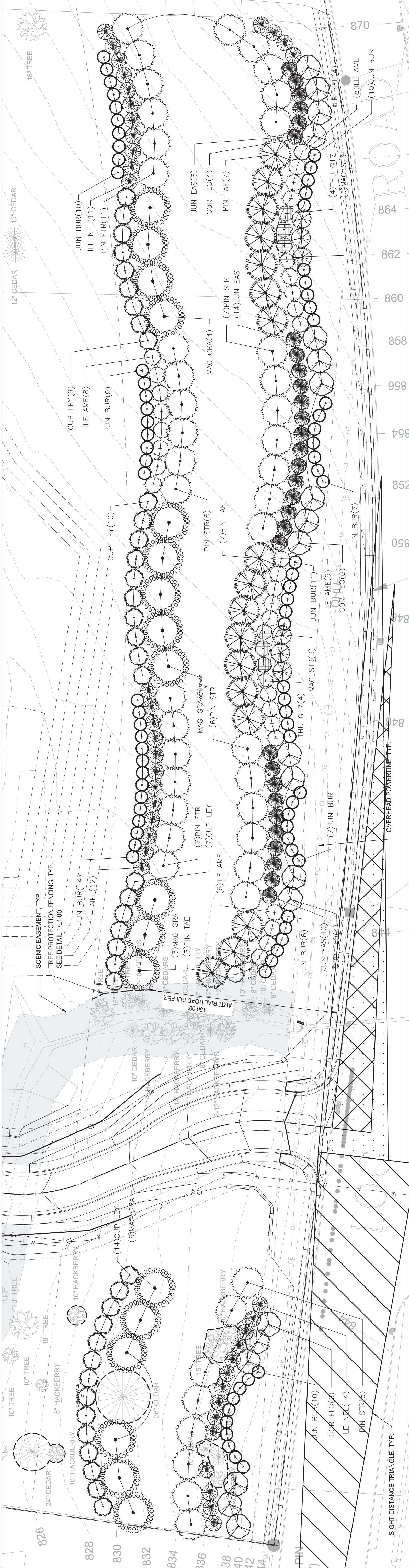
BRENTWOOD

PLANT SCHEDULE ARTERIAL ROAD BUFFER

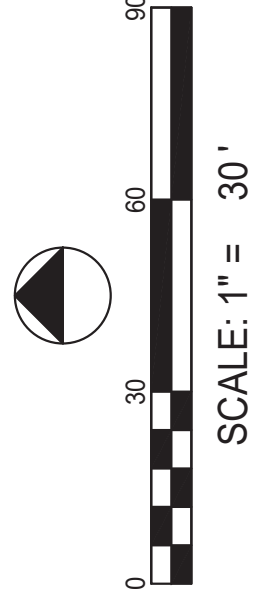
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	CONT	CAL	HT	REMARKS
ILE AME	31	ILEX OPACA GREENLEAF	GREENLEAF HOLLY	B&B	2" CAL MIN	10' - 12' HT	FULL TO GROUND, MATCHING
ILE NEL	41	ILEX X "NELLIE R STEVENS"	NELLIE STEVENS HOLLY	B&B	2" CAL MIN	10' - 12' HT	FULL TO GROUND, MATCHING
JUN EAS	30	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	B&B	2" CAL MIN	10' MIN HT	FULL PLANT, MATCHING.
JUN BUR	84	BURK RED CEDAR	BURK RED CEDAR	B&B	2" CAL MIN	8' MIN HT	FULL PLANT, MATCHING.
MAG GRA	18	MAGNOLIA GRANDIFLORA	SOUTHERN MAGNOLIA	B&B	2" CAL MIN	12' - 14' HT	FULL PLANT, MATCHING.
PIN STR	45	PINUS STROBUS	WHITE PINE	B&B	2" CAL MIN	8' MIN HT	FULL PLANT, MATCHING.
PIN TAE	17	PINUS TEDA	LOBLOLLY PINE	B&B	2" CAL MIN	8' MIN HT	FULL PLANT, MATCHING.
THU G17	8	THUJA OCCIDENTALIS "GREEN GIANT"	GREEN GIANT ARBORVITAE	B&B	2" CAL MIN	12' - 14' HT	FULL PLANT, MATCHING.
CUP LEY	40	X CUPRESSOCYPARIS LEYLANDII	LEYLANDI CYPRESS	B&B	2" CAL MIN	10' MIN HT	FULL PLANT, MATCHING.
FLOWERING TREES							
COR FLO	20	CORNUS FLORIDA	COMMON NAME	CONT	CAL	HT	REMARKS
			STRONG DOGWOOD	B&B	2" CAL MIN	8' MIN HT	STRONG CENTRAL LEADER, MATCHING.
MAG ST3	6	MAGNOLIA STELLATA	STAR MAGNOLIA	B&B	2" CAL	8' MIN HT	MATCHING FORM, TREE FORM, MIN. BRANCH 3

ARTERIAL ROADWAY BUFFER CALCULATIONS		
DESCRIPTION	QUANTITY	NOTES
TREES REQUIRED	438	972.66/100 = 9.73 9.73 X 45 = 437.85 = 438
PROVIDED		
BUFFER TREES	340	EVERGREEN TREES: 314 DECIDUOUS TREES: 26
STREET TREES	70	DECIDUOUS TREES: 70
SAVED TREES IN ARTERIAL BUFFER	28	SEE EXCEL CHART SHEET L1.00
TOTAL TREES PROVIDED	438	EVERGREEN TREES: 77% (438*26=410 314/410= .765) DECIDUOUS TREES: 23% (26*70) / 410) = 234

- ARTERIAL ROADWAY BUFFER REQUIREMENTS:
- PER SECTION 78-512(b)(5), A LANDSCAPING BUFFER SHALL BE PROVIDED ALONG THE FRONTAGE OF SPLIT LOG ROAD AT 45 TREES PER 100 LF. PRIMARILY EVERGREEN PLANT MATERIALS (MINIMUM 75%) WITH A MIXTURE OF A VARIETY OF PLANT SPECIES.
 - 972.66/100 = 9.73
9.73 X 45 = 437.85 = 438 TREES REQUIRED
- NOTE:
- TO REMAIN CONSISTENT WITH THE ADJOINING GLEN ABBEY, THE DEVELOPER PROPOSES TO RELOCATE 70 OF THE REQUIRED BUFFER PLANTINGS IN THE PLANTING STRIP BETWEEN THE CURB AND SIDEWALK ALONG THE STREET.



1 ENLARGEMENT
SCALE:



TN

ALLEN PROPERTY
OSRD ZONING

TURNBERRY HOMES

BRENTWOOD

SUBMITTALS / REVISIONS	
NO.	DATE DESCRIPTION

SHEET TITLE

ROADWAY BUFFER
LANDSCAPE PLAN

PROJECT NO.	DATE
19182	01/21/2020
DRAWN BY	SCALE
ZAK	1" = 30'
CHECKED BY	
AL	
SHEET NO.	

L1.02

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DESIGN
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DESIGN IS PROHIBITED AND IS SUBJECT TO LEGAL ACTION.

1. UNDERGROUND UTILITIES:

1.1. UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED BY THE OWNER, LANDSCAPE ARCHITECT, OR THEIR REPRESENTATIVES. BEFORE YOU DIG, CALL TENNESSEE CALL SYSTEM.

1.2. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT RESULT FROM THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY EXISTING UTILITIES.

2. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS TO ENSURE THAT THE NEW WORK SHALL FIT INTO THE EXISTING SITE IN THE MANNER INTENDED AND AS SHOWN ON THE DRAWINGS. SHOULD ANY CONDITIONS EXIST THAT ARE CONTRARY TO THOSE ON THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE PRIOR TO PERFORMING ANY WORK IN THE AREA INVOLVING DIFFERENCES. NOTIFICATION SHALL BE IN THE FORM OF A DRAWING OR SKETCH INDICATING FIELD MEASUREMENTS AND NOTES RELATING TO THE AREA.

1. PLANTING BEDS AND PLANT LOCATIONS SHALL BE STAKED BY THE LANDSCAPE CONTRACTOR. THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE OWNER OR THE OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO INSTALLATION OF THE PLANTS.
2. PLANTING BEDS SHALL BE CLEARED OF ALL GRASS AND WEEDS PRIOR TO INSTALLATION OF PLANTS, INCLUDING SPRAYING - ROUNDUP OR APPROVED SUBSTITUTE TO KILL ACTIVELY GROWING PLANTS.
3. ALL OTHER DISTURBED AREAS ARE TO BE SEEDED OR SODDED AS PER THE PLANS. ADDITIONAL SEEDING OR SODDING, IF REQUIRED, WILL BE AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE. SEE GRADING SHEET FOR SEEDING.
4. PLANTING BEDS SHALL HAVE A THREE (3) INCH SHREDDED HARDWOOD BARK MULCH OVER THE ENTIRE BED, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5. PRIOR TO PLANTING, ALL PLANTED AREAS SHALL BE TREATED WITH A WATER-SOLUBLE HERBICIDE FOR THE NON-SELECTIVE CONTROL OF ANNUAL AND PERENNIAL WEEDS PRIOR TO PLANTING.
6. TREE AND SHRUB PLANTING SHALL BE BACKFILLED WITH PLANT-SUITABLE SOIL (ONE (1) PART TOPSOIL AND TWO (2) PARTS SAND). THE SOIL MUST BE SAMPED AND ANALYZED TO BE APPROVED IN WRITING BY OWNER OR OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
7. PLANT GROUNDCOVER AND ANNUAL BEDS IN SAME MIXTURE AS SHRUBS. AFTER PLANTING & MULCHING, WATER AREAS TO POINT OF SATURATION.
8. ALL PLANTED AREAS ARE TO BE FERTILIZED WITH GRANULAR FERTILIZER. LANDSCAPE CONTRACTOR IS TO PROVIDE SOIL TEST RESULTS AND PROPOSED FERTILIZER APPLICATION RATES TO THE OWNER OR OWNER'S REPRESENTATIVE FOR APPROVAL.
9. ALL PLANT MATERIAL IS TO BE NURSERY GROWN AND TO COMPLY WITH AMERICAN STANDARD FOR PLANT MATERIAL.
10. REFLECTED AND REPLACED WITH PLANTS THAT MEET THE STANDARDS.
11. SPRAY TREES AND SHRUBS WITH AN ANTIDECIDANT IF FOLIAGE IS PRESENT.
12. EVERGREEN TREES AND SHRUBS SHALL BE PLANTED IN THE SAME MANNER AS DECIDUOUS MATERIAL IS PLANTED.

THE SITE ON THE DAY OF INSPECTION.

15. FIELD CHANGES MUST BE APPROVED IN WRITING BY THE OWNER OR OWNER'S REPRESENTATIVE.

16. EXISTING PLANT MATERIAL IS TO BE EVALUATED BY THE LANDSCAPE ARCHITECT FOR POSSIBLE RELOCATION ON SITE. THE LANDSCAPE CONTRACTOR IS TO NOTIFY THE LANDSCAPE ARCHITECT FOURTY-EIGHT (48) HOURS BEFORE BEGINNING WORK.

17. ALL PLANT MATERIAL SHALL BE SUPPLIED BY APPROPRIATE SOURCES TO PREVENT UNDULE STRESS OR PROLONGED ACCLIMATIZATION THAT WOULD INHIBIT PLANT GROWTH.

18. LANDSCAPE CONTRACTOR IS TO VARY PLANT QUANTITIES SHOWN ON PLAN AND IN PLANT LIST. IF DISCREPANCIES OCCUR, LANDSCAPE CONTRACTOR IS TO CONTACT LANDSCAPE ARCHITECT IMMEDIATELY.

19. ALL TREES SHALL BE A MINIMUM OF 8" IN HEIGHT AT TIME OF PLANTING. DECIDUOUS TREES TO BE EVERGREEN TREES TO BE A MINIMUM OF 12" IN HEIGHT AT TIME OF PLANTING.

20. TWO DBH MIN. AT TIME OF PLANTING. SEE PLANT LIST FOR LARGER MATERIAL REQUIRED.

21. MULTI-TRUNK PLANT MATERIAL SHALL BE ONE PLANT GROWN FROM SINGLE SEEDLING. NO CLUMP MULTI-PLANT STOCK WILL BE ACCEPTED.

22. IF IN THE OPINION OF THE LANDSCAPE ARCHITECT, THE CENTRAL LEADER OF ANY TREE HAS BEEN CUT IN THE HISTORY OF THE PLANT'S GROWTH, THE MATERIAL SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER. THE DECISION OF THE LANDSCAPE ARCHITECT WILL BE FINAL.

1. ALL PEDESTRIAN ACCESS WAYS MUST HAVE AT LEAST 7' OF CLEARANCE.
2. ALL CANOPY AND UNDERSTORY TREES SHALL HAVE AT LEAST ONE STRONG CENTRAL LEADER TRUNK. NO MULTI-TRUNK UNLESS SPECIFIED.
3. THE SOUTH SIDE OF ALL TREES SHALL BE MARKED BEFORE TRANSPLANT FOR DIRECTIONAL PLACEMENT AT THE TIME OF PLANTING. CONTRACTOR SHALL BE RESPONSIBLE FOR DIRECTIONAL PLACEMENT.
4. ALL TREES SHALL BE MATCHED SPECIMENS WITH A FULL CANOPY AND A UNIFORM BRANCHING HABIT.
5. EVERGREEN TREES SHALL BE BRUSHED AND PRUNED TO A STRONG CENTRAL LEADER.
6. ALL TREES MUST BE ACCEPTABLE FOR INSTALLATION PER THE CITY OF LOS ANGELES.
7. INSTALL TWO CANOPIES FOR EACH PLANT. CANOPIES MUST BE INSTALLED PER THE FOLLOWING: INSTALL ALL PLANTS IN ACCORDANCE WITH ALL APPLICABLE DETAILS AND SPECIFICATIONS INCLUDED WITHIN THE CONSTRUCTION PACKAGE.
8. ALL PLANTS MUST BE SELECTED, INSTALLED, AND MAINTAINED ACCORDING TO THE SPECIFICATIONS.
9. ALL TREES MUST BE PLANTED A MINIMUM OF 5 FEET FROM MAJOR UTILITY LINES. CONTACT LANDSCAPE ARCHITECT WHERE DISCREPANCIES OCCUR FOR FIELD ADJUSTMENT.

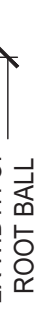


- NOTES:
1. WATER TREES IMMEDIATELY AFTER PLANTING.
 2. TREES OF SAME SPECIES TO BE MATCHED IN UNIFORMITY AND GROWTH.
 3. TREE MUST MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1)

(

- NOTES:
1. WATER MULTI-TRUNK TREES IMMEDIATELY AFTER PLANTING.
 2. MULTI-TRUNK TREES OF SAME SPECIES TO BE MATCHED IN UNIFORMITY AND GROWTH

SCALE: NTS



- NOTES:
1. WATER TREES IMMEDIATELY AFTER PLANTING
 2. TREES OF SAME SPECIES TO BE MATCHED IN UNIFORMITY AND GROWTH

SCALE: NTS

TURNBERRY HOMES

BRENTWOOD

[illegible]

SHEET TITLE

LANDSCAPING NOTES & DETAILS

PROJECT NO. 19182	DATE 01/21/2020
DRAWN BY ZK	SCALE AS SHOWN
CHECKED BY AA	
SHEET NO.	

L1.10



NJ



PROPERTY TITLE REFERENCE
TY BEING PARCEL 35.03 ON TAX MAP 55 WILLIAMSON COUNTY, TENNESSEE, AND BEING
TY CONVEYED TO KENDALL KELLER ALLEN & MARY JO ALLEN BY DEED RECORDED IN
S, PG.450, R.O.W.C. TENNESSEE.

LOT AREA TABLE

PARCEL AREA TABLE		
LOT #	SQ. FOOTAGE	ACREAGE
1	45,333 S.F.	1.04
2	48,632 S.F.	1.12
3	48,980 S.F.	1.12
4	48,556 S.F.	1.11
5	48,132 S.F.	1.10
6	47,708 S.F.	1.10
7	47,284 S.F.	1.09
8	46,860 S.F.	1.08
9	46,436 S.F.	1.07
10	45,031 S.F.	1.03
11	77,074 S.F.	1.77
12	53,889 S.F.	1.24
13	60,971 S.F.	1.40
14	65,753 S.F.	1.51
15	57,686 S.F.	1.32
16	44,545 S.F.	1.02
17	44,283 S.F.	1.02
18	45,308 S.F.	1.04
19	43,539 S.F.	1.00
20	87,641 S.F.	2.01

OPEN SPACE AREA TABLE

PARCEL AREA TABLE		
LOT #	SQ. FOOTAGE	ACREAGE
22	18,649 S.F.	0.43
23	16,128 S.F.	0.37
24	28,528 S.F.	0.65
25	35,260 S.F.	0.81

CERTIFICATE OF SURVEY
I HEREBY CERTIFY THAT THIS IS A CATEGORY 1 SURVEY
AND THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY IS
1: 13,900+ AS SHOWN HEREON.

SURVEYOR
TENN. REG. NO. _____

ROW AREA TABLE

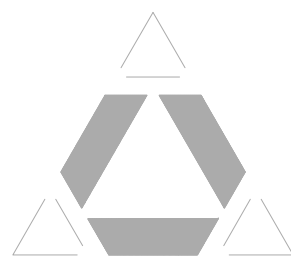
PARCEL AREA TABLE		
LOT #	SQ. FOOTAGE	ACREAGE
21	67,242 S.F.	1.54

BOUNDARY & TOPOGRAPHIC SURVEY

OF
9520 SPLIT LOG ROAD

TAX MAP 55, PARCEL 35.03 R.O.W.C. TN.

16th CIVIL DISTRICT
BRENTWOOD, WILLIAMSON COUNTY, TENNESSEE



Delta
Associates
INCORPORATED
Design - Surveying

7121 Crossroads Blvd., Brentwood, TN 37027
PHONE: (615) 850-3501

SCALE : 1" = 100'	DRAWN BY: TOC	DATE: 10-1-19	DRAWING NO.
	CHECKED BY: TOC	JOB NO: 19-5085L-9520	1 OF 1

**REQUEST FOR WATER AND/OR SEWER AVAILABILITY
APPLICATION FORM**

Parties desiring to connect to the City of Brentwood's water and/or sewer system are required to apply for availability. Requesting water and/or sewer availability is the first step in the development/building process and should be requested as early as possible to assure capacity is available for the planned project.

Date of Request: 01-23-2020			
<u>Owner Information</u>			
Owners Name:	KENDALL ALLEN	Company Name:	N / A
Address:	9520 SPLIT LOG ROAD		
Phone:	615 - 887 - 0574	Email:	KEN.ALLEN@LIVE.COM
<u>Owner's Representative If Applicable (i.e. consultant)</u>			
Name:	BRETT BEELER	Company Name:	LOSE DESIGN
Address:	2809 FOSTER AVENUE NASHVILLE, TN 37210		
Phone:	615 - 242 - 0040	Email:	bbeeler@lose.design
<u>Project Information</u>			
Project Name or Description:	Allen Property	Project Acreage:	27.99±
Project Address, Map & Parcel No.:	9520 SPLIT LOG ROAD BRENTWOOD, TN 37027		
Current/Proposed Zoning	CURRENT: R-2 PROPOSED: OSRD		
Typical Heated Living Space (sq. ft): (If Residential)	~4,000 s.f.		

<u>WATER INFORMATION:</u> (Meter/service line design shall follow AWWA Manual 22, latest edition)		
--- Residential ---		
Typical Residence: (Avg. day / Inst. Peak)	Domestic - 310 / 1240	Irrigation - N/A
Project Common space: (Avg. day / Inst. Peak)	Irrigation: N/A	

17 lots used for water calcs due to 1 existing connection for the 6 acre tract.

WATER INFORMATION (cont.)			
Typical Residence, Total Flow Range (Min.- Max., gpm):	20 - 30 gpm	Requested Meter size for Typ. Residence:	3/4" min
Total Projected Flow for Project (Avg. Day / Inst. Peak)	5,270 / 21,080	peak factor of 4 used	
--- Nonresidential ---			
Service Classification: (i.e. Office, Restaurant, Church, Car wash, etc.)	N/A		
Domestic Flow: (Avg. Day / Inst. Peak)	N/A	Site Irrigation (Avg. Day / Peak)	N/A
Fire Line Required: Y / N	Fire Flow: (Peak/Duration)	N/A	

SEWER INFORMATION:			
--- Residential ---			
Typical Residence: (Avg. day)	310 gpd (WSD design std.)	No. Of Planned Units:	18 lots
Total Projected Flow for Project (Avg. Day / Inst. Peak)	5580 / 22,320 peak factor of 4 used		
--- Nonresidential ---			
Service Classification: (i.e. Office, Restaurant, Church, Car wash, etc.)	N/A	No. of Units (See Design Criteria Attached)	N/A
Food Service Proposed: (i.e. cafeteria, deli counter, etc.)	Yes or No	If yes, briefly describe:	
Domestic Flow: (Avg. Day / Inst. Peak)	N/A		
Total Requested Flow:	N/A		

Please attach design flow calculations for water and sewer projections and project site plan (if applicable), including utility plan with your application. Applications should be submitted to the Water Services Department, PO Box 788, Brentwood, TN 37024-0788, miltonc@brentwood-tn.org.

City of Brentwood
Planning and Codes Department
5211 Maryland Way (37027)
P.O. Box 788
Brentwood, TN 37024-0788

Office (615) 371-2204

Fax (615) 371-2233

www.brentwoodtn.gov/planning



APPLICATION FOR
◆ REQUEST FOR ZONING CHANGE ◆

1.) GENERAL INFORMATION:

Project Name: Allen Property
Project Location (address): 9520 Split Log Road
Map / Group / Parcel #: 055 03503

(obtain this information from the Williamson County Property Assessor's data. If more than one parcel, attach a separate sheet listing tax map information for each parcel)

Current Zoning: R-2
Requested Change: OSRD
Area of Property (acres): 27.99±

Property Description: Attach a current description of the affected property's location, boundaries and size, in sufficient detail and accuracy, as determined by the Planning Director, so as to clearly delineate the area to be rezoned.

2.) APPLICANT INFORMATION:

Name: Turnberry Homes
Company: Nicky Wells
Mailing Address: 210 Jamesham Park Dr.
City/State/Zip Code: 37027
Phone Number: (615) 376.7001 Fax Number: (615) 376.6036
Email Address: nicky.wells@turnberryhomes.com

Signature of Owner:
Authorized Representative: [Signature]
Print Name: Nicky Wells

3.) OWNER INFORMATION:

Name: KENDALL K. ALLEN
Company: _____
Mailing Address: 9520 SPLIT LOG RD
City/State/Zip Code: BRENTWOOD, TN 37027
Phone Number: (615) 887-0574 Fax Number: () _____
Email Address: KEN.ALLEN@LIVE.COM

Owner's Signature: [Signature]
Print Name: KENDALL K ALLEN

This application shall be signed by all owners of the property, provided that if any interest in the affected property is owned by a corporate entity, limited partnership, governmental entity or nonprofit organization, such form shall be signed by a duly authorized official of such owner.

4.) REVIEW FEES:

The Brentwood Board of Commissioners has adopted the following sliding schedule of application fees for a zoning district change, effective March 7, 2005:

- Less than twenty-five (25) acres - \$1,000.00
- Twenty-five (25) acres but less than fifty (50) acres - \$2,000.00
- Fifty (50) acres but less than one hundred (100) acres - \$3,000.00
- One hundred (100) acres but less than two hundred (200) acres - \$4,000.00
- Two hundred (200) acres or greater - \$5,000.00

FOR STAFF USE ONLY:

FEE SUBMITTED: \$ 2,000.00 RECEIPT #: ARS3122 PROJECT NUMBER: Zon1912-001

5.) INFORMATION REQUIRED AS PART OF THE INITIAL SUBMITTAL:

- Three (3) complete paper sets and one (1) complete set on CD disc of the proposed development plan(s);
- Completed, signed request for zone change application;
- The applicable review fee;
- Written authorization from the current property owner;
- A current property description;
- A vicinity map showing the parcel configuration in an area 250 feet surrounding the subject property.
- Digital files in .jpg format on CD-ROM for use as part of the presentation to the Board of Commissioners.

6.) IMPORTANT ADDITIONAL INFORMATION:

All information as required by applicable sections of the Brentwood Municipal Code and this application shall be included as part of the initial original submittal package. Failure to include a complete review package may result in the delay of the rezoning application.

The Board of Commissioners has established a policy that all requests for rezoning will be heard on first reading at the first regularly scheduled meeting of the month. The Board of Commissioners meets on the second and fourth Monday of the month. There are several exceptions, please see the adopted schedule, located on-line at www.brentwood-tn.org.

Written notification shall be sent to all adjacent property owners within 1000 feet of the subject property. These notifications shall be sent via certified mail, return receipt requested. A listing, sorted alphabetically, of all property owners notified and green Return Receipt cards shall be forwarded to staff for inclusion in the city rezoning file.

City of Brentwood Municipal Code Section 78-87
Procedure for Zoning District Change.

- (a) *Contents of rezoning request.* Any request for a zoning district change shall be submitted to the planning director and shall include the following:
- (1) A completed request for rezoning form, which must be signed by all owners of the property, provided that if any interest in the affected property is owned by a corporate entity, limited partnership, governmental entity or nonprofit organization, such form shall be signed by a duly authorized official of such owner. The planning director shall prescribe the format of such form.
 - (2) A current description of the affected property's location, boundaries and size, in sufficient detail and accuracy as determined by the planning director so as to clearly delineate the area to be rezoned.
 - (3) Map and information regarding the physical characteristics of the surrounding area within at least 250 feet of the development.
 - (4) A statement of the nature of the landowner's interest in any proposed development of the land and a written statement of concurrence from all parties having a beneficial interest in the affected property.
 - (5) An application fee, based on the total acreage proposed for rezoning, as set forth below:
 - a. less than 25 acres - \$1,000.00.
 - b.** at least 25 acres but less than 50 acres - \$2,000.00.
 - c. at least 50 acres but less than 100 acres - \$3,000.00.
 - d. at least 100 acres but less than 200 acres - \$4,000.00.
 - e. 200 acres or greater - \$5,000.00.

(b) *Community meeting.* The parties requesting the zoning district change shall hold a community meeting to present the particulars of the proposed rezoning, including the details of any associated development plans. The community meeting shall be held at the city's public library or municipal center, or, with the planning director's approval, at a service/institution facility with indoor meeting rooms that is located near the affected property proposed for rezoning. This meeting shall take place prior to the planning commission meeting at which the rezoning is to be considered.

(c) *Written notification to affected property owners.* The parties requesting the zoning district change shall make a reasonable effort to notify all property owners within 1,000 feet of the boundaries of the property proposed for rezoning at least ten days prior to the community meeting. The notification boundary area shall be determined by the planning director or his designee. Notification shall be satisfied by the parties through evidence of delivery confirmation or proof of delivery attempt to the property owner by the U.S. Postal Service. The property owners data base used for notification shall be the latest certified tax year information available through the Williamson County Property Assessor's Office. Said notification shall include notice of the community meeting, as well as notice of the scheduled meetings of the planning commission and the board of commissioners at which the rezoning is to be considered.

(d) *Signs.* The parties requesting the zoning district change shall post official city rezoning signs on each street frontage of the property stating the current zoning, the requested zoning change, and dates of the community meeting and public hearing. Such signs shall be located five feet from the street right-of-way or 15 feet from the edge of the pavement, and shall be a minimum of four square feet in size, with no element higher than six feet from grade. To ensure proper visibility, the planning and codes department shall inspect and approve the location of the sign. Such signs shall be secured with a deposit of \$150.00 per sign, shall be erected a minimum of 15 days prior to the required community meeting, and shall be returned within five days following the public hearing before the board of commissioners.

(e) *Agenda scheduling.* No request for a zoning district change shall be considered by the board of commissioners until the request is deemed complete by the planning director. When an application for a zoning district change is complete, consideration of the change shall be scheduled on the agenda of the board of commissioners for first reading, provided that first reading shall be scheduled for the first meeting of any given month to allow for timely scheduling of the required community meeting. If a request for a zoning district change is deemed incomplete by the planning director, he shall notify the parties making the request of the need for additional information. Such notification shall be sent by the planning director within ten days of the submittal of an original request or amended request. Until deemed complete by the planning director, a request shall be held in abeyance and not submitted to the board of commissioners for consideration.

(f) *Timetable for consideration and approval.*

- (1) After a rezoning ordinance has been officially placed on the board of commissioners agenda for consideration on first reading, the applicant shall be allowed a maximum of 120 days from that meeting date to complete the rezoning process.
- (2) After the zoning district change is officially placed on the agenda, the applicant may obtain, at any time, a deferral of consideration by the board of commissioners and/or planning commission. However, if the deferral(s) initiated by the applicant result in the rezoning process exceeding 120 days, the rezoning ordinance shall be deemed void.
- (3) If the rezoning ordinance is deemed void, any further request for a rezoning district change shall require the applicant to submit a new application for consideration on first reading, based on the latest procedural requirements and technical standards in the zoning ordinance.
- (4) The 120-day time limitation established herein shall not apply to any deferrals of consideration resulting from formal action by the board of commissioners or planning commission. If any such actions occur, the 120 day period shall be extended by the number of days during which consideration is deferred by the action of either board.
- (g) *Re-submittals.* A submittal of a request for a zoning district change for any property for which a rezoning was previously disapproved by the board of commissioners or voided due to deferrals shall not be accepted by the planning director for a period of six months following the last action of the board of commissioners or the date the request became void. However, the board of commissioners may, by majority vote, direct the planning director to reinitiate a rezoning ordinance at any time under the procedures set forth herein.

(h) *Correction of errors.* In the event a minor error, as defined in this subsection, is discovered in the description of the location, boundaries or size of property which has been rezoned pursuant to this section, a corrected description may be substituted with the approval of the planning director. The corrected description shall thereafter serve as the basis for delineating the area which has been rezoned. An error shall be considered a “minor error” if the erroneous description and the corrected description differ by no more than one acre in total area, and any minimum amount of land required under the applicable zoning district is maintained. An error other than a minor error, as defined herein, shall require such corrective action by the board of commissioners and planning commission as deemed necessary by the city attorney.

Sec. 78-88. Planning commission review.

No amendment to this chapter, nor any zoning district change shall become effective unless the amendment is first submitted to the planning commission for its recommendations regarding approval or disapproval. If the planning commission recommends disapproval of an amendment, it shall require a favorable vote of the majority of the entire membership of the board of commissioners to become effective. If the planning commission does not provide a recommendation on the proposed amendment within 35 days after passage on first reading by the board of commissioners, the absence of action shall be considered as a recommendation for approval of the proposed amendment; provided, however, that a party requesting a zoning district change may waive this provision and consent to an extension of time for the planning commission's recommendation.

December 20th, 2019

Mr. Jeff Dobson
CITY OF BRENTWOOD PLANNING DEPARTMENT
5211 Maryland Way
Brentwood, TN 37024

RE: The Allen Property Open Space Residential Development
Request for Zoning Change

Dear Mr. Dobson:

On behalf of Turnberry Homes, please find attached **eight (8) copies and one (1) digital CD** of the Open Space Residential Development Preliminary Plans for the Request for Zoning Change of the Allen Property. This project consists of one parcel totaling **27.99± acres** located on Split Log Road.

1. Parcel 35.03, owned by Kendall Allen and Mary Jo Allen, is approximately 27.99± acres, and is currently zoned R-2. The entirety of Parcel 35.03 is requested to be rezoned as part of the overall development for the Allen Property.

Lose Design would like to request that this parcel be re-zoned to OSRD and tentatively scheduled for the City of Brentwood City Commission meeting for **January 14th, 2020**. A formal application for rezoning is attached.

Included in this submittal is the required rezoning fee of **\$2,000** for this submittal.

If you have any questions, please contact me at your convenience.

Sincerely,

LOSE Design

Michael Black
P.E. – Vice President of Engineering

Cc: Nicky Wells, Turnberry Homes

**CITY OF BRENTWOOD
TENNESSEE****RECEIPT**

Number: PRJ3122

Project Number **ZON1912-001**
Address **9520 SPLIT LOG RD**
Applicant **Turnberry Homes**
Owner **ALLEN, KENDALL**
Project Description **REZONING -- REMAINDER OF ALLEN P**

FEES PAID

2005 REZONING FEES >25 <50 AC	110-32820	\$2,000.00
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TOTAL FEES PAID	\$2,000.00
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DATE PAID: 12/20/2019

PAID BY: Lose Design

PAYMENT METHOD: CHECK 17387

LETTER OF TRANSMITTAL

Ship To: Brentwood Planning Department
5211 Maryland Way, Brentwood, TN
37027

Re: Allen Property Rezoning Request &
Preliminary Plans

Phone: (615) 371 - 2204

Date: 12/20/2019

Job #: 19182

COPIES	DATE	DESCRIPTION	FOR YOUR USE	AS REQUESTED	FOR REVIEW & COMMENT
1	12/20/2019	Letter to Jeff Dobson	X		
1	12/20/2019	Request for Zoning Change Application			X
8	12/20/2019	(8x) Proposed Development Plans – 24x36 Plans			X
1	12/20/2019	(1x) CD – Proposed Development Plans			X
1	12/20/2019	Check - \$2,000 – Review Fee		X	

Remarks:

Please contact the office at (615) 242-0040 with any questions or concerns.

From: Brett Beeler, E.I.T.



LETTER OF TRANSMITTAL

Ship To: Brentwood Planning Department
5211 Maryland Way, Brentwood, TN
37027

Re: Allen Property Rezoning Request &
Preliminary Plans

Phone: (615) 371 - 2204

Date: 01/03/2020

Job #: 19182

COPIES	DATE	DESCRIPTION	FOR YOUR USE	AS REQUESTED	FOR REVIEW & COMMENT
3	01/03/2020	R-2 Zoning Exhibit – 24x36 Plans			X
3	01/03/2020	(3x) Preliminary Plans – 24x36 Plans			X
1	01/03/2020	(1x) Preliminary Plans – Electronic CD			X
Remarks:					

Please contact the office at (615) 242-0040 with any questions or concerns.

From: Brett Beeler, E.I.T.

Property Description

Kendall Keller Allen and Mary Jo Allen Property

Property Parcel 35:03, Tax Map 55 R.O.W.C., TN.

A tract of land located in the City of Brentwood, Williamson County, Tennessee of record in Deed Book 5772, Page 450 R.O.W.C, TN., and more specifically described as follows;

Beginning at an iron pin (new) being the southwest corner of subject tract and in the northern Right-of-Way of Split Log Road, said iron pin being a common corner with the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN., Thence;

Leaving said Right-of-Way and with the common line of the North 07° 56' 25" East, a distance of 836.41 feet to an iron pin (new). Said iron pin being located in the rear property line of Lot 45 of the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN., Thence;

With the rear property of Lot 45 North 43° 43' 47" East, a distance of 138.70 feet to an iron pin (new) in the rear property line of Lot 44 of the Glen Abbey Subdivision, Section One of record in Plat Book P59, Page 107 R.O.W.C., TN., Thence;

Continuing with said common line a long rear property line of Lots 44, 43 and 42 North 23° 10' 30" East a distance of 445.58 feet to an iron pin (new). Said iron pin being a common corner in the rear property line of Lot 42 of the Glen Abbey Subdivision, Section One and Lot 25 of Glen Abbey Section Two of record in Plat Book P60, Page 121 R.O.W.C., TN., Thence;

Continuing with the common property line of the Glen Abbey Sundivision, Section Two and Section Three of record in Plat Book P62, Page 106 a long the rear lot lines of Lots 25, 65, 66 and 67 South 79° 34' 45" East a distance of 755.76 feet to an iron pin (existing). Said existing iron pin being a common corner of Kendall Kellar Allen and Mary Jo Allen of Record in Deed Book 5772, Page 450 R.O.W.C, TN., lot 67 of the Glen Abbey Subdivision, Section Three and the Trena Payne Property of record in Deed Book 7099, Page 472 R.O.W.C. TN., Thence;

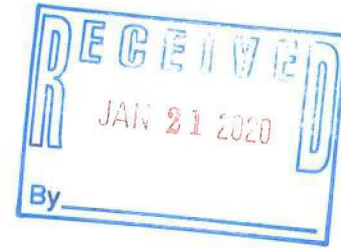
With the common line of the Trena Payne Property South 07° 27' 02" West, a distance of 1,238.29 feet to an iron pin (new) passing through an Existing iron pin at 1,236.89 feet. Said iron pin (new) being in the northern Right-of-Way of Split Log Road, Thence;

With said Right-of-Way with a curve to the right having an arc length of 582.98 feet, a radius of 1,879.86 feet, a chord length of 580.64 feet and a chord bearing of South 87° 58' 31" West, to an iron pin (new), Thence;

Continuing with said Right-of-Way North 83° 08' 26" West, a distance of 392.02 feet and passing through an existing concrete monument at 2.49 feet, to the point of beginning and containing 1,219,445 sq. ft. or 27,995 acres more or less.

The above-described tract of land is subjected to all easements of record.

This property description was prepared by Tori D. Cassidy RLS #2467 in accordance with the Boundary Survey prepared by Delta Associates, Inc., dated October 01, 2019.



LETTER OF TRANSMITTAL

Ship To: Brentwood Planning Department
5211 Maryland Way, Brentwood, TN
37027

Re: Allen Property Rezoning Request &
Preliminary Plans (Resubmittal)

Phone: (615) 371 - 2204

Date: 01/21/2020

Job #: 19182

COPIES	DATE	DESCRIPTION	FOR YOUR USE	AS REQUESTED	FOR REVIEW & COMMENT
3	01/21/2020	R-2 Zoning Exhibit – 24x36 Plans			X
3	01/21/2020	(3x) Preliminary Plans – 24x36 Plans			X
1	01/21/2020	(1x) Preliminary Plans – Electronic CD			X
1	01/21/2020	(1x) Comment Response Letter	X		
1	01/21/2020	(1x) Preliminary Drainage Calculations		X	
1	01/21/2020	(1x) USPS Approval Letter		X	
Remarks:					

Please contact the office at (615) 242-0040 with any questions or concerns.

From: Brett Beeler, E.I.T.



January 21, 2020

Jeff Dobson
Planning and Codes Director
City of Brentwood
5211 Maryland Way
Brentwood, TN 37027

RE: Allen Property Preliminary Plan Resubmittal Comment Response

Jeff,

Please see the following pages for the comment responses for the Allen Property Preliminary Plan Resubmittal. The previous submittal was on January 3, 2020. All comments given were addressed. Please let us know if you have any further questions or comments.

Sincerely,

Brett Beeler, EIT

1. The open space calculations show a total of 18 lots can be achieved on this proposal. The plan shows 19. The proposal does not meet the requirements of the Code.

Now showing 18 total lots.

2. On the R-2 Plan -- Lots 7, 9, 10, 11, 12, 13 & 14 are encumbered by the slopes in excess of 15% and must be designated as Hillside Protection Lots. Increase their area to three acres, minimum, or remove all slopes in excess of 15% from their area.

Lots 7, 9, and 10's slopes in excess of 15% are a byproduct of private development and not natural. I.e. basketball court, driveway, farm pond. They would not be considered Hillside Protected Lots.

Lots 11, 12, 13, and 14's slopes have been removed from their area and are now located in open space.

3. On the R-2 Plan – Lot 19 does not meet the minimum area requirement for the R-2 District – 43,539.

Lot 19 adjusted to meet the minimum area requirement

4. Add a legend to the R-2 plan defining the various shading patterns. Also add a location map to the plan.

Slope Legend Provided

5. Verify that the detention areas as shown on the R-2 plan are sufficient to provide proper drainage for the lots.

Verified. Detention areas were compared between the R-2 and the OSRD.

6. How might the 6+ acre tract develop without a stub street connecting the property to the rest of the development? Add a stub to the property line from Borrow Lane.

Still under consideration.

7. Verify that the proposed street name of Borrow Lane has been approved by the Williamson County Office of Emergency Management.

Borrow Lane was verified by the Glen Abbey Plat.

8. Move the entrance road on Split Log Road to the east slightly to align with Ivy Crest Drive. Provide a three-lane section on Borrow Lane at the intersection. This will provide better visibility for vehicles exiting Taramore.

Entranced adjusted to be more aligned with Ivy Crest Drive. Sidewalks tightened to back of curb as a part of this effort to minimize impacts to environmental features.

9. Provide a location for the Cluster Box Units (CBU's), inside the subdivision as required by the USPS. Provide their approval of the location of the CBU's. This approval must be received before the plan can be presented to the Board of Commissioners for their review on First Reading.

See revised sheet C1.00 for approved location of the CBUs. Approved Mode of Delivery Agreement with signatures is included with this resubmittal.

10. Consider a median location at the entrance for the required CBU's with pull-off.
12' median now shown at the proposed entrance. CBU will be placed within the development.

11. Show the sight distance triangles at the intersection of Split Log Road and Borrow Lane.
Intersection sight distance exhibit and calculations are now provided as apart of the preliminary calculation report.

12. Designate the area south of Lot 1 and 18, outside of the proposed drainage improvements in the area as a "Scenic Easement," per Section 78-186. The area should extend along the creek through the arterial road buffer. This requirement is intended to protect the stream and wetlands in the area.

Environmental area now shaded and labelled on plans as "Scenic Easement"

13. Designate Lot 19 as a Hillside Protection lot on the OSRD Development Plan.
Slopes greater than 15% above 850' in elevation are a byproduct of private development and not natural. The ~6 acre lot would not be considered a Hillside Protection Lot.

14. Since the 6+ acre lot is included as part of the subdivision, the arterial road buffer must extend across the frontage of this lot.

Arterial Road Buffer now extended along the frontage of Lot 19.

15. A total of 437 plantings (existing & proposed) are required in the arterial road buffer, based on its approximate length of 970 feet along the frontage. This number includes the frontage across Lot 19. The tree calculations are based on caliper inches on the plan. The Code is based on the number of trees provided. Revise the plan to provide a table showing the number of trees existing and provided in the buffer area. Refer to Section 78-512 of the zoning ordinance. Provide additional notes on the plan indicating if the developer proposes to relocate some of the required buffer plantings to other sections of the subdivision (78-512(5)c). This data must be provided before the plan may be presented to the Boards of Commissioners on First Reading. Areas B-1 thru B-8 provide a total of 140 new plantings.

See revised sheet L1.02. An Arterial Roadway Buffer Calculations chart has been provided detailing the total trees required and provided. A note has been added stating, "To remain consistent with the adjoining Glen Abbey, the developer proposes to relocate 70 of the required buffer plantings in the planting strip between the curb and sidewalk along the street."

16. A total of 74 street trees are proposed.

See revised sheet L1.01. 70 Street trees are proposed to supplement to remainder of the required Arterial Road Buffer plantings. A note has been added to sheet L1.02 stating this request.

17. Provide additional information regarding the 6+ acre tract. Verify if Turnberry have the right of first refusal if the Allen's decide to sell.

No right of first refusal.

18. Verify that the area along the frontage of Split Log Road is sufficiently flat enough to install a six foot wide sidewalk and two foot wide green space in back of the curb across the frontage of the property along Split Lot Road. Show the sidewalk on the plan.

Six foot wide sidewalk and two foot wide green space now shown along Split Log Road.

19. Provide public utility and drainage easements (PUDE) along all lot lines.

P.U.D.E's now provided on typical lot depiction. See Sheet C1.00.

20. Label Split Log Road as an arterial street.

Split Log Road now labelled an arterial street.

21. Reprint the plan at a more usable scale – 1" = 100'. Use a larger sheet size if necessary.

Sheets resized to be 1" = 100'.

22. Add a street cross section to the plan

See Detail Series C4.00 for Street cross section.

23. Provide preliminary drainage calculations.

Preliminary drainage calculations are now provided.

24. Indicate if entrance features will be included as part of the development of the project. Provide details.

See sheet C4.01 for Entrance Wall Details.

25. As part of the review and approval of the preliminary plan, horizontal curve data and a vertical profile for Borrow Lane will need to be provided for construction plan submittal meeting City of Brentwood Subdivision Regulation requirements.

Horizontal and Vertical information for Borrow Lane now provided. See C1.00 for horizontal and C3.00 for vertical.



**MODE OF DELIVERY AGREEMENT
TENNESSEE DISTRICT**

Brentwood
37027

NAME OF PROJECT The Allen Property
ADDRESS OF PROJECT 9520 Split Log Rd DATE _____
POST OFFICE/ZIP CODE Brentwood 37027 PROPOSED ROUTE # _____
This Project is: NEW CONSTRUCTION ☒ RENOVATION ☐ (If renovation, please complete conversion request)
Estimated 1st Occupancy Date: _____ 10% Occupancy: _____ Completion: _____
Delivery options will be explained by USPS representative (options shown in gray below).

Type of Project	Deliveries	Equipment-Type / #	EQUIPMENT OPTIONS
Office Bldg. (___ Floors)	_____	_____	CBU Type I (8 Del)
Shopping Mall	_____	_____	CBU Type II (12 Del)
Strip Mall	_____	_____	CBU Type III (16 Del)
Apts./Condos (___ Floors)	_____	_____	CBU Type IV (13 Del)
Townhouses	_____	_____	CBU Type V (18 Del)
Single Family Homes	<u>18</u>	<u>(1) CBU TYPE V</u>	CBU Type VI (20 Del)
Trailer Park	_____	_____	Curb line 2 or 4 post
Other (Specify)	_____	_____	Wall mount STD 4C

DEVELOPER / CONTRACTOR / OWNER RESPONSIBILITY IS AS FOLLOWS:

Location and installation of all receptacles must be approved by USPS representative

Concrete pads for CBU's are required to meet USPS specifications.

Concrete pads for CBU's are installed by: Developer ☒ other ☐

Equipment purchased by: Developer ☒ other ☐

Equipment installed by: Developer ☒ other ☐

Equipment owned/maintained by: Developer ☐ other ☐

Keys issued to residents by: Developer ☒ USPS ☐ other ☐

Locks changed by: Developer ☐ USPS ☒ other ☐

Residents of single-family homes must be informed of their ongoing responsibility for keys; box maintenance/repair, snow removal, etc.

Note: On multi-tenant delivery and/or rental situations, the building owner/manager is responsible for lock changes. Owner/manager will handle parcels and accountable? Yes ☐ No ☐

This notice will serve as an Agreement / Letter of Consent to the Postal Service for the placement of Centralized Delivery Equipment at the agreed upon location(s) indicated on the plat map. By signing below, I acknowledge that the contractor options and responsibilities outlined above for receiving mail delivery service have been discussed with me.

USPS REPRESENTATIVE

NAME: Sandy Alzman

TITLE: Growth Management Coordinator

SIGNATURE: [Signature]

TELEPHONE # (423) 562-3243

DATE: _____

PROPERTY DEVELOPER/MGR/OWNER

NAME: Nicky Wells, Trunkerry Homes

TITLE: President

SIGNATURE: [Signature]

TELEPHONE # 615.376.7001

DATE: 01.17.20

This agreement is subject to final approval by District Operations Programs Support. Submit completed agreement and other required attachments to the local Post Office to forward to the Growth Management, Operations Programs at the TN District Office

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Resolution 2020-12 - Adoption of the UAS Program Interdepartmental Assistance Policy

Submitted by: Holly Earls, Administration

Department: Legal

Information

Subject

Resolution 2020-12 - Adoption of the UAS Program Interdepartmental Assistance Policy

Background

As you are aware, the Brentwood Fire and Rescue Department (BFR) has recently instituted an Unmanned Aircraft Systems Program (UAS Program). The use of the City's UAS allows first responders to respond effectively while still maintaining a level of safety and security for the citizen. It provides cutting edge technology to assist first responders in situations including, but not limited to, search and rescue, flooding, hazardous materials monitoring, structural and wildland interface fire assessment, railroad incidents, and damage assessment. A departmental General Operating Guideline (attached) was developed to provide criteria for the use of the UAS by BFR, and the UAS Program has been very successful thus far.

There have been other instances lately where it became evident that the use of the City's UAS would be beneficial to other departments in the City. However, there were no clear guidelines as to when and how the UAS would be used. Therefore, staff from several departments met to develop a policy to provide guidance to ensure that all relevant federal, state, and local guidelines would be followed and that the City would be adequately covered from a liability standpoint when assistance is provided to other departments.

Highlights of the proposed policy include the following:

- The UAS Program Manager (currently Lieutenant Jay Williams) must review and approve all UAS use requests.
- A written flight plan describing the area(s) and route(s) where the UAS will be flown will be required.
- The UAS may only be used for City purposes as provided by state law, which includes emergency operations and preparation, marketing, and the creation of City maps.
- Except as allowable by law, the City's UAS shall not be used for intentionally capturing images of private property without consent of the property owner or conducting any type of surveillance on private property, including surveillance for

police or code enforcement purposes.

- The UAS shall be controlled from public property except where express written consent has been obtained by a private property owner.
- The UAS will not be flown in adverse weather conditions unless such flight is deployed to survey such conditions.
- All reasonable attempts will be made to avoid recording of footage from private property, particularly enclosed property unless the property owner's permission has been previously obtained.

As with all BFR UAS flights, any flight for another City department will comply with all applicable guidelines set forth by the Federal Aviation Administration (FAA).

If you have any questions, please contact the Fire Chief or City Attorney.

Staff Recommendation

Staff recommends approval of Resolution 2020-12.

Fiscal Impact

Attachments

Resolution 2020-12

UAS Program Interdepartmental Assistance Policy

BFR UAS General Operating Guideline

RESOLUTION 2020-12

**A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE TO ESTABLISH A
POLICY FOR THE BRENTWOOD FIRE AND RESCUE DEPARTMENT'S
UNMANNED AIRCRAFT SYSTEMS (UAS) PROGRAM TO PROVIDE ASSISTANCE
TO OTHER CITY DEPARTMENTS**

WHEREAS, the Brentwood Fire and Rescue Department has instituted an Unmanned Aircraft Systems Program (UAS Program); and

WHEREAS, it has become apparent that the UAS Program would be beneficial for other uses among various City departments; and

WHEREAS, City staff has developed the UAS Program Interdepartmental Assistance Policy to provide operational guidelines and safety procedures for the UAS Program to provide assistance for other City departments to ensure full compliance with federal, state, and local regulations.

BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the UAS Program Interdepartmental Assistance Policy, attached hereto as Attachment A, is hereby adopted.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR Rhea E. Little, III

ADOPTED: _____

Approved as to form:

RECORDER Holly Earls

CITY ATTORNEY Kristen L. Corn

UAS Program Interdepartmental Assistance Policy

Purpose

This policy establishes operational guidelines and safety procedures for the Brentwood Fire and Rescue Department's (BFR's) Unmanned Aircraft Systems (UAS) program to provide assistance to other City departments. This policy provides criteria of flight and filming parameters.

Eligibility

The BFR's UAS may only be used for City purposes as provided for and allowable by state law, including, but not limited to emergency operations and preparation, information and marketing, and the creation of City maps. Except as allowable by law, the City's UAS shall not be used for intentionally capturing images of private property without consent of the property owner or conducting any type of surveillance on private property, including surveillance for police or code enforcement purposes.

The UAS Program Manager ("Program Manager"), or his/her designee, shall have responsibility to review UAS use requests and to approve such requests. UAS operations should only be performed by authorized BFR employees, age 18 years old or older and only for gathering footage relevant to and for City purposes.

Scheduling

UAS flights at public events will be properly communicated with event coordinators in advance of the event. All flights and flight locations relating to public events will be scheduled with the Program Manager in advance of the operation.

UAS flights relating to mapping will be scheduled with the Technology Department Director, or designee, in advance of the flight.

Guidelines and Safety Procedures

The UAS operator will practice discretion, respect, and privacy when filming throughout the City. Safe use is the primary priority and any use of the UAS must be approved in advance by the appropriate Director.

All flights must meet the following guidelines and safety procedures unless an exemption is granted by FAA:

1. All FAA standards, as may be amended from time to time, shall be followed.
2. The UAS must stay below 400 feet AGL and remain a safe distance from any surrounding obstacles when possible.
3. UAS must always remain in line-of-sight of the operator while in use.
4. UAS shall be controlled from public property, except where express written consent to operate is provided by all legal interest holders in private property.

5. All reasonable attempts will be made to avoid recording of footage from private property, particularly enclosed property (backyards, storage areas, behind private fences, etc.) unless the property owner's permission has been previously obtained.
6. UAS shall not be flown over crowds unless approved through City Administration. UAS shall always be flown with due regard to the safety of surrounding people and property.
7. UAS shall not be flown in adverse weather conditions, unless such flight is deployed to survey the weather conditions, perform emergency operations or reconnaissance and has been approved by the Fire Chief or his designee.
8. UAS will only be flown by BFR personnel who have appropriate FAA licensure and have been trained on the UAS's use.
9. Two people must always be involved with the use of the UAS that is operated in emergency situations. One person shall act as a visual observer and the other shall act as a remote pilot in command. A UAS flight predetermined by a map and GPS coordinates may be flown with only one operator.
10. The operator must follow community-based safety guidelines as prescribed by organizations including, but not limited to, the Academy of Model Aeronautics, AUVSI and Small UAS Coalition.
11. The Department Director or designee, in conjunction with the City Attorney when appropriate, shall review all footage that is kept ensuring that no images have been captured in violation of state law. If there are such images, the footage shall be deleted or otherwise removed from equipment and other stored media as provided by law.
12. UAS must remain clear of and not interfere with manned aircraft operations. The operator must always follow "see and avoid" criteria.
13. The operator shall hold a current FAA 107 certification.

Safety Procedures

The UAS Program Director will evaluate and approve all UAS assistance requests based on this policy. A written flight plan describing the area(s) and route(s) where the UAS will be flown will be requested prior to approval.

Adopted by Resolution 2020-12
Effective date _____

Brentwood Fire & Rescue Department – General Operating Guidelines		
SUBJECT: UAS (Unmanned Aerial System) Operations		Number: 247
Draft Date: 10-23-2018	Comment Date:	Revision Date: 09-16-2019
Effective Date: 12-15-2019	Review Date:	Page: 1 of 8

SCOPE

This guideline applies to all members and operators assigned to the Brentwood Fire & Rescue UAS team.

PURPOSE

The purpose of this guideline is to establish protocols for the deployment, operation, and safety of all activities involving UAS operation inside as well as outside city limits.

DEFINITIONS

UAS/UAV - (hereafter referred to as UAS) are Unmanned aircraft systems and all associated support equipment, control station, data links, telemetry, communications, navigation equipment, etc., necessary to operate the unmanned aircraft as defined by the Federal Aviation Administration (FAA). For the purposes of this policy, "UAS" will encompass all unmanned aircraft systems operated by the participating departments or agencies.

The Brentwood Fire and Rescue Department (BFR UAS Team) – Appointed personnel made up of individuals who operate under FAA Part 107 and the Certificate of Authorization granted by the FAA.

Remote Pilot in Command (RPIC) - The individual in control of the UAS. He/she is in complete control and will fly at all times in a safe manner.

Visual Observer (VO) - The individual that with standard vision unaided will watch out for foreign objects, manned aircraft, powerlines, or unforeseen obstacles.

Forward Person View (FPV) - An individual specifically operating the cameras on the UAS. This person does not have control of the aerial device but may have control of a spotlight or illumination device used to locate victims.

UAS Module Leader - Typically a higher ranking officer (Battalion Chief). This position leads a group of remote pilots on an incident and provides a single point of contact for UAS operations to incident leadership. A typical UAS module consists of RPIC, VO, and FPV. The UAS module leader or his/her designee, represents the Brentwood Fire & Rescue Department and is responsible for the administration and on-scene supervisory functions related to the BFR UAS team. The UAS Module leader is also responsible for coordinating with the Air Tactical Group Supervisor to ensure that the UAS operations are not in conflict with manned flight operations. This position is typically filled on large scale incidents involving "charlie package" EMAC deployments.

Jurisdiction - A range or sphere of authority. Public agencies have jurisdiction at an incident related to their legal responsibilities and authority. Jurisdictional authority at an incident can be political or geographical (e.g., city, county, State, or Federal boundary lines) or functional (e.g., law enforcement, public health).

EMAC - Emergency management assistance compact. EMAC offers assistance during governor-declared states of emergency or disaster through a responsive, straightforward system that allows states to send personnel, equipment, and commodities to assist with response and recovery efforts in other states.

Jurisdictional Agency - The agency having jurisdiction and responsibility for a specific geographical area, or a mandated function.

Brentwood Fire & Rescue Department – General Operating Guidelines		
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Information - Refers to digital imagery (may include data in other mediums) recorded or transmitted by a UAS. This digital imagery may include data about people, organizations, events, incidents, or objects.

Law - Includes any applicable local, state, or federal statute, ordinance, regulation, executive order, policy, or court rule, decision, or order, as construed by the appropriate officials or agencies.

Public – Includes:

- 1) Any person and any for-profit or nonprofit entity, organization, or association;
- 2) Any governmental entity for which there is no existing specific law authorizing access to this information;
- 3) Media organizations; and
- 4) Entities that seek, receive, or disseminate information for whatever reason, regardless of whether it is done with the intent of making a profit, and without distinction as to the nature or intent of those requesting information from the BFR.

Public – Does *not* include:

- 1) People or entities, private or governmental, who have legal authority to assist in emergency operations requested by an Authority Having Jurisdiction (AHJ) during an emergency or disaster event, and
- 2) Public agencies whose authority to access information gathered and retained by the BFR UAS team is specified in law.

Digital Electronic Management System (DEMS) - A content management system (CMS) that centrally stores and manages all digital files. It allows an organization to control and centralize management of digital content or data.

Memory Card - Sometimes called a *flash memory card* or a *storage card*, a memory card is a small storage medium used to store data such as text, pictures, audio, and video for use on small, portable, or remote computing devices.

External Hard Drive - A portable storage device that can be attached to a computer through a USB or FireWire connection, or wirelessly. External hard drives typically have high storage capacities and are often used to back up computers or serve as a network drive.

Hard Drive - A high-capacity, self-contained storage device containing a read-write mechanism plus one or more hard disks, inside a sealed unit.

Cloud Drive - A term used to describe an online storage solution utilized by the city of Brentwood. It can also be described as the “OneDrive” or “icloud”.

Digital Image - A numeric representation (normally binary) of a two-dimensional image. Depending on whether the image resolution is fixed, it may be of vector or raster type. By itself, the term “digital image” usually refers to raster images or bitmapped images.

Brentwood Fire & Rescue Department – General Operating Guidelines		
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RESPONSIBILITIES

UAS Team Members WILL:

- 1) Hold and maintain a current and valid Part 107 license granted by the FAA.
- 2) Maintain flight ready status only as long as they are employed by BFR.
- 3) Ensure that all UAS emergency flights will maintain a RPIC and a VO at a minimum.
- 4) Log every flight with mission critical info such as request for service, location, weather conditions, operator name, flight time and maximum altitude attained in AGL.
- 5) Record and store all records and logs on a cloud platform.
- 6) Wear reflective vests designating their involvement with the BFR UAS team when operating in public.
- 7) Perform and maintain a record of at least 3 complete take off and landings every 90 days.
- 8) Participate and log a minimum of 4 hours of UAS training every month.
- 9) NOT return to work and operate any UAS equipment if:
 - a. Alcohol has been consumed in the preceding 8 hours.
 - b. With a blood alcohol level of .04 or greater.
 - c. Over the counter medications with possible inhibiting effects have been ingested in the preceding 12 hours.

PROCEDURE

Operations

- Battery levels and firmware will be checked every Sunday by BFR UAS team members.
- Maintenance and system checks will be performed on every aerial vehicle on the 15th of every month by UAS team members per manufacturer guidelines.
- All flights surrounding towers with guidewires will maintain a 2000' clearance around structure.
- All flights will maintain a clearance of 500ft vertically from visible cloud structure and a 2000ft clearance horizontally from visible cloud structure.
- All plastic blades on quadcopters will be replaced every six months.

UAS position utilization and hierarchy (ICS Structure) under deployment packages

- "Alpha -A" Package - Low complexity requirement such as situational awareness, small scale acre/perimeter calculation, simple photo and video capture in a non-emergent setting. This situation can typically be handled by a RPIC with or without a VO. No further supervision should be needed.
- "Bravo -B" Package - Moderate complexity requirements supporting small incidents (single structure fire, SAR, disaster assessment, hazmat response). This situation will typically be handled by a RPIC, VO, and/or a FPV operator and will act under the direction of the on-scene incident commander.
- "Charlie-C" Package - High complexity data product requirement supporting large scale incidents such as large area multi-agency search and rescue, multi-agency hazmat response, or multi-agency EMAC deployment. This situation will typically be handled by RPIC, VO, FPV operator, and a BFR Battalion Chief serving in the role of Module Leader. This package will typically act under the direction of a strike team leader, TEMA representative, or incident management team via the UAS Module leader.

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Documentation and Storage of Electronic Data

- Equipment check and weather (pre-flight check list) will be noted and documented prior to all UAS operations.
- After each flight, the operator shall be able to provide documentation of UAS operations and relative conditions via data entered into cloud storage software.
- The RPIC is responsible for electronic data handling as well as writing any supporting documentation for the incident.
- Digital imagery may be temporarily stored on or accessed via a BFR UAS member's hard drive or external hard drive to meet an operational need. Once the electronic data is no longer needed, the BFR UAS member must remove the images from the hard drive or external hard drive system and deliver them to the BFR UAS DEMS for storage.
- Members will not store, transfer, or utilize electronic images and digital imageries for personal use.

BFR UAS Data Retention Procedure for Training or Non-Emergency Operations:

- After the completion of training or non-deployment flight operations, the BFR UAS member is responsible for the storage and disposal of any data imagery collected.
- All digital imagery shall be stored in accordance with the member department's policy and procedures.
- Members will not store, transfer, or utilize electronic images and digital imageries for personal use.

BFR UAS Data Retention Procedure for Emergency Operations:

- All data obtained during emergency operations will be deleted within 90 days of collection from the incident date unless otherwise needed for training purposes.
- After the completion of on-scene flight operations, the BFR UAS member is responsible for providing data imagery to the jurisdictional agency, requesting organization, and or the incident commander and or his or her designee.
- The BFR UAS member will document to whom the data imagery was submitted via the "UAS Data Log Form" found on the currently used city cloud drive.
- Following transfer of data, the empty memory card will then be returned to the BFR UAS member and placed by that member back in the BFR UAS team's memory cache for future use.
- If the digital imagery is related to an investigation, the BFR UAS member will ensure chain of custody by following procedures related to the requesting jurisdictional agency.

BFR UAS Data Retention Procedure for Training or Non-Deployment Operations:

- After the completion of on-scene training or non-deployment flight operations, the BFR UAS member is responsible for the storage and disposal of any data imagery collected.
- All digital imagery shall be stored in accordance with the member department's policy and procedures.
- Members will not store, transfer, or utilize electronic images and digital imageries for personal use.

Brentwood Fire & Rescue Department – General Operating Guidelines

SUBJECT: UAS (Unmanned Aerial System)
Operations

Number: 247

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Revision Date: 09-16-2019

Effective Date: 12-15-2019

Review Date:

Page: 5 of 8

FLIGHT CHECKLIST

PRE FLIGHT



DURING FLIGHT



POST FLIGHT

At office

- ☐ Aircraft Documentation
- ☐ NOTAM
- ☐ Local regulations and permissions.
- ☐ Proximity to the airport.
- ☐ Weather condition permits flying.
- ☐ All Batteries Charged
- ☐ Flight Gear check

In the field

- ☐ Scan area for obstacles, e.g. take-off and landing area.
- ☐ Wind check
- ☐ Daily Flight Report filled.
- ☐ Assemble UAV, ensure screws are tight and propeller check
- ☐ Sensor/ Camera setting check
- ☐ Batteries securely mounted
- ☐ Ensure GPS fix
- ☐ Confirm Mission flight plan
- ☐ Operators checklist (Integrated)
- ☐ RC remote check (if used)
- ☐ Final airframe inspection
- ☐ Flight Crew briefings, e.g. flight mission and safety
- ☐ Wind check again for launch.

After launch

- ☐ Aircraft reached safe altitude.
- ☐ Confirm observer has the aircraft in sight.
- ☐ All systems green
- ☐ Satellite and GPS check
- ☐ Check Battery remaining

Before Landing

- ☐ Ensure UAV flight done according to mission plan.
- ☐ Scan landing area for obstacles.
- ☐ Wind check
- ☐ Observer briefing for landing
- ☐ All systems green

After landing

- ☐ Power down UAV
- ☐ Remove and safely store batteries
- ☐ Airframe inspection
- ☐ Check camera/ sensor to ensure data collected
- ☐ Transfer data and flight log
- ☐ Make logbook entry

Back at office

- ☐ Flight and Maintenance Report
- ☐ Charge Batteries
- ☐ SD card cleaned and ready to use
- ☐ Airframe checked
- ☐ Data processed

Brentwood Fire & Rescue Department – General Operating Guidelines		
SUBJECT: UAS (Unmanned Aerial System) Operations		Number: 247
Draft Date: 10-23-2018	Comment Date:	Revision Date: 09-16-2019
Effective Date: 12-15-2019	Review Date:	Page: 6 of 8

Aircraft Hand Signals

Move Forward



Move Rearward



Move Left



Move Right



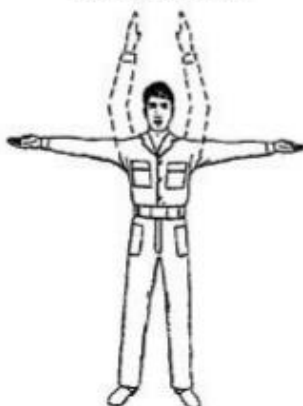
Stop



All Clear



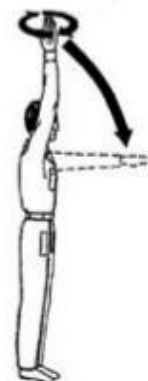
Move Upward



Move Downward



Clear to Take-off



(EdgeData, 2016)

Brentwood Fire & Rescue Department – General Operating Guidelines

SUBJECT: UAS (Unmanned Aerial System)
Operations

Number: 247

Draft Date: 10-23-2018

Comment Date:

Revision Date: 09-16-2019

Effective Date: 12-15-2019

Review Date:

Page: 7 of 8

Contingency Plan Checklist

Event	Result	Procedure
Battery Depletes	Unmanned aerial system (UAS) incapable of continuing flight operations	UAS return to base (RTB) as soon as practical; cease data collection
Ditch Procedures	UAS incapable of continuing flight operations	Identify safe landing area; attempt a controlled landing; if able, land UAS in water (shallow preferred for ease of recovery) away from public
Fuel Depletes	UAS incapable of continuing flight operations	UAS RTB as soon as practical; cease data collection
Hazardous Weather	UAS incapable of continuing flight operations	UAS RTB as soon as practical; cease data collection
Hostile Environment	Mission impacted by hazard (e.g. air traffic, public activity)	See and avoid; take evasive action as required with safety taking precedence; UAS RTB as soon as practical
Loss of Communications	Mission impacted by lack of communications hazard	Maintain visual line of sight (VLOS); take evasive action as required with safety taking precedence; UAS RTB as soon as practical
Loss of Control Signal	UAS not controllable	Maintain VLOS; UAS RTB and land without harm to UAS or contacting surrounding objects
Loss of Direct Visual	UAS could become hazard if unable to regain visual control	Regain direct visual of UAS; contact mission payload operator and/or visual observer to determine status

Event	Result	Procedure
Loss of GPS Signal	Use extreme caution as the positional data for the UAS will not be accurate	Assume manual control of the UAS; Maneuver and climb UAS to reacquire GPS signal; if GPS signal cannot be acquired, determine whether safe UAS control can be maintained; if safe flight cannot be maintained, land as soon as possible
Loss of Situational Awareness (SA)	UAS could become hazard if unable to regain SA	Climb to safe altitude; reorient with use of sensors; RTB as required
Privacy Impact	Possible public complaint	Cease data collection; after RTB, complete an assessment
UAS Failure	UAS incapable of continuing flight operations	Maintain VLOS; UAS RTB as soon as practical

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Res 2020-04 - Authorizing Acquisition of Land and Easements for the Brentwood Pump Station Storage Facility Project

Submitted by: Chris Milton, Water & Sewer

Department: Water & Sewer

Information

Subject

Resolution 2020-14 - Authorizing Acquisition of Land and Easements for the Brentwood Pump Station Storage Facility Project

Background

The Water Services Department's Capital Improvements Program for FY2020-2025 includes the Brentwood/Metro Sewer Pumping Station Storage Facility construction project. The storage facility project includes the storage facility (tank) and related pumping and piping infrastructure proposed to be constructed adjacent to the Brentwood/Metro sewer pumping station located approximately ½ mile west of Hillsboro Road.

To successfully complete this project, the City will need to acquire land and permanent and construction easements from area property owners. Preliminary discussions have been ongoing with the land owners, but in order to begin more definitive discussion staff needs the Commission's approval. The owners have expressed interest in selling their 44-acre parcel that surrounds the existing pumping facility. There have also been discussions centered around the purchase of a few acres or the minimum needed for the planned facilities. The surrounding land is significantly encumbered by flood plain, TVA power lines, existing sewer lines from the City and Metro/Nashville and a large Harpeth Valley Utility District water line.

In order for staff to acquire the property needed for this proposed construction project, staff is requesting authorization for the Mayor, City Manager, and City Attorney to move forward with negotiations for the acquisition of land and easements. This could include condemnation of property should a non-amicable resolution result. Without authorization to use the right of condemnation as an ultimate last option, it is possible the City will be unable to meet its Corrective Action Plan obligations to have the tank completed and operational by the end of calendar year 2022.

Attached are a site map and utility map of the property.

Please contact Chris Milton, Director of Water Services should you have any questions.

Staff Recommendation

Staff recommends approval.

Previous Commission Action

This project is included in CIP approved by the Commission.

Fiscal Impact

Amount :

Source of Funds: Water & Sewer Funds

Account Number: 412-16700-8056

Fiscal Impact:

The appraisal for the entire 44.4 acres is \$1.11M.

Attachments

Resolution 2020-14

Property Map

Site Map

RESOLUTION 2020-14

**A RESOLUTION OF THE CITY OF BRENTWOOD, TENNESSEE AUTHORIZING THE
MAYOR, CITY MANAGER AND CITY ATTORNEY FOR THE CITY OF BRENTWOOD
TO NEGOTIATE FOR, OR TO INSTITUTE EMINENT DOMAIN PROCEEDINGS
AND/OR TO INSTITUTE OR INTERVENE IN ANY OTHER NECESSARY LEGAL
ACTIONS FOR THE ACQUISITION OF LAND AND EASEMENTS NECESSARY FOR
THE BRENTWOOD PUMP STATION STORAGE FACILITY PROJECT**

WHEREAS, construction of a sewer pumping station storage facility along with the related pumping and piping infrastructure is planned adjacent to the Brentwood/Metro sewer pumping station located approximately ½ mile west of Hillsboro Road; and

WHEREAS, such improvements are necessary to the health, safety and welfare of area residents; and

WHEREAS, the City of Brentwood, under its charter, has the legal authority to condemn property, real or personal, or any easement or interest therein, whether within or without the City, for present or future public use, and the conditions may require the City of Brentwood to exercise this legal right.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY OF BRENTWOOD, TENNESSEE, AS FOLLOWS:

SECTION 1. That the Mayor, City Manager and City Attorney for the City of Brentwood are hereby authorized to negotiate for, or to institute eminent domain proceedings and/or to institute or intervene in any other necessary legal actions for the acquisition of land and easements necessary for the Brentwood pump station storage facility project.

SECTION 2. That this resolution shall take effect from and after its passage, the general welfare of the City of Brentwood, Williamson County, Tennessee requiring it.

MAYOR

Rhea E. Little, III

ADOPTED: _____

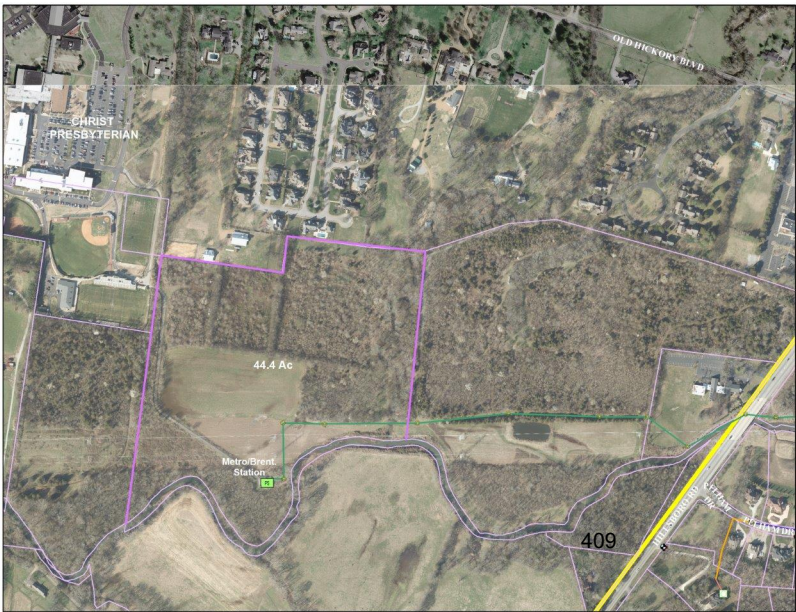
Approved as to form:

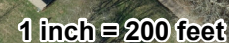
RECORDER

Holly Earls

CITY ATTORNEY

Kristen L. Corn





BRENTWOOD SEWER LIFT STATION

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Appointment of Four (4) Members to the Historic Commission

Submitted by: Holly Earls, Administration

Department: Administration

Information

Subject

Appointment of four (4) members to the Historic Commission

Background

At the February 10, 2020 meeting, the City Commission is scheduled to appoint a total of four (4) members to the Historic Commission. Applicants must be residents of the City of Brentwood. The appointees will serve three (3) year terms expiring on February 28, 2023.

Notice of the upcoming appointments and process/deadlines for applications were published in the Tennessean's Williamson section and posted on the City's website (www.brentwoodtn.gov) and on the Brentwood City Government Cable Channel (BTV).

The interested persons are:

1. Kim Coggin
2. Anne Goad
3. Sherry Hammond
4. Ashley McAnulty
5. Jennifer Moran
6. Tara Volpintesta

The applications are attached.

Staff Recommendation

n/a

Fiscal Impact

Attachments

Applications

From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Tuesday, January 7, 2020 10:38:41 AM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/07/2020 10:38 AM
Response #: 164
Submitter ID: 17066
IP address: 4.14.92.186
Time to complete: 8 min. , 58 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Kim Coggin

Spouse's name (if applicable)?

NA

Address:

7099 Willowick Dr.

Phone Number:

615-604-2953

Email address:

kim.coggin@comcast.net

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Frazier & Deeter

Job Title

Market Leader-Growth & Strategic Initiatives

Spouse's Current Employer or Former Employer if Retired:

NA

Spouse's Job Title:

NA

How many years have you lived in Brentwood?

12

Please provide a detailed description of your community involvement below:

Leadership Brentwood Class of 2017

Parent of 3 - 2 at BHS (band and baseball active parent) and one graduated BHS last year

Member of Willowick HOA

Current member Brentwood Historic Commission

I

Please provide a brief summary of why you would like to serve on this board:

After going through Leadership Brentwood, I was so amazed at the history of Brentwood! My friends are busy parents, working full-time and I shared the stories I learned with them. I joined the Board to continue to learn the history, be active in documenting the history and to tell more stories.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

Not applicable

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

This is an automated message generated by the Vision Content Management System™. Please do not reply directly to this email.

From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Sunday, November 17, 2019 3:02:44 PM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 11/17/2019 3:02 PM
Response #: 154
Submitter ID: 15648
IP address: 2601:484:c201:8240:3464:c569:3aa5:da4c
Time to complete: 19 min. , 4 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Anne Goad

Spouse's name (if applicable)?

Jerry Goad

Address:

1421 Bowman Lane

Phone Number:

615-373-9533

Email address:

algart9533@bellsouth.net

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Lupus Foundation Mid-South Chapter

Job Title

Patient Educator

Spouse's Current Employer or Former Employer if Retired:

retired

Spouse's Job Title:

retired

How many years have you lived in Brentwood?

since 1983--also lived in Brentwood from 1973-1976

Please provide a detailed description of your community involvement below:

Member of Leadership Class of 1998
Leadership Alumni Board 1999
Member of Historic Commission 20+ years--Current Chair of Board
Bi-Centennial Committee
All volunteer activities of the Historic Commission
Production of the original "Historic Brentwood" video

Please provide a brief summary of why you would like to serve on this board:

1421 Bowman Lane
I wish to continue the activities I have participated in with the board , especially raising awareness of Brentwood's heritage from the original settlers and those who have followed in creating one of the most outstanding communities in Tennessee.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

NO

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

When the "new library" was opened (1999?), I was in the art business. I inventoried the available artwork

that the library owned and hung the paintings throughout the library space.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

NO

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Monday, January 6, 2020 3:17:51 PM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/06/2020 3:17 PM
Response #: 163
Submitter ID: 17058
IP address: 76.122.248.20
Time to complete: 55 min. , 38 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Sherry Hammond

Spouse's name (if applicable)?

Art Hammond

Address:

1089 Hamer Ct.

Phone Number:

6157761438

Email address:

sherryhammond@comcast.net

Employment Status:

(o) Retired

Current Employer or Former Employer if Retired

Lupus Foundation of America, Mid-South Chapter

Job Title

CEO

Spouse's Current Employer or Former Employer if Retired:

Cumberland Swan

Spouse's Job Title:

CFO

How many years have you lived in Brentwood?

29 years

Please provide a detailed description of your community involvement below:

Since becoming a Brentwood Resident, I have been involved in the community. I was a member of the Brentwood Woman's Club for over 10 years and was President for 6 years where I was instrumental in overseeing many projects and supporting many charities in Williamson County. One that stands out is I was chair of "Celebrate Brentwood", a community involved weekend at Crocket Park complete with food vendors, fun games, music and children's activities.

Even before being selected as an Historic Commission Board Member, I was involved in the historic events. I was a participant and chair of "A Day in Brentwood's Past" held in Granny White Park for many years. I was the Patron's Party Co-chair for the Brentwood Home Tour that raised money for the historic projects and Boiling Spring Academy purchase. I participated as a docent for the Home Tour as well. For several years I was selected for the Sister Cities Board and ultimately the chair. This was a wonderful opportunity for High School students to experience a student exchange to Brentwood England to broaden their educational and cultural experience and to host Brentwood England students to Brentwood Tennessee.

I was a Board Member of the Lupus Foundation of America, Mid-South Chapter and ultimately the chair before being hired as the CEO, where I worked for 15 years. Before I was a board member, I was the volunteer coordinator for the golf tournament that raised over \$100,000 annually.

I am now a board member and Secretary of St. Sampson Medical Clinic which is a free Rheumatology Clinic for those without insurance serving the entire state of TN. I helped with the founding of this all volunteer clinic in 2010 and am especially proud of the work helping those to be able to return to work and to live a better quality of life.

Please provide a brief summary of why you would like to serve on this board:

I am very interested in preserving and telling the story of Brentwood's history. This is a wonderful city that we all have the privilege in which to live, work, raise a family, play, and enjoy. But, it is also important to remember those who came before us and how they shaped our city. We have a rich history and those who live here, many from other states don't really know our history. I am proud to be a small part of telling the

history to others.

I have enjoyed my involvement as a Brentwood Historic Commission board member and have worked on many projects that have been important to preserving Brentwood history. One especially that is dear to my heart is working with Linda Lynch and Ashley McAnulty in decorating and procuring furniture for Ravenswood Mansion and chairing the very successful "Rendezvous at Ravenswood" for the opening of the Mansion.

I am now Secretary of the Board, work with the Cache in on Brentwood, the geocache project that teaches Brentwood History through geocaching, but truthfully I work on just about every project in some small way that we provide to the community. I really love writing the weekly Facebook posts about Brentwood History. I enjoy researching and telling the stories of days gone by and hopefully educating our community about its history.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No, I am not.

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

No

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Monday, December 30, 2019 11:35:49 AM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 12/30/2019 11:35 AM
Response #: 157
Submitter ID: 16996
IP address: 204.110.198.10
Time to complete: 27 min. , 55 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Ashley McAnulty

Spouse's name (if applicable)?

Mary Catherine

Address:

8113 Warner Road

Phone Number:

615-347-8902

Email address:

cityofnote@aol.com

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Stephens Inc.

Job Title

Senior Vice President

Spouse's Current Employer or Former Employer if Retired:

Parks

Spouse's Job Title:

Office Manager

How many years have you lived in Brentwood?

40+ Years

Please provide a detailed description of your community involvement below:

Brentwood Historic Commission - Vice Chair

Historic Belmont Mansion Board - President

Andrew Jackson Foundation (former Hermitage Association) - Treasurer and Board Member

Jack C. Massey College of Business Accounting Advisory Board - Member

Brentwood United Methodist Church Foundation - Board Member

Tennessee Decorative Arts Symposium - Founder and Annual Participant

Education First Foundation - Former Board Member

Frist Center for the Visual Arts - Member

Cheekwood - Member

Please provide a brief summary of why you would like to serve on this board:

During my service on the Historic Commission Board, I have been involved in various initiatives that support the City's efforts to restore and make available many of the important historic structures located in Brentwood. Having assisted with the heightened recognition of the Boiling Springs Academy and Fewkes Mounds being listed on the National Historic Register with National Significance, coordinating the first Rendezvous at Ravenswood fundraiser to support Smith Park, assisting with the annual Brentwood History Bowl, writing articles for the Bugle newsletter, conducting live historic interviews (history of Brentwood Public Safety, local business history, historic sports organizations, and area craftsmen), I feel that many of these initiatives are important to the City and I would like to continue to work on these projects. My goal as a member of the Historic Commission Board would also be to work with fellow board members to implement the important initiatives of the Historic Commission on projects including additional educational programming, historic preservation, and other projects that benefit the City of Brentwood and its citizens.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

None that I am aware of.

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

None that I am aware of.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

None that I am aware of.

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Friday, January 3, 2020 4:02:32 PM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/03/2020 4:02 PM
Response #: 160
Submitter ID: 17034
IP address: 68.53.68.209
Time to complete: 11 min. , 20 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Jennifer Moran

Spouse's name (if applicable)?

Erick Shrauger

Address:

9904 Lodestone Dr

Phone Number:

6159394917

Email address:

jenmoran@aol.com

Employment Status:

(O) Homemaker

Current Employer or Former Employer if Retired

Not employed

Job Title

Not employed

Spouse's Current Employer or Former Employer if Retired:

AON

Spouse's Job Title:

VP of Health & Welfare Consulting

How many years have you lived in Brentwood?

13

Please provide a detailed description of your community involvement below:

Volunteer at Sunset Elementary, PTO Board member, Book Fair Chair, 5th grade graduation chair

HOA member, Concord Crossing subdivision

Volunteer at East Brentwood Presbyterian Pre-School, PTO member

Please provide a brief summary of why you would like to serve on this board:

As a huge history buff, I minored in History at Miami University, I would bring my love of learning and enthusiasm to supporting the board and increasing community involvement with Brentwood history and its many historic landmarks.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

No

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Wednesday, January 8, 2020 8:33:37 AM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/08/2020 8:33 AM
Response #: 168
Submitter ID: 17075
IP address: 199.116.174.176
Time to complete: 5 min. , 47 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Historic Commission

What is your name?

Tara Volpintesta

Spouse's name (if applicable)?

Bart Volpintesta

Address:

8105 Vaden Drive Brentwood, TN 37027

Phone Number:

6153900456

Email address:

tara.volpintesta@bcdtravel.com

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

BCD Travel

Job Title

Global Program Manager

Spouse's Current Employer or Former Employer if Retired:

BVTV Video Production

Spouse's Job Title:

CEO

How many years have you lived in Brentwood?

17

Please provide a detailed description of your community involvement below:

2018 Brentwood Police Citizen Academy

2019 Fire & Rescue Citizen Academy

Currently volunteer at Warner Park Nature Center

Currently volunteer for Senior Ride Nashville as a drive

Please provide a brief summary of why you would like to serve on this board:

I appreciate the hard work that has been done by this board to preserve what is truly precious to our community.

My desire is to serve on this board to help shine a light on the history of Brentwood, to educate and involve the community in our history.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No.

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there

been such a relationship with the City in the past? If so, please describe:

No.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

No.

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

This is an automated message generated by the Vision Content Management System™. Please do not reply directly to this email.

Brentwood City Commission Agenda

Meeting Date: 02/10/2020

Appointment of Four (4) Members to the Tree Board

Submitted by: Holly Earls, Administration

Department: Administration

Information

Subject

Appointment of four (4) members to the Tree Board

Background

At the February 10, 2020 meeting, the City Commission is scheduled to appoint four (4) members to the Tree Board. The appointees will serve two (2) year terms expiring February 28, 2022.

Applicants must be residents of the City of Brentwood. Notice of the upcoming appointments and process/deadlines for applications were published in the Tennessean's Williamson section and posted on-line on the City's web page (www.brentwoodtn.gov) and on the Brentwood City Government Cable Channel (BTV).

The interested persons are:

1. Dane Andersen
2. Jennifer Bourne
3. Brian Evans
4. Robbie Hayes
5. Lynn Tucker

The applications are attached.

Staff Recommendation

n/a

Fiscal Impact

Attachments

Applications

From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Tuesday, January 7, 2020 2:38:09 PM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/07/2020 2:38 PM
Response #: 166
Submitter ID: 17072
IP address: 24.11.195.81
Time to complete: 31 min. , 32 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Tree Board

What is your name?

Dane Andersen

Spouse's name (if applicable)?

Mary Pemberton

Address:

1231 Concord Hunt Drive

Phone Number:

615-423-0460

Email address:

andersen.dane@gmail.com

Employment Status:

(O) Retired

Current Employer or Former Employer if Retired

Mars Petcare

Job Title

Global Director of Commodity Price Risk Management

Spouse's Current Employer or Former Employer if Retired:

Retired, formerly at Aspen Ice

Spouse's Job Title:

Director of Ice Skating Programs

How many years have you lived in Brentwood?

13

Please provide a detailed description of your community involvement below:

I serve as the Board Treasurer at Owl's Hill Nature Sanctuary where I'm also actively involved in leading group hikes ranging from young schoolchildren to adults, doing trail maintenance and assisting in animal counts.

I've been involved with Habitat for Humanity Williamson-Maury as a budget coach helping families prepare for the financial responsibilities of home ownership.

At the Oasis Center in Nashville, I've volunteered at the Bike Workshop, an earn-a-bike program for Nashville area youth.

I was a founding board member and remain an active organization member of Wild Ones Middle Tennessee Chapter, an organization which promotes the use of native plants in the landscape and the use of sustainable landscaping practices.

Please provide a brief summary of why you would like to serve on this board:

I've always enjoyed being around trees, whether in my yard, hiking through the woods or taking my dog for his daily walks in Crockett Park. However, until a few years ago, I didn't fully appreciate how important trees are to the environment and our health. Through a combination of completing the Tennessee Naturalist Program and my volunteer work at Owl's Hill Nature Sanctuary, I've developed a much deeper knowledge of and appreciation for trees. I enjoy sharing what I've learned with people I lead on hikes at Owl's Hill.

Brentwood has such a rich tree heritage through the Arbor Day events, the Deerwood and Library Arboretums and the entire park system. It's part of what makes me proud to be a resident of this city. I'd love to have the opportunity to serve on the Tree Board helping to maintain and build upon this legacy of enriching people's lives through trees. I will be honored if selected. Thank you for your consideration.

The following questions request additional information that may be pertinent in the consideration of

appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

I'm not aware of any potential conflicts of interest

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Tuesday, January 7, 2020 1:39:20 PM

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A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/07/2020 1:39 PM
Response #: 165
Submitter ID: 17071
IP address: 66.83.55.34
Time to complete: 8 min. , 43 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Tree Board

What is your name?

Jennifer Bourne

Spouse's name (if applicable)?

Jeff Bourne

Address:

1823 Bronwyn Ct

Phone Number:

615-260-4741

Email address:

jenniferinsuresnashville@gmail.com

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Martin & Zerfoss

Job Title

Risk Advisor

Spouse's Current Employer or Former Employer if Retired:

Mars Petcare

Spouse's Job Title:

Distribution Analyst

How many years have you lived in Brentwood?

5.5

Please provide a detailed description of your community involvement below:

Rotary Club of Brentwood- Vice President

Leadership Brentwood- Vice Chair

Please provide a brief summary of why you would like to serve on this board:

I would like to learn more about the city of Brentwood and if you know Betsy Crossley; Hearing her excitement and love for the trees makes you excited to learn more. I thought this would be a good way to learn more and get involved.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

no

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

Other than involvement in Leadership Brentwood, No.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

no

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Wednesday, January 8, 2020 7:33:05 AM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/08/2020 7:32 AM
Response #: 167
Submitter ID: 17074
IP address: 198.140.189.250
Time to complete: 34 min. , 18 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Tree Board

What is your name?

Brian Evans

Spouse's name (if applicable)?

Michelle Evans

Address:

728 Princeton Hills Drive, Brentwood, TN 37027

Phone Number:

615-554-9315

Email address:

evans_brian@comcast.net

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Tractor Supply Company

Job Title

VP, Human Resources

Spouse's Current Employer or Former Employer if Retired:

Cummins Inc.

Spouse's Job Title:

Project Manager

How many years have you lived in Brentwood?

20

Please provide a detailed description of your community involvement below:

- Board Member (Emeritus) for United Way of Williamson County. County Campaign Chair in 2015 and Tocqueville Chair 2016-2018
- Leadership Brentwood Class of 2018
- Leadership Brentwood Steering Committee - 2018-Present
- Princeton Hills HOA Board Member 2008-2010
- Princeton Hills HOA Architectural Review Committee 2016-2019
- Lipscomb College of Business - Dean's Advisory Board

Please provide a brief summary of why you would like to serve on this board:

I am seeking more opportunities to serve in the great community of Brentwood. Having now lived in Brentwood 20 years, longer than any city, it will be my forever home. I love our city, its citizen and the beauty of the topography. I have a personal passion for sustainability and consider myself an amateur landscaper.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No, I am not.

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No . Tractor Supply does sponsor several community activities and is an active corporate citizen, but there is no business relationship.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

The only conflicts I could see would be if Tractor Supply had some sort of request to make changes to it's campus. The contrary, I see a benefit of having Tractor Supply more involved.....such as our plan to participate in the Arbor Day celebration.

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Sunday, January 5, 2020 11:25:36 AM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/05/2020 11:25 AM
Response #: 162
Submitter ID: 17047
IP address: 2600:1004:b119:b47d:51a1:4a35:393f:dcc9
Time to complete: 24 min. , 10 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Tree Board

What is your name?

Robbie Hayes

Spouse's name (if applicable)?

Tricia Hayes

Address:

6790 Sawyer Road

Phone Number:

615-693-2979

Email address:

jrhayes@hntb.com

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

HNTB Corporation

Job Title

Project Manager

Spouse's Current Employer or Former Employer if Retired:

St. Thomas Hospital

Spouse's Job Title:

Nurse

How many years have you lived in Brentwood?

12

Please provide a detailed description of your community involvement below:

I currently serve on the following:

- City of Brentwood Tree Board (Board Member)
- Citizens for Brentwood Greenspace (Board Member)
- Cumberland Region Tomorrow (Board Member; Executive Committee)
- Leadership Middle Tennessee (Class of 2020)
- Nashville Children's Theatre (Board Member)
- National Association of Environmental Professionals (Board Member)

I am also a Leadership Brentwood alumni (Class of 2017)

Please provide a brief summary of why you would like to serve on this board:

I am a current Tree Board member, where I've served since 2018 - this has been an amazing experience! I've greatly enjoyed the opportunity to serve the City and its citizens, while also feeling personally rewarded by improving my community.

I feel that I bring a unique perspective, both as a non-(Brentwood) native and through my professional experiences, including a certification in environmental sustainability. I am driven by opportunity to lead and feel I am someone who works to build consensus between stakeholders and the general public.

Brentwood is a wonderful place to live, work, and play – and our natural environment plays a major part in sustaining a high quality of life for its residents and visitors. I want to contribute to the challenges and opportunities that Brentwood faces regarding growth, development and natural preservation. I want to be a representative of this committee and become a strong voice for the Brentwood community.

I will carry the objectives and lessons gained from serving on this board and look to protect the community's interests, such as awareness regarding the Emerald Ash Borer. I have volunteered to represent the Tree Board in giving talks to various organizations regarding this issue affecting Brentwood.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

No.

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

No.

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

No.

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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From: tech@brentwoodtn.gov
To: [Lambert, Deanna](#); [Earls, Holly](#)
Subject: City of Brentwood: Online Board Application Submittal
Date: Thursday, January 2, 2020 5:22:04 PM

Warning: External Email – Do not click any links or open any attachments unless you trust the sender and know the content is safe.

A new entry to a form/survey has been submitted.

Form Name: Board and Commission Applicant Information Sheet
Date & Time: 01/02/2020 5:21 PM
Response #: 159
Submitter ID: 17023
IP address: 2601:484:c200:8d40:29a5:5f98:8aaa:f164
Time to complete: 13 min. , 23 sec.

Survey Details

Page 1

It is the policy of the City of Brentwood that family members living in the same household or other individuals living in the same household may not concurrently serve on City boards.

☒ I Understand

Please select the Board you wish to apply for:

☐ Tree Board

What is your name?

lynn tucker

Spouse's name (if applicable)?

Mike

Address:

6100 Bryan Place

Phone Number:

615-310-6698

Email address:

lynntuc@gmail.com

Employment Status:

(o) Employed

Current Employer or Former Employer if Retired

Williamson, Inc. Chamber

Job Title

Foundation Director

Spouse's Current Employer or Former Employer if Retired:

self

Spouse's Job Title:

Author

How many years have you lived in Brentwood?

24

Please provide a detailed description of your community involvement below:

Tree Board Chair: 10 plus years

Maryland Farms YMCA board member: 6 years

Rotary Treasurer: 10 plus years

Leadership Brentwood and Youth Leadership Brentwood Director: 13 years

Please provide a brief summary of why you would like to serve on this board:

I have been excited to watch our Tree board members take on more responsibility in helping to maintain our two Arboretums, and to expand our Arbor Day celebration-and I love being a part of this talented and hard-working group. In addition, we have begun to take on more responsibility in educating the public on Emerald Ash Borer and other pest issues. I feel that my organizational skills have been valuable in providing continuity and an historic perspective to the group, and I would hope to continue in this role.

The following questions request additional information that may be pertinent in the consideration of appointments to City boards. Affirmative responses to these questions will not necessarily be grounds for disqualification, but provide the opportunity for you to identify relationships or potential conflicts that should be disclosed prior to an appointment being made.

Are you related by blood, marriage or adoption to any member of the Brentwood City Commission, any employee of the City of Brentwood, or any member of a City of Brentwood volunteer board? If so, please describe:

no

Do you or any member of your immediate family, your employer or any association/community group with which you are affiliated have a business relationship with the City of Brentwood, or has there been such a relationship with the City in the past? If so, please describe:

no

If appointed to the board identified above, are you aware of any potential conflicts of interest you may have in regard to business before the board? If so, please describe:

no

By submitting this application, I confirm that the above information is true and correct. I affirm that I have familiarized myself with the activities and duties associated with membership on this board as described on the City's board page. If I am appointed to a board, I affirm that I will regularly attend the board's meetings and functions.

☒ I Agree

Thank you,
City of Brentwood

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