TEXAS DEPARTMENT OF TRANSPORTATION

TECHNICAL PROVISIONS

FOR

SH 249 EXTENSION

September 28, 2016

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ATTACHMENTS

Attachment 2-1: Work Breakdown Structure Requirements

Attachment 2-2: Organization Structure for Cost Reporting

Attachment 2-3: I2MS Field Forms

Attachment 2-4: Minimum QA Construction Control Points

Attachment 4-1: Environmental Permits, Issues and Commitments

Attachment 5-1: TxDOT Third Party Agreements

Attachment 6-1: Utility Adjustment Forms

Attachment 11-1: Cross Street Design Criteria

Attachment 11-2: Proposed Cross Street Typical Sections

Attachment 17-1: Preliminary Layout for Environmental Communications Building Locations

Attachment 18-1: TxDMV Motor Carrier Division Permit Restriction Application

Attachment 19-1: Performance and Measurement Table

Attachment 19-2: Baseline Inspection Requirements

Attachment 19-3: Maintenance Limits

Attachment 19-4: Maintenance Management Plan Template

Attachment 21-1: Toll Systems Responsibility Matrix

Attachment 21-2: Typical Toll Zone Layout

Attachment 21-3: Toll Zone Pavement Design

SECTION 1.0 GENERAL

1.1 Project Description

The Project generally consists of the design, construction and the potential for capital maintenance of approximately 24 miles of new tolled main lanes from Farm to Market Road (FM) 1774 in Pinehurst, Texas (Montgomery County) to FM 1774 in Todd Mission, Texas in Grimes County (Segment 1), and from FM 1774 in Todd Mission, Texas to State Highway (SH) 105 near Navasota, Texas in Grimes County (Segment 2).

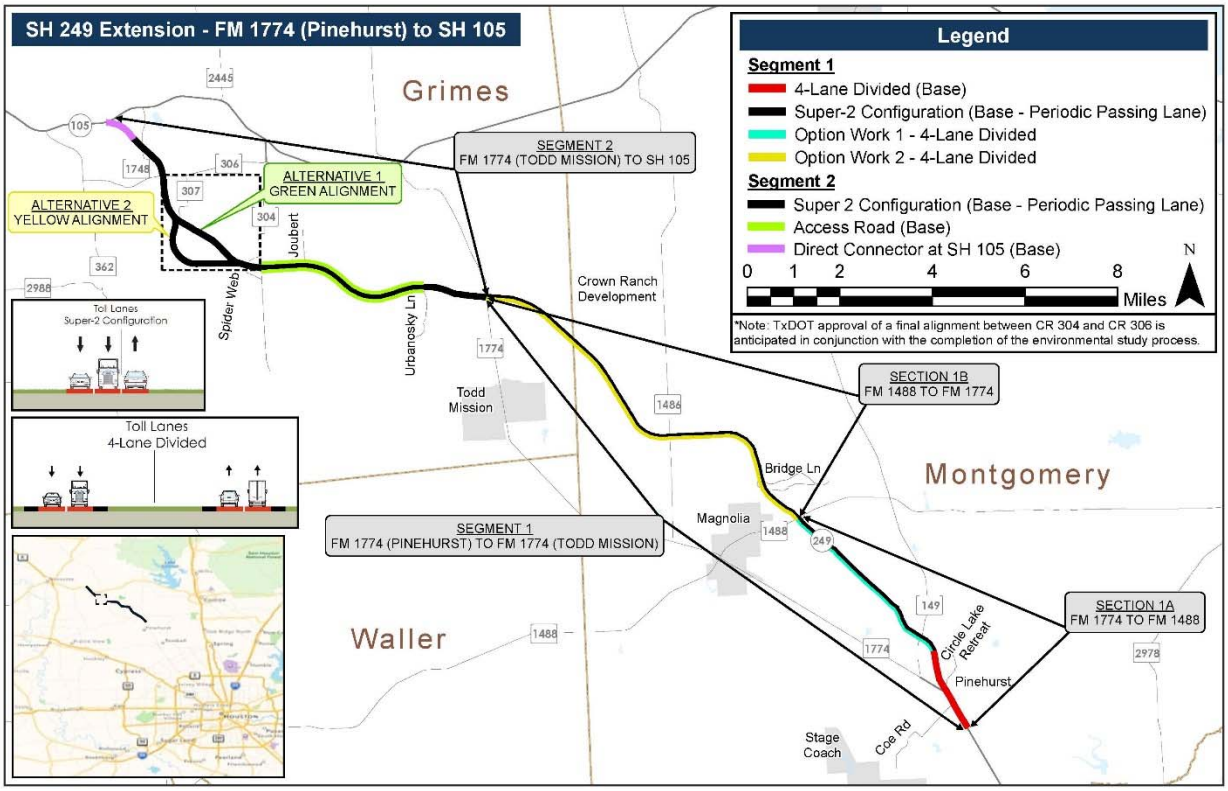


Figure 1-1: Project Map

Segment 1 consists of Section 1A and Section 1B and is approximately 14 miles in length, and Segment 2 is approximately 10 miles in length. The approximate limits of the Design and Construction Work ("Project Limits") shall be as shown on the Texas Department of Transportation (TxDOT) Preliminary Schematic Design – Base Scope provided in the Reference Information Documents (RIDs). The approximate limits of the Maintenance Work during construction shall be as shown in Attachment 19-3.

1.2 Project Scope

The Base Scope for Segments 1 and 2 shall include, but is not limited to, the design and construction of a Super 2 roadway and the associated drainage, bridge structures, retaining walls, noise barriers, signing, pavement markings, lighting, tolling infrastructure, and traffic signals as shown on the Preliminary Schematic Design – Base Scope provided in the RIDs.

A Super 2 shall be defined as a single roadbed with one lane in each direction and periodic (intermittent) passing lanes in alternating directions. Passing lengths and locations shall be in accordance with the Preliminary Schematic Design – Base Scope provided in the RIDs.

The Base Scope may also be supplemented, at TxDOT's sole discretion, to include Option Work in Segment 1 as further described in Section 1.2.4. Any material change to the Project Elements listed as Basic Configuration must be submitted for TxDOT review and written approval in accordance with Section 2.1.1 of the Design-Build Agreement (DBA), herein referred to as the "Agreement".

All station values stated in these Technical Provisions are in reference to the Project baseline "SH 249 Baseline" as shown in the TxDOT Preliminary Schematic Design.

DB Contractor shall be aware that the Segment 2 alignment between CR 304 and CR 306 is not finalized due to the on-going environmental study process. There are two alignments currently under consideration between CR 304 and CR 306 described in these Technical Provisions called the "green" and "yellow" alignments. A final Segment 2 alignment is anticipated in conjunction with the completion of the environmental study process. Preliminary Schematic Designs of both the "green" and "yellow" alignments are provided in the RIDs.

1.2.1 Section 1A Base Scope

1.2.1.1 Main Lanes

DB Contractor shall design and construct two main lanes in each direction from STA 1156+50 to approximately STA 1220+00 and a Super 2 configuration from approximately STA 1220+00 to the main lane bridge over Mill Creek Tributary F and FM 1488 (approximate STA 1453+00).

SH 249 main lane bridges shall be constructed at the following locations as shown on the Preliminary Schematic Design:

(a) West Rollingwood St., FM 1774, Union Pacific Railroad, and Circle Lake Drive;

(b) Future Terra Boulevard (with centerline located at STA 1228+50);

(c) Mill Creek Tributary A (approx. STA 1250+00);

(d) FM 149;

(e) Mildred Lane;

(f) Mill Creek Tributary B (approx. STA 1320+00);

(g) Mill Creek Tributary C (approx. STA 1350+00);

(h) Future thoroughfare (with centerline located at STA 1389+00);

(i) Mill Creek Tributary D (approx. STA 1400+00); and

(j) Mill Creek Tributary E (approx. STA 1430+00).

1.2.1.2 Access Driveways

DB Contractor shall provide local access driveways to maintain local street access or adjacent property access impacted by ROW acquisition for the Project at the following locations as depicted on the Preliminary Schematic Design:

(a) Restore access to Parcels 101 (R245800) and 102 (R39281) with an access driveway off Circle Lake Drive (approximate STA 1192+00 to 1199+00);

(b) Restore access to Parcel 105 (R445075) with an access driveway off Circle Lake Drive (approximate STA 1199+00 to 1201+00);

(c) Restore access to Parcel 112 (R43422) with an access driveway off FM 149 (approximate STA 1261+00 to 1264+00);

(d) Restore access to Parcel 110 (R43405) west of SH 249 with an access driveway off Jennie Lane (approximate STA 1280+50 to 1285+50); and

(e) Restore access to Parcels 110 (R43405), 117 (R123222), 119 (R123213), and 125 (R123234) east of SH 249 with an access driveway off Mildred lane (approximate STA 1280+50 to 1292+00).

Parcel number is the ROW Strip Map number provided in the RID and the R# is the Montgomery County Appraisal District Identification number.

1.2.1.3 Ramps

Ramps shall be constructed at the following locations:

1.2.1.3.1 Northbound Ramps

(a) Entrance ramp from Woodtrace Blvd;

(b) Exit ramp toward FM 149;

(c) Entrance ramp from FM 149; and

(d) Exit ramp toward FM 1488.

Northbound ramp bridges (stations are approximate):

(a) Mill Creek Tributary A (STA 1250+00);

(b) Mill Creek Tributary F (STA 1455+00).

1.2.1.3.2 Southbound Ramps

(a) Exit ramp toward Woodtrace Blvd;

(b) Entrance ramp from FM 149;

(c) Exit ramp toward FM 149; and

(d) Entrance ramp from FM 1488.

Southbound ramp bridges:

(a) Future Terra Boulevard (with centerline located at STA 1228+50);

(b) Mill Creek Tributary A (STA 1250+00);

(c) Mill Creek Tributary E (STA 1430+00); and

(d) Mill Creek Tributary F (STA 1455+00).

1.2.1.4 Intersection Approaches/Departures

The following intersection approaches and departures shall be constructed:

1.2.1.4.1 Northbound

(a) Four lane approach to FM 149 from SH 249 exit ramp;

(b) Two lane departure from FM 149 to SH 249 entrance ramp;

(c) Three lane approach to FM 1488 from SH 249 exit ramp; and

(d) Two lane departure from FM 1488 to the stub out described in Section 1.3.2 below.

1.2.1.4.2 Southbound

(a) Two lane departure from FM 149 to the SH 249 entrance ramp;

(b) Three lane approach to FM 149 from the SH 249 exit ramp;

(c) Two lane departure from FM 1488 to the SH 249 entrance ramp;

(d) Three lane approach to FM 1488 from the stub out described in Section 1.3.2 below.

1.2.1.5 Cross Streets/Intersections

DB Contractor shall design and construct cross street improvements, including pavement drainage, signing, pavement markings, lighting, and traffic signals in accordance with Attachments 11-1 and 11-2. Cross street improvements shall be performed at the following locations:

(a) FM 149 at SH 249; and

(b) FM 1488 at SH 249.

1.2.1.6 Toll Zones

Main lane Toll Zones shall be constructed as follows (in each direction):

(a) Between FM 149 and FM 1488.

Ramp Toll Zones shall be constructed as follows:

(a) Northbound exit toward FM 149; and

(b) Southbound entrance from FM 149.

1.2.1.7 Railroad Crossings

A grade separated crossing shall be constructed at FM 1774 in Montgomery County (Union Pacific Railroad).

1.2.1.8 Noise Barriers

Noise barriers shall be designed and constructed at the approximate locations provided below in Table 1-1, between the main lanes and right of way (ROW), as described in Table 4-17 of the Draft Environmental Impact Statement (DEIS) dated January 2015. DB Contractor shall be aware that the determination whether noise barriers are feasible and reasonable and noise barrier parameters such as location and extent as described in the DEIS are subject to change and may be altered in the Final Environmental Impact Statement (FEIS). The FEIS/Record of Decision (ROD) is anticipated to be issued by TxDOT by February 2016.

DB Contractor shall determine final placement of noise barriers and ensure that sufficient access is provided for construction and maintenance of the noise barrier. Noise barrier system designs showing final placement of the barriers shall be submitted to TxDOT for review and approval.

Table 1-1: Noise Barrier Locations

Noise Barrier	Receiver	Location
Noise Barrier 1	R-7 through R-10	Along west ROW line from approximately STA 1285+00 to approximately STA 1385+00.

1.2.2 Section 1B Base Scope

1.2.2.1 Main Lanes

DB Contractor shall design and construct a Super 2 configuration from the main lane bridge over Mill Creek Tributary F and FM 1488 (approximate STA 1453+00) to the main lane bridge over FM 1774 in Todd Mission at approximately STA 1935+00.

SH 249 main lane bridges shall be constructed at the following locations as shown on the Preliminary Schematic Design:

(a) Mill Creek Tributary F (approx. STA 1455+00) and FM 1488;

(b) Future Thoroughfare (with centerline at 1526+00) and Mill Creek A (approx. STA 1535+00);

(c) Clear Creek A (approx. STA 1555+00);

(d) Clear Creek B (approx. STA 1630+00);

(e) FM 1486;

(f) Mill Creek Tributary G (approx. STA 1810+00);

(g) Future thoroughfare (with centerline at STA 1842+00); and

(h) Mill Creek B (approx. STA 1920+00).

1.2.2.2 Ramps

Ramps shall be constructed at the following locations:

1.2.2.2.1 Northbound Ramps

(a) Entrance ramp from FM 1488;

(b) Exit ramp toward FM 1486;

(c) Entrance ramp from FM 1486; and

(d) Two lane exit ramp to FM 1774 in Todd Mission.

Northbound ramp bridges (stations are approximate):

(a) Mill Creek B (STA 1920+00).

1.2.2.2.2 Southbound Ramps

(a) Exit ramp toward FM 1488;

(b) Entrance ramp from FM 1486;

(c) Exit ramp toward FM 1486; and

(d) Entrance ramp from FM 1774 in Todd Mission.

Southbound ramp bridges (stations are approximate):

(a) Clear Creek B (STA 1630+00); and

(b) Mill Creek B (STA 1920+00).

1.2.2.3 Intersection Approaches/Departures

The following intersection approaches and departures shall be constructed:

1.2.2.3.1 Northbound

(a) Two lane approach to FM 1486 from SH 249 exit ramp;

(b) Two lane departure from FM 1486 to SH 249 entrance ramp; and

(c) Two lane approach to FM 1774 from SH 249 exit ramp.

1.2.2.3.2 Southbound

(a) Two lane departure from FM 1486 to the SH 249 entrance ramp;

(b) Two lane approach to FM 1486 from the SH 249 exit ramp; and

(c) Two lane departure from FM 1774 to the SH 249 entrance ramp.

1.2.2.4 Cross Streets/Intersections

DB Contractor shall design and construct cross street improvements, including pavement drainage, signing, pavement markings, lighting, and traffic signals in accordance with Attachments 11-1 and 11-2. Cross street improvements shall be performed at the following locations:

(a) FM 1486 at SH 249; and

(b) FM 1774 in Todd Mission at SH 249.

1.2.2.5 Toll Zones

Main lane Toll Zones shall be constructed as follows (in each direction):

(a) Between FM 1486 and FM 1774 in Todd Mission.

Ramp Toll Zones shall be constructed as follows:

(a) Northbound exit toward FM 1486; and

(b) Southbound entrance from FM 1486.

1.2.3 Segment 2 Base Scope

1.2.3.1 Main Lanes

DB Contractor shall design and construct a Super 2 main lane configuration from and including the bridge over FM 1774 in Todd Mission at approximately STA 1935+00 to the SH 249/SH 105 Interchange.

SH 249 main lane bridges shall be constructed at the following locations (stations below are approximate) as shown on the Preliminary Schematic Design:

(a) FM 1774 in Todd Mission;

(b) Mill Creek C (STA 1975+00);

(c) Union Pacific Railroad (STA 2000+00);

(d) Urbanosky Lane and Southbound to Northbound access road turnaround;

(e) Pinebrook South Access;

(f) CR 304;

(g) Northbound to Southbound access road turnaround (Green alignment: STA 2255+00; Yellow alignment: STA 2260+00);

(h) Beason Creek (Green alignment: STA 2280+00; Yellow alignment: STA 2290+00);

(i) CR 307 (Green alignment: STA 2317+00; Yellow alignment: STA 2325+00);

(j) CR 306 and Burlington Northern Santa Fe Railway; and

(k) FM 1748.

1.2.3.2 SH 105 Work

DB Contractor shall design and construct improvements to SH 105 to accommodate the construction of a bi-directional direct connector as described below in Section 1.2.3.3. DB Contractor's design shall maintain the current number of through lanes on SH 105.

DB Contractor's design shall provide access from Lawridge Lane to eastbound SH 105.

1.2.3.3 Interchanges/Direct Connectors

A single bi-directional direct connector shall be constructed consisting of one lane from eastbound SH 105 to southbound SH 249 and one lane from northbound SH 249 to westbound SH 105. DB Contractor's design shall include a 42" single slope concrete barrier separating opposing traffic on the direct connector.

1.2.3.4 Access Roads

Northbound and southbound access roads (two lanes in each direction) shall be constructed from Urbanosky Lane to (Green alignment: STA 2255+00; Yellow alignment: STA 2260+00).

1.2.3.5 Ramps

Ramps shall be constructed at the following locations:

1.2.3.5.1 Northbound Ramps

(a) Entrance ramp from FM 1774 in Todd Mission;

(b) Exit ramp toward Pinebrook South Access;

(c) Entrance ramp from CR 304; and

(d) Exit ramp toward CR 306.

1.2.3.5.2 Southbound Ramps

(a) Exit ramp toward FM 1774 in Todd Mission;

(b) Entrance ramp from Pinebrook South Access;

(c) Exit ramp to CR 304; and

(d) Entrance ramp from CR 306.

1.2.3.6 Intersection Approaches/Departures

The following intersection approaches and departures shall be constructed:

1.2.3.6.1 Northbound

(a) Two lane departure from FM 1774 to entrance ramp from FM 1774; and

(b) One lane approach to CR 306 from exit ramp to CR 306.

1.2.3.6.2 Southbound

(a) Two lane approach to FM 1774 from exit ramp to FM 1774; and

(b) One lane departure from CR 306 to entrance ramp from CR 306.

1.2.3.7 Cross Streets/Intersections

DB Contractor shall design and construct cross streets, including pavement drainage, signing, pavement markings, lighting, and traffic signals in accordance with Attachments 11-1 and 11-2. Cross street pavement reconstruction shall be performed from SH 249 ROW line to SH 249 ROW line, including transitions to the existing section. Cross street improvements shall be performed at the following locations:

(a) Urbanosky Lane at SH 249;

(b) Pinebrook South Access at SH 249;

(c) CR 304 at SH 249;

(d) CR 307 at SH 249 (Green alignment: STA 2317+00; Yellow alignment: STA 2325+00; If yellow alignment is selected, CR 307 Work shall include a roadway realignment to the west of SH 249 from STA 2301+80 to STA 2327+30 to maintain local street access or adjacent property access impacted by ROW acquisition for the Project);

(e) CR 306 at SH 249; and

(f) FM 1748 at SH 249.

1.2.3.8 Access Road Turnarounds

Access road turnarounds shall be constructed as follows:

(a) Southbound access road to northbound access road at Urbanosky Lane;

(b) Northbound access road to southbound access road at CR 304;

(c) Southbound access road to northbound access road at CR 304; and

(d) Northbound access road to southbound access road (Green alignment: STA 2255+00; Yellow alignment: STA 2260+00).

1.2.3.9 Toll Zones

Main lane Toll Zones shall be constructed as follows (in each direction):

(a) Between FM 1774 in Todd Mission and Urbanosky Lane; and

(b) Between CR 304 and CR 306.

1.2.3.10 Railroad Crossings

Railroad crossings shall be constructed at the following locations:

(a) Grade separation north of FM 1774 in Todd Mission (Union Pacific Railroad);

(b) Grade separation at CR 306 (Burlington Northern Santa Fe Railway); and

(c) Grade separation (direct connector) at SH 105 (Union Pacific Railroad).

1.2.3.11 SH 105 East Connections

Users traveling from NB SH 249 to EB SH 105 and from WB SH 105 to SB SH 249 shall utilize CR 306 and FM 1748 as depicted in Figure 1-2 below. DB Contractor shall show the required signage on the preliminary operational signing schematic described in Section 16.3.1 to provide guidance information to Users to make these connections. DB Contractor shall be required to install the signage as part of the Work.

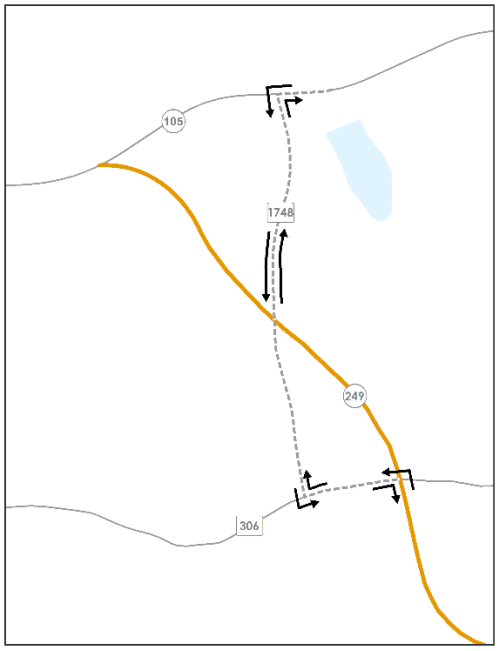


Figure 1-2: SH 105 East Connections

1.2.4 Option Work

1.2.4.1 Option Work 1

Option Work 1 generally consists of the design and construction of four tolled main lanes in lieu of a Super 2 configuration from just south of FM 149 at approximately STA 1220+00 to just south of FM 1488 at approximately STA 1433+00.

If TxDOT, in its sole discretion, elects to exercise Option Work 1, DB Contractor shall design and construct the Option Work 1 Elements described in this Section 1.2.4.1 and depicted in the Preliminary Schematic Design – Option Work 1 & 2 provided in the RIDs.

1.2.4.2 Option Work 2

Option Work 2 generally consists of the design and construction of four toll lanes, in lieu of a Super 2 configuration, from just south of FM 1488 to just south of FM 1774 in Todd Mission at approximately STA 1900+00.

If TxDOT, in its sole discretion, elects to exercise Option Work 2, DB Contractor shall design and construct the Option Work 2 Elements described in this Section 1.2.4.2 and depicted in the

Preliminary Schematic Design – Option Work 1 & 2 provided in the RIDs. Option 2 will only be exercised in conjunction with Option 1.

1.3 Transitions to Adjacent Infrastructure, Roadways, and Facilities

DB Contractor shall design and construct transitions and interconnections to be uniform at each interface with adjacent infrastructure, roadway, and facilities. All connections and tie-in points shall be designed according to the standards and requirements of the Persons having jurisdiction.

DB Contractor shall coordinate with third parties and other contractors performing work at or adjacent to the Site to provide seamless transitions at all times from the Project to any work proposed, being developed, or existing. DB Contractor shall remove any temporary transitions which are not intended to accommodate permanent traffic operations connecting the proposed improvements to existing roadways and shall restore all areas impacted.

DB Contractor shall minimize disruption to traffic operations and adjacent property access throughout the performance of the Work.

1.3.1 Tomball Tollway (SH 249) Montgomery County Phase 2A

SH 249 Segment 3 (Phase 2A) is a four-lane divided roadway connecting to a four-lane section in Segment 1 just south of FM 1774 in Pinehurst at approximately STA 1156+50, as depicted on the MCTRA SH 249 Phase 2A Preliminary Schematic provided in the RIDs. The *Segment 1 TxDOT-Montgomery County PDA* (Project Development Agreement) between TxDOT and Montgomery County describes the project responsibilities of the parties and is provided in the RIDs.

1.3.2 FM 1488 Magnolia Relief Route

The FM 1488 Magnolia Relief Route project is a four-lane divided roadway on new location from the SH 249 Extension Project north of FM 1488 to existing FM 1488 on the west side of Magnolia. The preferred alternative for the relief route is located on the north side of Magnolia in Montgomery County, as shown on the *FM 1488 Magnolia Relief Route-Project Map* in the RIDs.

The relief route currently contemplates use of Project ROW and crossing over the SH 249 facility on the north side of Magnolia. DB Contractor shall accommodate the proposed relief route by providing pavement stub outs as shown on the Preliminary Schematic Design.

The environmental review, consultation and other actions required are currently being carried out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated Dec. 16, 2014, and executed by the Federal Highway Administration (FHWA) and TxDOT contained in the RIDs.

1.4 Compatibility with Future Expansion

The Work, including any Option Work, shall accommodate and be consistent with future expansion of the facility as contemplated on the Preliminary Schematic Design and described below in Section 1.4.

The future expansion of the facility shall include a median divided four-lane facility (two lanes in each direction) with a minimum median width of 48 feet between the northbound travel lanes (the Project's Super 2 pavement) and the future southbound travel lanes. The placement of the

Project's Super 2 pavement shall be such that the future southbound roadbed can be constructed within Project ROW using side slopes specified in Table 11-1 without the use of retaining walls except at bridge approaches and ramps or similar constained locations for which design deviations shall be submitted for approval by TxDOT to keep within ROW. The median width of 48 feet shall be measured between the two innermost lanes of the future four-lane median divided facility, including shoulder widths.

DB Contractor shall ensure that any utilities that require relocation or adjustment to accommodate the Work shall also accommodate the future expansion to the greatest extent possible within Preliminary ROW.

The Design Documents furnished by DB Contractor shall be consistent and compatible with the improvements associated with the future expansion and provide for a smooth transition from the Work including any Option Work to the future expansion.

DB Contractor shall minimize "throwaway" costs associated with improving the Project to meet the requirements of the future expansion. The Work shall provide for minimal disruption to traffic and toll collection operations during the construction of the future expansion.

DB Contractor shall design and construct the intersections, including bridge span lengths, to accommodate the cross street future expansion configurations described in Attachments 11-1 and 11-2.

Noise barriers shall also be designed and constructed to accommodate the future expansion.

Additionally, the Work shall minimize the cost associated with the future expansion to the extent that DB Contractor costs to construct the Work are not unreasonably increased.

1.5 Design Visualization

DB Contractor shall provide three-dimensional (3-D) design files to TxDOT for use during the design and construction process.

DB Contractor shall provide accurate 3-D models that depict the Project. Completed models will represent realism and aesthetic attributes of the existing conditions and the proposed Project. DB Contractor shall add roadway design details to the model that are not normally provided at the stage of Preliminary Schematic Design and verify that the Preliminary Schematic Design complies with design guidelines presented in the *TxDOT Roadway Design Manual*, *Texas Manual on Uniform Traffic Control Devices* (TMUTCD), the *American Association of State Highway and Transportation Officials* (AASHTO) *Green Book*, and the *AASHTO Roadside Design Guide* or applicable standards listed in these Technical Provisions.

The design visualization models shall show both existing and proposed design conditions either separately or combined in the same display. Based on specific Project requirements, the final design visualization Submittals may include photo-matched renderings, rendered plan view layouts, and animated sequences.

DB Contractor shall provide, along with the Record Documents, a 3-D Computer Aided Drafting and Design (CADD) model of the completed Project and any Work product generated during the modeling process, such as site photographs, textures, material assignments, and additional terrain information. All CADD data should be in electronic format and native to TxDOT's CADD

architecture using Bentley Systems, Inc. MicroStation (MicroStation) to provide complete compatibility between DB Contractor and TxDOT.

DB Contractor shall collect, review, and evaluate all of the available existing data pertaining to the Project and prepare the design visualization models to reflect current design requirements. The data shall include MicroStation design files, GEOPAK geometry files, existing terrain models, and digital ortho photography. DB Contractor shall field verify the existing and proposed condition of design visualization models for dimensional accuracy and realism.

All CADD work and resulting data shall be compatible with TxDOT's existing CADD software. This data shall be delivered in native format using MicroStation. Resulting animations for design visualization purposes do not have to be native MicroStation, but do need to be capable of viewing on any device with minimal support to, or effort by TxDOT.

1.5.1 Design Visualization Services – Photo Rendering and Exhibits

DB Contractor shall provide photo renderings of no more than 12 locations to be determined by TxDOT at each of the 30% and 90% design stages, or as directed by TxDOT, but not to exceed 24 renderings total. DB Contractor shall submit the completed renderings to TxDOT within the timeframe stated in Table 1-2.

DB Contractor shall coordinate with TxDOT the location of the photographs. DB Contractor shall take a minimum of two existing condition photographs at each of the 12 locations. These photographs will serve as the basis for the photo-renderings.

DB Contractor shall provide two mounted "before" images and two mounted "after" static 3-D photo matched images of proposed design Elements at each of the 12 locations.

The photo renderings and exhibits are intended to be used by TxDOT for public information purposes. DB Contractor may utilize alternative 2-D software, including Adobe Photoshop, for generating renderings for public information with prior TxDOT approval.

1.5.2 Design Visualization Services – 3-D Computer Model

1.5.2.1 General Requirements

Utilization of 3-D design is an integral part of the performance of the Project prior to and during construction, and throughout the Project's service life. Additionally, the implementation of 3-D design techniques is intended to improve quality, reduce risk, improve collaboration with Project stakeholders, provide an early focus toward technical review, and increase opportunity for innovation.

DB Contractor shall prepare topographically accurate 3-D computer models for 12 locations.

The computer model shall accurately depict the geometric design of the proposed improvements at each of the 12 locations and associated interchanges. Engineering judgment shall be used for definition of slope, retaining wall, bridge abutment placement, and other physical features that may not be readily apparent from the design schematic. The computer model shall also incorporate existing features in the corridor out to the project ROW line and out to a distance of 500 feet along cross streets at interchanges.

1.5.2.2 Design Requirements

DB Contractor shall utilize 3-D methodologies and techniques to incorporate the Project schematic into DB Contractor's Project integrated design files. DB Contractor's 3-D design shall facilitate the coordination and accommodation any asset management considerations as it relates to maintenance.

DB Contractor shall create an integrated-model of the existing condition utilizing 3-D methodologies and techniques. The existing condition model shall include existing ground surface and certain subsurface Elements (including, at a minimum: drainage structures, bridge and wall foundations, and utilities) features utilizing data from light detection and ranging (LiDAR), Subsurface Utility Evaluation (SUE), field surveys, and existing plans data collection; including currently available LiDAR or other existing ground surface data (.dtm or .tin format) provided by TxDOT.

DB Contractor shall utilize 3-D methodologies and techniques to develop the geometric design and the 3-D design model for each proposed roadway and incorporate it into the Project's integrated design models.

DB Contractor shall prepare, in accordance with these Technical Provisions, all geometric design elements, including but not limited to:

(a) Refine and finalize horizontal and vertical alignments for all collector-distributors, access roads, ramps, direct connectors, crossing and parallel roadways, pavement transitions, and tie-ins to existing lanes;

(b) Determine horizontal and vertical clearances at grade separations, underpasses, and overpasses;

(c) Develop superelevation and superelevation transition designs for each roadway. Verify rollover constraints are adequately addressed: including ramp, collector-distributor, and direct connector gore locations; and

(d) Preliminary existing and proposed cross sections at a scale of 1 foot = 20 feet horizontal and 1 foot = 20 feet vertical on 100-foot increments. The design cross sections will be developed from the 3-D model. DB Contractor shall prepare cross sections for all roadways within the limits of the Project.

(e) Integrated design model Submittals shall consist of 3-D MicroStation file(s) containing 3-D graphical elements (components, contours, superelevation transitions limits, and existing and proposed finish grade triangles) representative of the design model, and .dtm or .tin surface files.

DB Contractor shall include key existing and proposed 3-D design features for the following Elements of the Work in accordance with the Technical Provisions:

1. Roadway (including, at a minimum: main lane pavement, pavement markings, barrier walls, access road pavement and pavement markings, locations of ramps entering and exiting the main lanes, and locations of ramps entering and exiting the main lanes to the access roads);

2. Drainage (including at a minimum: drainage trunk lines, laterals, ditches, outfalls, detention ponds whether off-Site or on-Site, cross culverts, and inlet locations);

3. Structures (including, at a minimum: sufficient detail to show top of deck surface, structure type, bottom of beam surface, pier, abutment and retaining wall locations);

4. Utilities (including existing utility lines to remain in place and proposed relocations and/or adjustments);

5. Signing (including, at a minimum: overhead span or cantilever sign structure locations and structure type);

6. Lighting (including, at a minimum: pole and foundation locations);

7. Signals (including, at a minimum: controller, pole, and foundation locations);

8. Toll Infrastructure (including, at a minimum: structure type; not to include detailed Elements related to toll gantries or Elements inside buildings);

9. Aesthetic concepts and Elements (including, at a minimum: form, shapes, scale, textures, and colors);

10. Noise walls (including aesthetic type, shape, scale, textures, and colors);

11. Existing and proposed railroad elements;

12. Foundations, including drilled shafts, columns, abutments, retaining walls, high mast lighting, gantries, and any other ground penetration to be shown to scale of width and depth; and

13. Existing structures to remain within 25 feet of the Project ROW.

1.5.3 Immersive 3-D Over the Shoulder Milestone Review Meetings

DB Contractor shall present the Project 3-D design model to TxDOT and stakeholders at review meetings. DB Contractor shall utilize software that allows for interactive visualization of the 3-D design model key features. The 3-D design model shall be completed to a sufficient level of detail that existing terrain, proposed design features, and existing infrastructure to remain in place can be viewed, analyzed, and discussed among meeting participants. Immersive 3-D milestone review meetings shall occur prior to any design Submittals to TxDOT and DB Contractor shall provide the native 3-D Design model files to TxDOT prior to each meeting.

DB Contractor's 3-D design model shall be capable of providing the following minimum functionality during the immersive 3-D milestone review meetings:

(a) View the model and manipulate view settings to interactively change data display on screen (e.g., pan, rotate, walk, fly, zoom, etc.);

(b) Measure distances and areas throughout all areas of the model;

(c) Reference baseline geometry, stationing, and existing and proposed ROW; and

(d) Dynamically visualize key existing and proposed design features detecting conflicts/clashes amongst the Elements of the Work listed in Section 1.5.2.2.

1.6 Offices, Equipment, and Vehicles

Except where noted elsewhere in the Agreement, DB Contractor and TxDOT shall co-locate until Final Acceptance to facilitate Project coordination and daily communication. The definition of "co-locate" for the Term of the Agreement is office space meeting the conditions of these Technical Provisions that are within two miles of the Project ROW, or as approved by TxDOT.

In addition to co-location requirements for specified and Key Personnel elsewhere in these Technical Provisions, the following DB Contractor's personnel shall be co-located with TxDOT:

(a) Senior design engineer, and at least one CADD technician for the design duration; and

(b) ROW Acquisition Manager (ROW AM) during ROW acquisition phase.

The office space requirements for the Project office are provided below.

1.6.1 Office Network and Systems

DB Contractor shall, for each TxDOT representative, provide, furnish, install, operate, and maintain the following for the TxDOT office spaces:

(a) A local area network (LAN) with a minimum two 100 megabits per second (Mbps) network drops for each personal office area and a minimum of four 100 Mbps drops for each conference room. All drops shall have the ability to connect to the internet. The network shall allow for multiple virtual private network (VPN) connections/sessions. The network shall also provide full wireless (Wi-Fi ®) coverage within the office. The wireless network shall be capable of 802.11 a/b/g/n;

(b) A touch-tone telephone system (with voice mail) with at least one telephone, with speakers, for each personal office area. Also provide at least one telephone, with speakers, and a minimum of one satellite microphone for each conference room. The telephone system shall have the ability to host two lines per telephone, access all outside lines, receive any incoming call, caller identification, conference-call capability (three-way calling), call forwarding, call transfer, hold, hold music, and send to voice mail functionality;

(c) Access to DB Contractor's Electronic Content Management System (ECMS) systems for file sharing, collaboration, reviews, and responses at each personal office area and within each conference room;

(d) One computer with two flat panel monitors, including all necessary peripherals for each personnel office area and the reception area in the Project office. Five of these computers shall be laptops with docking stations;

(e) Peripherals shall include at minimum, monitor stand, docking station for laptop computers, mouse, keyboard, 16 gigabyte thumb drive, extra battery for laptop computers, wireless internet for laptop computers, and carry bag for laptop computers. For every eight computers, DB Contractor shall provide one external DVD drive and one external hard drive with not less than two terabytes of memory per external hard drive;

(f) Desktop computers shall be new systems with at least a one year manufacturer's warranty. Minimum configuration for the desktop shall consist of no less than four GB internal RAM, 500 GB hard drive, two (2.0) GHz dual core processors operating on a 64-bit platform. The system shall include not less than: internal Wi-Fi ®, graphics processor, audio card, an HDMI port, at least three USB ports;

(g) Laptops shall be new systems with at least a one year manufacturer's warranty. Minimum configuration for the desktop shall consist of no less than four GB internal RAM, 500 GB hard drive, two (2.0) GHz dual core processors operating on a 64-bit platform. The system

shall include not less than: internal Wi-Fi ®, graphics processor, audio card, an HDMI port, at least three USB ports;

(h) Each computer shall be configured and tested with the following minimum ordinary software requirements. Brand names are provided as examples, equally capable and compatible software can be installed with TxDOT's prior approval. Latest version or latest edition software shall be defined as the latest commercially available software at the time of the execution of DB Contractor's contract, or issuance of the first Notice to Proceed, whichever is later:

(i) Windows 10 or latest edition of operating system;

(ii) Microsoft Office Professional latest edition (Office, PowerPoint, Outlook, Excel);

(iii) Adobe Acrobat reader (latest version);

(iv) Internet Explorer and Google Chrome;

(v) Anti-virus software with latest updates;

(vi) DVD software driver compatible with the shared external DVD drive;

(vii) Software driver and backup software compatible with the shared external hard drive; and

(viii) Document management software required to access DB Contractor's client facing document library (as applicable).

(i) DB Contractor shall provide the following additional software packages for TxDOT's use. TxDOT shall direct DB Contractor as to which computers these software packages are to be installed. During the course of the Project, DB Contractor may be required to move one or more of these additional software packages between computers;

(i) Four copies of Bentley's MicroStation latest version;

(ii) Four copies of GeoPak; and

(iii) Four copies of Adobe Acrobat Professional latest version.

(j) Two iPad Air (latest version available), or equal, with Wi-Fi + Cellular, 64 GB capacity along with 4G/LTE cellular service and protective case with key pad;

(k) Three global positioning system (GPS) cameras (to include compass/GPS module, minimum 4GB SD card, camera bag, additional battery, USB cable, neck strap, rechargeable lithium-ion battery, battery charger, instruction manuals, and warranty card);

(l) One GoPro Hero4 Black Edition (latest version available), or equal;

(m) High speed, highly reliable internet service(s) capable of providing a minimum download speed of 18 Mbps and a minimum upload speed of 18 Mbps per network drop, with a minimum of three concurrent download connections and a minimum of two concurrent upload connections;

(n) The ability to print to any printer listed in this Section 1.6.1 from any network drop or wireless connection regardless of user domain (e.g. TxDOT and others computers shall be able to print to any printer listed in this Section 1.6.1 from any network drop);

(o) Include all network equipment, racks, structured cabling, wall plates, jacks, patch panels, patch cords (including patch cables for each LAN and telephone drop in each personal office area and conference room, power assemblies, and other appurtenances needed to meet the requirements contained within these Technical Provisions;

(p) All hardware and software shall meet applicable industry standards and protocols;

(q) Provide on-call technical support a minimum of eight hours per day, five days per week until the completion and close out of the Project;

(r) One high-speed laser computer printer capable of handling 11 inches x 17 inches prints for core office and one for field office;

(s) One high-speed color printer capable of handling 11 inches x 17 inches prints for core office and one for field office;

(t) One high-speed color photocopy machine capable of handling 11 inches x 17 inches prints for core office;

(u) One facsimile transmission machine for core office and one for field office;

(v) One high-speed color scanner capable of handling 11 inches x 17 inches prints for core office and one for field office;

(w) A multipurpose piece of equipment capable of meeting multiple parts of the requirements above will be considered to meet the requirements;

(x) One paper shredder or secure paper shredding service for core office;

(y) One commercial grade three-hole punch for core office and one for field office;

(z) One commercial grade GBC binder (or equal) for core office;

(aa) All office supplies, including copier paper, toners, pens, pencils, notepads, and other miscellaneous office supplies; and

(bb) One hard copy of all TxDOT and AASHTO design manuals and standards as specified in the Agreement for core office.

(cc) DB Contractor shall certify and state supplied components as functional before installation and will bear all responsibility for replacement of parts at Work commencement. DB Contractor shall prepare test plan for all parts and components and submit, before installation, test installed systems and supply test results, in conformance with industry standard testing procedures.

1.6.2 Core Office

DB Contractor shall provide all space, facilities, and support Elements necessary to design, construct, and maintain the TxDOT Project office in accordance with the Agreement. DB Contractor shall provide office space, not greater than 12,000 square feet (SF), for TxDOT's design and Project management staff, including, other contract employees for a maximum of ten persons. If it is necessary to locate any of these Elements of the Work off-Site or outside of this office, DB Contractor shall obtain TxDOT's prior written consent.

DB Contractor shall provide TxDOT office space available for move-in and functional within the timeframe stated in Table 1-2. The location, condition, and amenities of the office space for TxDOT are subject to TxDOT's prior written approval. DB Contractor shall provide a preliminary TxDOT facility area layout plan to TxDOT. TxDOT will promptly review and comment on required modifications to the layout within ten days. DB Contractor shall submit a final facility layout plan within the timeframe stated in Table 1-2.

1.6.2.1 TxDOT Facility Area and Items Provided by DB Contractor

DB Contractor shall provide separate office space for the exclusive use of TxDOT's design and Project management staff in the TxDOT facility area as specified herein and subject to TxDOT's prior written approval. This office space shall be located within the same building or complex as DB Contractor's office staff. TxDOT will be reasonable regarding re-use of existing space within DB Contractor's current office facility, provided that the space is contiguous and workable in TxDOT's sole discretion.

1.6.2.1.1 Office Condition

The offices shall be in good and serviceable condition, at least of the same quality as those of DB Contractor's counterpart office space, and available for occupancy as specified herein. Both Parties shall participate in a facility condition survey prior to and at the completion of occupancy. TxDOT shall return possession of DB Contractor-provided TxDOT facility area to DB Contractor in essentially the same condition as when TxDOT occupied the facilities, except for reasonable wear and tear and except for alterations, or loss or damage, caused by any member of a DB Contractor-Related Entity.

1.6.2.1.2 Loss or Damage

If office spaces, related facilities, or fixtures are destroyed, damaged, or stolen during the Work in the TxDOT facility area, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within ten Business Days after the occurrence of such destruction or damage, repair those items to their original condition or replace them. However, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, and printers) necessary for normal office operations, replacement shall occur within two Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall replace the facilities noted herein within the timeframes specified herein, and TxDOT shall reimburse DB Contractor for actual, reasonable, and documented costs incurred.

1.6.2.1.3 Office Facilities and Equipment

For the TxDOT facility area it provides, DB Contractor shall:

(a) General. Secure facility space, obtain all permits, install and pay for all utility services, and maintain the facilities as part of the Work;

(b) Access and Security. Provide separate TxDOT entrance/exit(s) from building, which shall be secured with electronic door lock(s) plus a deadbolt lock. DB Contractor shall provide security badge card access with locking doors running on time zone/holiday schedules for entry doors as well as other designated areas (e.g., network/telecommunications, document storage, offices). DB Contractor shall provide software for maintaining access to these areas, which will be owned and/or maintained by TxDOT's design and Project management staff;

(c) Lighting and Electricity. Include with all interior spaces overhead lighting meeting Occupational Safety and Health Administration (OSHA), building, electrical, and energy code requirements for similar office space (provide nominal 30 foot candles of light at 30 inches above finish floor). Each office space shall have at least four duplex receptacles, with minimum circuit capacity of 20 amperes. In addition, each personal office area and conference room shall have a 1,500 volt-ampere uninterruptible power supply. All LAN, telephone system equipment, and appurtenances shall have an uninterruptible power supply sized properly to be capable of providing up to one hour of battery run time;

(d) Janitorial and Trash Services. Provide daily janitorial service (except Saturdays, Sundays, and holidays) and maintain trash containers and trash pickup service for the building and Site areas beyond the TxDOT facility area. This shall include, but not be limited to, sweeping and mopping floors, cleaning restrooms and break room, emptying wastebaskets, and periodic dusting. This service shall be paid for by DB Contractor. DB Contractor shall pay for and procure janitorial services for the TxDOT facility area;

(e) Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;

(f) Accessibility and Licensing. Meet all access requirements of the *Texas Accessibility Standards*, the *Americans with Disabilities Act Accessibility Guidelines*, as amended (42 USC §§12101, et seq.) (ADA), and the applicable building code. Facility design plans shall be submitted to the Texas Department of Licensing and Regulation (TDLR) for review and approval as required by Section 16, Chapter 68 of the Texas Administration Code (TAC);

(g) Restrooms, Break Room, and Entry Space. Provide access to women's and men's restrooms, break room space, and building entry space. These spaces may be shared with DB Contractor's office space/staff. These spaces and all TxDOT spaces shall have access 24 hours per day, seven days per week, and 365 days per year (24/7/365). In lieu of access to a common break room, DB Contractor may provide a 200 SF break room/kitchen within the TxDOT space, with refrigerator with freezer compartment, sink, and microwave. Break room/kitchen will have storage closet (25 SF) and cabinets with drawers and counter tops. In the event that access to restrooms cannot be accessed from a common building entry/lobby, DB Contractor may provide separate restrooms for the TxDOT facility area. In the event it is necessary to locate a separate break room and/or restrooms within the TxDOT facility area, the 3,000 SF TxDOT space allocation may be required to be increased to accommodate these spaces;

(h) Heating Ventilation and Air Conditioning (HVAC). Provide electrical and HVAC systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces, 24/7/365, through the year. Server room shall have dedicated air conditioning/cooling system capable of maintaining temperatures between 65 and 70 degrees Fahrenheit, and 15% relative humidity;

(i) Code Requirements. Meet all applicable building and fire code requirements; and

(j) Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any facility and/or site restoration Work as required.

1.6.2.1.4 Space Requirements

Although actual spaces may vary slightly, the following nominal size requirements will apply, and the typical TxDOT facility area shall include the following Elements:

(a) Offices. Enclosed offices for TxDOT's management staff (nominal 150 SF each, unless otherwise approved by TxDOT), four total with keyed door hardware, desk, desk chair, book case, file cabinet, credenza, and guest desk chair;

(b) Cubicles. Cubicle area spaces for administration staff (nominal 64 SF each), six total; (power supply and data and communication lines to cubicles may be provided through power pole drops);

(c) Conference Rooms. One conference room (enclosed) at nominal 12 feet x 25 feet (300 SF). All shall have dimmable lighting with a minimum 60-inch flat panel monitor with VGA/HDMI accessibility in conferences rooms, and an overhead projector. Each conference room shall have one chair for every 24 SF of conference room space and a conference table of sufficient size for each chair;

(d) Reception Area. Receptionist space with waiting area with seating for two visitors (nominal 200 SF); other furniture to be determined jointly by DB Contractor and TxDOT;

(e) Work Room. Work room (nominal 150 SF) with 30-inch high plastic laminate wall-mounted counters (15 lineal feet of counter). Work room shall be located near the center of the facility, and in close proximity to the receptionist space;

(f) Storage and Filing. One lockable space for storage and filing, nominal 15 feet x 20 feet (300 SF);

(g) Server Room. One computer server room (150 SF) that has limited access and is locked via security card access. Server room shall be accessible via hallway entry not sharing any walls with the exterior of the building, and have no windows, a non-static floor covering, a standard 7 foot-19 inch rack and at least three dedicated 20-amp power circuits and one 30-amp circuit. All patch panels (phone and data) shall be located within the designated server room. Temperature shall be maintained with a dedicated air conditioning/cooling system as defined above;

(h) Parking Area. Parking area for at least 15 vehicles (ten staff/seven visitors) that is reasonably level (all-weather surface and all-weather access); a portion of the available parking area must accommodate an 8-foot vehicle height. If covered parking is available, no less than two covered parking spaces shall be made available to TxDOT;

(i) Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain 2 foot-candles of lighting within the building and parking areas of the site; and

(j) Corridors. Corridors within the TxDOT facility shall have a nominal width of 54 inches.

1.6.2.1.5 Miscellaneous Requirements and Features

The following shall be provided as noted:

(a) Flooring. Carpeted flooring (carpet not required in server room);

(b) Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with uninterruptible power supply on locks (fail closed);

(c) Electrical Outlets. All data/voice outlets shall be installed next to power outlets;

(d) HVAC. 24/7/365 HVAC as previously described;

(e) Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;

(f) Power Circuits. Provide dedicated electrical power circuits for copiers, and minimum of six duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room;

(g) Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction;

(h) Insurance. Insurance (obtained and provided by DB Contractor) covering the use of the Project office by DB Contractor and TxDOT, in accordance with the terms of the underlying property use agreement with the property owner, but in no event shall the insurance be less than that required by the Agreement;

(i) Vending Area. DB Contractor shall provide access to general building vending area;

(j) Utilities. Initial installation and monthly expense of all utilities paid by DB Contractor except long-distance telephone service;

(k) Monthly Services. DB Contractor shall procure and pay directly to the vendor for janitorial, trash, recycling, and secure document shredding services;

(l) Emergency Contacts. 24-hour emergency contact to DB Contractor; and

(m) Furniture. DB Contractor-provided allowance of $15,000 in the Price for additional furniture not listed in the requirements of this Section 1.7.2, which shall be obtained by DB Contractor at the direction of TxDOT, and billed through DB Contractor. At the end of the Project, DB Contractor shall have ownership of the furniture and shall be entitled to the full salvage value of the furniture, with the right to retain or otherwise dispose of the furniture at its sole discretion, without any further accounting to TxDOT.

1.6.3 Field Office

DB Contractor shall provide all space, facilities, and support elements necessary to conduct field operations to complete the Work in accordance with the Contract Documents. DB Contractor shall provide office space for TxDOT's Project management acquisition staff

including, the Program Manager and other contract employees. The field office shall be located within one mile of the Project ROW.

DB Contractor shall provide field office space for the exclusive use of TxDOT's field construction staff for the Project as specified herein. The field offices can be combined with the core office described in Section 1.6.2 as long as the combined offices meet the requirements of Sections 1.6.2 and 1.6.3.

Subject to TxDOT's prior written approval, DB Contractor shall provide separate facilities for TxDOT's resident engineer staff located within the same complex as DB Contractor's field office. Should DB Contractor elect to construct the Work using field offices other than the one specified, corresponding facilities shall be provided for TxDOT's exclusive use and shall be at least of the same quality as DB Contractor's counterpart management and field staff.

Prior to commencing construction of TxDOT's field office space, DB Contractor shall submit for TxDOT's approval final wiring and circuitry plans, office furniture and equipment layout, a field office floor plan, a lighting plan, and a parking plan for TxDOT's Project management and contract staff vehicles.

Concurrent with NTP1, DB Contractor is authorized to begin work on the field office space. Final completion of TxDOT's field office space, including all punch list items, shall occur before TxDOT shall issue Notice to Proceed 2 (NTP2).

In regard to field offices for TxDOT field construction staff, DB Contractor shall ensure the following conditions are achieved:

1.6.3.1 Office Condition

The field office shall be in good and serviceable condition meeting all ADA and local government regulatory criteria for safe a workspace environment, at least of the same quality as those of DB Contractor's counterpart management and field staff, respectively and available for occupancy as specified herein. Both Parties shall participate in a facility condition survey prior to and at the completion of occupancy. TxDOT shall return possession of DB Contractor-provided facilities to DB Contractor in essentially the same condition as when TxDOT occupied the facilities, except for reasonable wear and tear and except for alterations, loss, or damage caused by any member of DB Contractor-Related Entity.

1.6.3.2 Loss or Damage

If office space(s) or related facilities, furniture, or fixtures that are provided by DB Contractor are destroyed, damaged, or stolen during the Work, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within ten Business Days after the occurrence of such destruction or damage, replace those items that it had provided or repair them to their original condition; however, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, printers) necessary for normal office operations, replacement shall occur within two Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall replace the facilities noted herein within the timeframes specified herein, and TxDOT shall reimburse DB Contractor for actual, reasonable, and documented costs incurred.

1.6.3.3 Field Office Facilities and Equipment

For the facilities it provides, DB Contractor shall:

(a) General. Secure sites, obtain all site permits, install and pay for all utility services, and maintain the facilities clean and in good working order as part of the Work;

(b) Access and Security. Provide separate buildings or trailers for TxDOT staff that include at least two entrances/exits, providing an 8 foot x 10 foot (minimum) covered entrance area, from each building or trailer. Each entrance/exit shall be secured with a door lock plus a deadbolt lock;

(c) Lighting and Electricity. Include with all interior spaces overhead lighting meeting the requirements of OSHA and of building and electrical codes for office space. Each office space shall have at least two duplex receptacles. The minimum circuit capacity shall be 20 amperes;

(d) Janitorial and Trash Service. Provide daily janitorial service (except Saturdays, Sundays, and holidays) and maintain trash containers and trash pickup service. This will include, but not be limited to, sweeping and mopping floors, cleaning the toilet, and lavatory and emptying wastebaskets;

(e) Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;

(f) Accessibility. Meet all access requirements of ADA;

(g) Utility Service. Provide potable water, sewer service, and electricity to the field office facility;

(h) HVAC. Provide electrical and HVAC systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces, 24/7/365, through the year. Server room shall have dedicated air conditioning/cooling system capable of maintaining temperatures between 65 and 70 degrees Fahrenheit, and 15% relative humidity. Temperature controls for TxDOT's field office space shall be placed in an appropriate location within TxDOT's secured area;

(i) Code Requirements. Meet all local building and fire code requirements;

(j) Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any site restoration Work as required;

(k) Networking. Provide a secured wireless network with encryption, operating at both 2.4 and 5 gigahertz (GHz) with 802.11a/b/g/n protocols; and

(l) Internet. Provide three T1 lines with a connection speed of 12 Mbps or greater at NTP1.

1.6.3.4 Space Requirements

Although actual space requirements will depend upon Work schedule and geographic locations of the field offices, a typical field office should include the following elements:

(a) Offices. Enclosed offices with lockable doors for TxDOT's construction representative, TxDOT-designated construction manager and one other TxDOT or contract employees (three offices at 150 SF each, unless otherwise approved by TxDOT), with keyed door hardware, desk, desk chair, book case, file cabinet, credenza and guest chair;

(b) Offices/Cubicles. Offices or cubicles for up to six field engineer/inspection/ administration staff (60-80 SF each);

(c) Conference Rooms. One enclosed conference room of not less than (350 SF) and access to another common conference room (350 SF);

(d) Server room. One server room, matching the requirements of the core office server room;

(e) Storage and Filing. Two lockable spaces for storage and filing at each field office (a combined space of 200 SF);

(f) Surveying Equipment Storage. Clean inside storage space for surveying equipment (80 SF);

(g) Tool Shed. Outside shed for small tools and equipment (outside) (200 SF);

(h) Site Amenities. A well-graded site for the office with access road, parking area, and security fence with lockable drive-in gates sufficient to enclose the office and parking area;

(i) Staff Parking Area. A parking area for at least 15 vehicles that is reasonably level (all-weather surface and all-weather access) within the boundaries of a security fence;

(j) Visitor Parking Area. An all-weather level surface outside the security fence to accommodate visitor parking (all-weather surface and all-weather access-minimum of 2,000 SF);

(k) Security. A 24-hour security service or silent watchmen-type security system;

(l) Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain 2-foot candles of lighting within the fenced field office site;

(m) Window Security. Security bars on all exterior windows;

(n) Laboratory Facility. A completed facility suitable to accommodate a functioning portable lab (approximately 2,500 SF) located immediately adjacent to the Independent Quality Firm (IQF) laboratory required in Section 2.2.5.3;

(o) Cultural Resources Storage. Sufficient space and covered facilities for any archeological or paleontological recovery operations (approximately 2,000 square feet);

(p) Kitchen/Break Room. Each field office shall contain a 300 SF kitchen with storage closet (25 SF), cabinets with drawers and counter tops. Kitchen shall be equipped as described above for the core office;

(q) Restrooms. Two restrooms including toilets and sinks; and

(r) First Aid Supplies. Provide emergency first aid supplies in accordance with DB Contractor's Safety and Health Plan.

1.6.3.5 Miscellaneous Requirements and Features

The following shall be provided:

(a) Flooring. All rooms may be tiled, at a minimum, flooring type to be the same or better than flooring provided for DB Contractor personnel in the field office;

(b) Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with uninterruptible power supply on locks (fail closed);

(c) Electrical Outlets. Each office and conference room shall have two (2 data, 1 com Cat 5E) outlets per room, and one (2 data, 1 com Cat 5E) outlet per cubicle, as well as outlets at designated printer, fax, and copier locations and any and all shared areas (i.e., workroom, storage room, etc.). All data/voice outlets shall be installed next to power outlets;

(d) HVAC. 24/7/365 HVAC as previously described;

(e) Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;

(f) Power Circuits. Provide dedicated electrical power circuits for copiers, and minimum of six duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room;

(g) Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction;

(h) Insurance. Insurance (obtained and provided by DB Contractor) covering the use of the Project office by DB Contractor and TxDOT, in accordance with the terms of the underlying property use agreement with the property owner, but in no event shall the insurance be less than that required by the Agreement;

(i) Utilities. Initial installation and monthly expense of all utilities paid by DB Contractor except long distance telephone service;

(j) Emergency Contacts. 24-hour emergency contact to DB Contractor; and

(k) Furniture. DB Contractor-provided allowance of $15,000 in the Price for additional furniture not listed in the requirements of this Section 1.7.3, which shall be obtained by DB Contractor at the direction of TxDOT, and billed through DB Contractor. At the end of the Project, DB Contractor shall have ownership of the furniture and shall be entitled to the full salvage value of the furniture, with the right to retain or otherwise dispose of the furniture at its sole discretion, without any further accounting to TxDOT.

1.7 Submittals

Submittals described in Section 1 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 1-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 1-2: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 1			
Project Photo Renderings	At 30% & 90% design stages or as directed by TxDOT and within 30 days of request	For Information	1.5.1
3-D Design Files	10 days prior to Over the Shoulder Milestone Review Meetings	Review and Comment	1.5.2-1.5.3
Preliminary TxDOT Facility Area Layout Plan	Within 15 days after NTP1	Review and Comment	1.6.2
Final TxDOT Facility Area Layout Plan	Within 10 days after receipt of TxDOT comments	Review and Approval	1.6.2
TxDOT core office space available for occupancy	Within 60 days after NTP1	N/A	1.6.2
Final wiring, circuitry, furniture, equipment, floorplan, lighting, and parking plans for TxDOT field office space	Prior to commencing construction of TxDOT's field office space	Approval	1.6.3
TxDOT field office space final completion	Before NTP2	N/A	1.6.3

SECTION 2.0 PROJECT MANAGEMENT

DB Contractor shall establish and maintain an organization that effectively manages all Elements of the Work. The Project management effort shall be defined by and follow the Project Management Plan (PMP), which consists of Project administration requirements and a collection of several management plan components (PMP components) shown in Table 2-1 below and as described in this Section 2.

The PMP is an umbrella document that describes DB Contractor's managerial approach, strategy, and quality procedures for the design and construction of the Project. The PMP shall achieve all requirements of the Agreement and is a living document for the duration of this contract. The PMP shall include the representations in Exhibit 2 of the Agreement consistent with Section 1.2.2 of the Agreement. Within the timelines for implementing each component of the PMP, the plan shall include details of external auditing procedures.

Table 2-1: Components of the Project Management Plan

Component Title	Section of Technical Provisions That Defines the Component Requirements	TxDOT Approval is a Condition to Issuance of NTP2	TxDOT Approval is a Condition to Commencement of Construction
Project Administration	Section 2.1	Yes	-
Quality Management Plan	Section 2.2	Parts as described in referenced sections	Parts as described in referenced sections
Professional Services Quality Management Plan	Section 2.2	Yes	-
Construction Quality Management Plan	Section 2.2	-	Yes
Public Information and Communications Plan	Section 2.3 and Section 3	Yes	-
Safety and Health Plan	Section 2.4	Yes	-
Comprehensive Environmental Protection Plan	Section 2.5 and Section 4	Parts as described in referenced sections	Parts as described in referenced sections
TxDOT – DB Contractor Communications Plan	Section 2.6	Yes	-
Affected Third Parties Plan	Section 2.7 and Section 5	-	-
Risk Management Plan	Section 2.8	Yes	-
Utility Management Plan	Section 2.9 and Section 6	Yes	-
Right of Way Acquisition Management Plan	Section 2.10 and Section 7	Parts as described in referenced sections	Parts as described in referenced sections
Traffic Management Plan	Section 2.11 and Section 18	Yes	-

Component Title	Section of Technical Provisions That Defines the Component Requirements	TxDOT Approval is a Condition to Issuance of NTP2	TxDOT Approval is a Condition to Commencement of Construction
Maintenance Management Plan	Section 2.12, Section 19, and Attachment 19-4	Version 1	-
Sustainability Plan	Section 2.13	Yes	-

DB Contractor shall include in the PMP all components described in Table 2-1, and shall meet the submittal requirements of Table 2-2.

DB Contractor shall ensure all commitments and requirements contained in the PMP are verifiable and shall allow TxDOT to audit the plans and monitor the activities described in the PMP at all times to assess DB Contractor performance.

2.1 Administrative Requirements

Within 30 days after issuance of NTP1, DB Contractor shall submit for TxDOT approval the project administration component of the PMP (other than the Project Baseline Schedule (PBS), which shall be subject to the requirements of Section 2.1.1) that meets the requirements of this Section 2.1.

DB Contractor shall include in the project administration component procedures for updating all components of the PMP and quality control to establish and encourage continuous improvement. These shall include:

(a) Procedures for preparation of amendments and submission of amendments to any part of the PMP;

(b) Auditing and management review of DB Contractor's own activities under the PMP;

(c) Auditing and management review of Subcontractor's activities and management procedures; and

(d) Procedures to facilitate review and audit by TxDOT and consultants.

In addition, the Project Administration component of the PMP shall include procedures for establishing required Plans not specifically stated in this Section 2 inclusive of the PMP.

2.1.1 Project Schedule

2.1.1.1 General Requirements

DB Contractor shall create a complete and logical Project Schedule that represents DB Contractor's plan for managing and executing the Work. The Project Schedule shall be used to: plan the work; define the timeframe for completion of the Project; provide milestones of major Submittals; monitor progress; facilitate progress payments; and to measure the impact of changes that occur during design and construction.

The scheduling software employed by DB Contractor shall be compatible with the current scheduling software employed by TxDOT as of the Effective Date (currently Primavera P6). DB

Contractor shall provide an electronic file version of the schedule to be imported by TxDOT using TxDOT's scheduling software.

If separate short-term look ahead schedules are prepared using a different tool, DB Contractor shall submit these short-term look ahead schedules to TxDOT and assure they align accurately with the overall Project Schedule.

2.1.1.2 Project Baseline Schedule (PBS)

2.1.1.2.1 Staged Schedule Development

As the design is developed, it is intended that the Project Schedule represent the most accurate information known. Accordingly, a three staged schedule development process shall be used, as follows:

(a) **Preliminary Project Baseline Schedule - PBS1:** Submitted with proposal.

(b) **Project Baseline Schedule - PBS2:** DB Contractor shall use PBS1 as a foundation to prepare PBS2. The schedule shall be fully developed to the work breakdown structure (WBS) levels shown in Attachment 2-1 for the entire Project, and be cost loaded in accordance with Section 2.1.1.2.2, Subsection H. For the Project administration, ROW acquisition, design and Utility coordination WBS levels, the maximum activity durations will be 20 days unless approved by TxDOT. No resource loading will be required for these WBS levels. For the Utility relocation and construction WBS levels, the maximum activity duration will be 40 days unless approved by TxDOT. No resource loading will be required for these WBS levels until PBS3. Upon acceptance, DB Contractor shall update PBS2 monthly until PBS3 is reviewed and accepted.

(c) **PBS3:** PBS3 shall be submitted prior to any construction activities commencing. The level of detail to develop the schedule for the construction and Utility relocations WBS levels are shown in Attachment 2-1. For the construction and Utility relocation WBS levels, the maximum activity duration is 20 days unless approved by TxDOT. The construction and Utility relocation activities shall be resource loaded in accordance with Section 2.1.1.2.2, Subsection G. PBS3, once accepted, will be the revised baseline schedule.

2.1.1.2.2 Schedule Requirements

The schedule shall include all major activities of Work required by the Contract Documents. It shall also include submittal activities and submittal review activities for TxDOT's and all third party reviews, such as for Government Approvals and Utility Owner reviews, which require an approval, acceptance, or concurrence.

The schedule shall indicate the sequence of performing each major activity and the logical dependencies and inter-relationships among the activities, and shall provide a sufficient number of activities to assure adequate planning to allow monitoring and evaluation of progress and, if applicable, payments.

A. WBS and Activity Coding

DB Contractor shall organize the schedule in accordance with the WBS presented in Attachment 2-1. Additional WBS elements and/or levels may be added with TxDOT's approval.

DB Contractor shall supplement the WBS organization with Project level activity codes that allow Project activities to be sorted by type of work, phase, location of work, and responsibility

or as mutually agreed to by DB Contractor and TxDOT. Only Project level activity codes shall be utilized unless otherwise approved by TxDOT. If required, specific Project level activity codes shall be assigned as presented in Attachment 2-1 along with the required WBS.

B. Activities

For each activity in the Project Schedule, DB Contractor shall:

(a) Assign a unique identification number;

(b) Provide a logical activity description so that the scope of Work is identifiable and progress on each activity can be measured. The scope and location of the Work shall be included in the activity description, and a list of abbreviations used in activity descriptions shall be provided by DB Contractor if requested;

(c) Assign quantities of Work to construction activities;

(d) Provide a duration based on the quantity divided by a reasonable anticipated production rate and a list of anticipated production rates for major Work elements. Inclement weather days shall not be accounted for in the activity durations;

(e) Include separate activities for cure time and assign to a cure calendar, unless otherwise approved by TxDOT;

(f) Use the activity "Percent Complete Type" setting in P6 of "Physical Percent Complete", unless otherwise approved by TxDOT; TxDOT approval time should be set to calendar days and set to "Duration % Complete", as this is a set time of review; and

(g) Assign a predecessor and successor relationship for each activity, except for NTP1 and Substantial Completion milestone(s).

C. Calendars

Through the use of calendars, DB Contractor shall incorporate seasonal weather conditions into the schedule, using a ten to 100 year average from the closest station provided by the National Oceanic and Atmospheric Administration, for Work that may be influenced by adverse weather conditions. A seven day/week cure calendar for curing activities shall be included. DB Contractor shall adequately represent non-work days for activities with limitations such as Utility shutdown, work seasons, and landscape seasons. Non-work periods such as holidays as identified in the Agreement shall also be incorporated.

DB Contractor shall set up all calendars as Project specific. Global calendars shall not be used unless otherwise approved by TxDOT.

D. Constraints and Milestones

DB Contractor shall identify each Completion Deadline with a milestone and assign a "Finish On or Before" constraint date. No other constraints are allowed without TxDOT approval.

DB Contractor shall include additional milestones in the schedule to define significant events such as Notices to Proceed (NTPs), start and finish of major segments/areas/regions of work, major traffic changes, and coordination points with outside entities.

E. Schedule Calculation Settings

The default schedule calculation settings in Primavera shall be used, except that critical activities shall be defined as the "Longest Path".

F. Float and Float Suppression

Float shall not be considered as time for the exclusive use of, or benefit of, either TxDOT or DB Contractor but shall be considered as a jointly owned, expiring resource available to the Project. Float shall not be used to the financial detriment of either party.

DB Contractor shall not sequester float through the use of excessive lags, extended durations, calendar manipulation, intangible relationships, or any other such methodology.

G. Resource Loading and Leveling

For all construction activities, resources shall be incorporated at a crew level into the schedule when required. DB Contractor shall provide a list of crews separate from the schedule, and shall identify the composition of and production rate for each crew type. The crews shall be defined as a labor resource type and shall be assigned to appropriate activities.

The schedule option of leveling resources shall only be used with prior notification and concurrence of TxDOT.

H. Cost Loading and Cost Reporting Structure

DB Contractor shall utilize the Organization Structure for Cost Reporting provided as Attachment 2-2 to allocate the total contract amount to the lowest levels shown. Once reviewed and accepted by TxDOT, DB Contractor shall not change the cost allocation without written approval from TxDOT. Attachment 2-2 shall be the same as the WBS level 3, and shall be used for reporting Project costs and developing draw requests.

DB Contractor shall cost load the schedule utilizing the breakdown and category amounts as agreed to in Attachment 2-2, and shall allocate the cost as follows:

(a) No schedule activity shall exceed $1.0 million unless otherwise approved by TxDOT;

(b) The costs shall not be allocated to "Level of Effort" or WBS summary type activities unless approved by TxDOT;

(c) The costs shall not be allocated to TxDOT activities;

(d) The costs shall be broken down in the level of detail for each individual control section job (CSJ) number, and provide the ability to roll up to the approved contract value for each CSJ; and

(e) The costs shall not be artificially inflated, imbalanced, or front loaded when allocated to the activities.

DB Contractor shall submit procedures for addressing payment for unincorporated materials and cost loading modifications for TxDOT's review and approval.

2.1.1.2.3 PBS2 and PBS3 Narrative and Submission

DB Contractor shall prepare and submit a narrative report for the initial PBS2 and PBS3 submittals in accordance with the following requirements. Updates and revisions to these schedules have separate narrative requirements.

A. PBS2 Narrative Requirements

DB Contractor shall provide a schedule narrative that addresses the following in the order listed. The narrative shall:

(a) Describe the plan and approach to each of the major elements of work: ROW acquisition, design, Utilities, additional third party coordination, construction, and tolling. A discussion of the schedule uncertainty shall be included in each of the major elements;

(b) Describe the Critical Path;

(c) Describe the activity identification naming convention and provide a guide to acronyms and abbreviations used in activity descriptions;

(d) Provide a list of activities with durations exceeding the limits required in Section 2.1.1.2.1, as well as an explanation for using a longer duration. Activities exceeding the limits must have written approval from TxDOT;

(e) Describe the approach to setting up the calendars used in the schedule, including adverse weather assumptions, and nighttime and shift work. The source of historical inclement weather data used in defining weather dependent work calendars shall also be provided;

(f) Describe the milestones and constraints used and the completion dates as they relate to the Completion Deadlines in the Agreement;

(g) Describe the use of leads and lags in the schedule;

(h) Describe activity coding methodology;

(i) Describe how resources were addressed in the schedule, as well as resource limitations. A comprehensive list of planned resources including number of crews, crew composition, and expected crew production rates shall be provided for all construction activities; and

(j) Describe how the contract amount was allocated to the activities. A graph showing three cumulative cash flow curves shall be provided: one based on the early dates; one based on the late dates; and one based on the Maximum Payment Schedules.

As an attachment to the schedule narrative, DB Contractor shall provide the following for verifying the electronic copy of the schedule is the same as the schedule presented in the narrative:

(a) 11 inches x 17 inches longest path plot in a Portable Document Format (PDF); and

(b) Copy of the schedule calculation log in a PDF.

All schedule plots shall include: the Project title, the schedule file name, the data date, a page number, and a legend indicating the various symbols used and their meanings.

B. PBS2 Submission

DB Contractor shall submit PBS2 within the timeframe stated in Table 2-2. DB Contractor shall submit the following with the PBS2 schedule:

(a) One copy of the proposed Attachment 2-2 with the total contract amount allocated. In order to facilitate the schedule cost loading, this may be submitted prior to the schedule submission;

(b) One electronic copy of the narrative report in a PDF; and

(c) One electronic copy of the schedule in the Primavera .xer format.

C. PBS3 Narrative Requirements

DB Contractor shall provide a schedule narrative that describes the following in the order listed:

(a) How resources were addressed in the schedule and any resource limitations, including a list of planned resources with number of crews, crew composition, and expected crew production rates;

(b) The plan and approach to the construction of the Project and Utility relocations; and

(c) The longest/Critical Path.

As an attachment to the schedule narrative, provide the following for verifying the electronic copy of the schedule is the same as the schedule presented in the narrative:

(a) 11 inches x 17 inches longest path plot in a PDF; and

(b) Copy of the schedule calculation log in a PDF.

Include on all schedule plots the Project title, the schedule file name, the data date, and a legend indicating the various symbols used and their meanings.

D. PBS3 Submission Requirements

Prior to the commencement of any Construction Work, DB Contractor shall obtain TxDOT review and acceptance of PBS3. DB Contractor shall submit the following with the PBS3 schedule:

(a) The narrative report in PDF;

(b) The narrative report without attachments in Word format; and

(c) The schedule in Primavera .xer format.

2.1.1.2.4 TxDOT Review and Acceptance

TxDOT will review the schedule submittal and within 21 calendar days of submission, return it to DB Contractor as accepted, accepted with comments to be addressed in the following Project

Schedule Update, or returned for resubmission within ten days from the date of receipt by DB Contractor. DB Contractor shall repeat the submittal process until receiving TxDOT acceptance of the Project Schedule.

TxDOT's review and acceptance of the Project Schedule is for conformance to the requirements of the Contract Documents only and does not relieve DB Contractor of any responsibility for meeting any completion deadlines. Review and acceptance does not expressly or by implication warrant, acknowledge, or admit the reasonableness of the logic or durations of the Project Schedule. If DB Contractor fails to define any element of work, activity, or logic and TxDOT's review does not detect this omission or error, DB Contractor is responsible for correcting the error or omission.

DB Contractor is solely responsible for planning and executing the Work and for providing sufficient materials, equipment, and labor to guarantee completion of the Project in accordance with the Contract Documents and completion deadlines.

2.1.1.3 Project Schedule Updates

2.1.1.3.1 Update Requirements

DB Contractor shall update the Project Schedule monthly with actual start and finish dates for completed activities, and physical percent complete and remaining durations for activities in progress. The data date for each Project Schedule Update shall be the day after the progress period for payments closes. Logic changes shall be implemented consistent with the retained logic method of scheduling to allow out-of-sequence Work to proceed. DB Contractor shall submit the Project Schedule Update with the monthly Progress Report.

A. Acceptable Schedule Changes

Acceptable scheduling changes in an update include: logic adjustments to address out of sequence Work and splitting of activities to address significant periods of inactivity for payment purposes.

DB Contractor shall not revise descriptions to represent a different scope than originally intended. No changes in activity durations, activity cost loading, calendar assignments, logic ties, or constraints will be allowed without TxDOT's written concurrence. These are considered schedule revisions. An activity identification number can only be used once. DB Contractor shall not delete an activity, then create a new activity at a later date utilizing the same activity identification number.

B. Acceptable Cost Loading Changes in an Update

The splitting of activities for payment purposes will be allowed provided that justification is submitted, reviewed, and accepted by TxDOT. DB Contractor shall ensure planned budget values match the total Project cost or revised total Project cost at all times.

2.1.1.3.2 Project Schedule Update Narrative and Submission Requirements

DB Contractor shall provide a narrative with each Project Schedule Update submittal. The narrative shall:

(a) Include a comparison between last month's longest/Critical Path and current month's longest/Critical Path, with an explanation for any slippage or gains in Completion Deadlines;

(b) Describe Work performed during the progress period with explanation of deviations between the Work planned or scheduled and the Work performed for the period, and explain any adjustments made to correct actual dates that were prior to the current update period;

(c) Include a table of contract milestones and major interim milestones reflecting current completion dates compared to targeted completion dates;

(d) Describe changes made to the schedule in terms of acceptability for an update and the affect the changes had on the Critical or near Critical Paths;

(e) Include a look ahead at Work to be accomplished during the next month, with a focus on Critical Path items; and

(f) Include a description of potential Project issues that may impact the schedule. A discussion of the following shall be included: how critical each issue is and how much float it has; actions TxDOT could or needs to take to avoid or mitigate the issue; and DB Contractor's Plans on how to mitigate, avoid or resolve the issue. If requested, DB Contractor shall begin the Time Impact Analysis (TIA) process.

A discussion of problems or delay in the Project Schedule Update narrative shall not relieve DB Contractor of complying with contractual requirements regarding notification and documentation of claims.

DB Contractor shall include the following as attachments to the Project Schedule Update narrative:

1. Longest path schedule plot organized by WBS and sorted by early start in a PDF;
2. Schedule plot comparing DB Contractor's actual monthly progress to the previous month's planned progress, organized by WBS in a PDF;
3. A 30-day look ahead schedule layout in a PDF;
4. Monthly expenditure projections in the Attachment 2-2 format;
5. Updated actual cumulative cash flow curve plotted along with the three cumulative cash flow curves: one based on the early dates; one based on the late dates; and one based on the Maximum Payment Schedules required in Section 2.1.1.2.3; and
6. Other layouts or reports as agreed upon or requested by TxDOT.

DB Contractor shall submit the following with the monthly Project Schedule Update:

i. The narrative report with attachments in a PDF;

ii. The narrative report without attachments in Word format; and

iii. The schedule in Primavera .xer format.

2.1.1.3.3 TxDOT Review and Acceptance

TxDOT will review the Project Schedule Update submittal within 14 days of submission, return it to DB Contractor as accepted, accepted with comments to be addressed in the following Project Schedule Update, or returned for resubmission within ten days from the date of receipt by DB Contractor. DB Contractor shall repeat the submittal process until receiving TxDOT acceptance

of the Project Schedule. Acceptance of the Project Schedule Update is required prior to payment of the associated Draw Request.

TxDOT's review and acceptance of the Project Schedule Update is for conformance to the requirements of the Contract Documents only and does not relieve DB Contractor of any responsibility for meeting any Completion Deadlines. Review and acceptance does not expressly or by implication warrant, acknowledge, or admit the reasonableness of the logic or durations of the Project Schedule. If DB Contractor fails to define any element of work, activity, or logic and TxDOT's review does not detect this omission or error, DB Contractor is responsible for correcting the error or omission.

2.1.1.4 Schedule Revisions

2.1.1.4.1 DB Contractor Schedule Revisions

DB Contractor shall submit schedule revisions using a copy of the latest accepted update. DB Contractor shall not update and revise the schedule at the same time. All changes to the schedule, other than allowed in Section 2.1.1.3, will be considered revisions.

2.1.1.4.2 Change Order Revisions

Upon receipt of a request for a change proposal, DB Contractor shall incorporate the proposed change into a copy of the latest update using Steps 1 and 2 of the TIA process, provided in Section 2.1.1.6. The potential time impact which may result from the change shall be assessed by DB Contractor.

DB Contractor shall allocate Change Order costs into the Project Schedule Update immediately following the execution date of the Change Order and assign to the "Change Modification" level of Attachment 2-2.

2.1.1.4.3 Recovery Schedule Revision

When required in accordance with Section 4.5 of the Agreement, DB Contractor shall prepare and submit a "Recovery Schedule" demonstrating the proposed plan to recover schedule slippage and to achieve the Completion Deadlines. The recovery plan shall be explained in writing and submitted in Primavera .xer format.

TxDOT will review the Recovery Schedule submission within 14 days after submission and return it to DB Contractor as accepted, accepted with comments to be addressed in the following Project Schedule Update, or returned for resubmission within ten days from the date of receipt by DB Contractor. DB Contractor shall repeat the submittal process until receiving TxDOT acceptance of the Recovery Schedule.

2.1.1.4.4 Revision Submission Requirements

The following shall be submitted with the schedule revision:

(a) A written revision analysis report providing the reason for the revisions, the scope and changes made to the schedule, and a description of the resulting effects on the schedule including any changes to the Critical or near Critical Paths;

(b) Schedule plots and/or comparison analysis to the update prior to the revision showing the changes that were made in a PDF; and

(c) The revised schedule in Primavera .xer format.

2.1.1.4.5 TxDOT Review and Acceptance

TxDOT will review the schedule revision or Change Order revision submission within 14 days after submission and return it to DB Contractor as: accepted, accepted with comments to be addressed in the following Project Schedule Update, or returned for resubmission within ten days from the date of receipt by DB Contractor. DB Contractor shall repeat the submittal process until receiving TxDOT acceptance of the Project Schedule.

In the event the time impact of a Change Order revision cannot be agreed upon, DB Contractor shall continue tracking the change in accordance with Steps 3 and 4 of the TIA process and report findings.

2.1.1.5 Time Impact Analysis

DB Contractor shall submit to TxDOT a TIA as part of a Potential Change Order (PCO) Notice for an impact that may potentially cause Project delay as set forth in the Contract Documents and when requested by TxDOT for evaluating the potential time impact of Change Orders under consideration.

If TxDOT requests a TIA, it shall be submitted by DB Contractor within the timeframe specified in Table 2-2. Submission of a TIA does not relieve DB Contractor of complying with all contractual requirements regarding notification and documentation of PCOs and actual Change Orders.

Time extensions will only be considered when the total and Project float are absorbed and the Completion Deadline(s) is delayed.

Each TIA shall consist of the following steps:

Step 1: Establishing the status of the Project before the impact by using the Project Schedule Update with the closest data date prior to the impact, or as adjusted by mutual agreement to the date the impact began.

Step 2: Estimating the duration of the impact, determining appropriate logic, and insertion of the impact activity or activities into the Project Schedule Update used in Step 1, and predicting the effect of the impact on the schedule.

Step 3: Tracking the effects of the impact on the schedule during its occurrence. Identifying and measuring the effect of mitigation efforts taken by either DB Contractor or TxDOT.

Step 4: DB Contractor shall establish the status of the Project after the impact is complete and identify any ongoing mitigation efforts being taken.

Steps 1 and 2 shall be submitted to TxDOT with a PCO, or as soon as there is constructive notice of a potential time impact. Step 3 shall be incorporated into Project Schedule Updates until the impact is complete. Step 4 shall be submitted to TxDOT no later than 30 days after the completion of an impact. If Step 4 is not submitted within 30 days, the issue will be considered as having no time impact.

A TIA shall consist of a report with accompanying schedules used in the analysis in Primavera .xer format. The report shall:

(a) Identify the scope and timeline for the impact(s) being analyzed;

(b) Identify the schedules used in the analysis;

(c) Identify the schedule approach to modeling the time impact including the addition of activities, relationships, modifications to calendars, or application of constraints, and include a plot of the portion of the schedule showing the model;

(d) Describe the impact or potential impact by comparing Step 1 to Step 2;

(e) Describe the results of mitigation efforts taken through Step 3;

(f) Describe any other potential mitigation efforts that may be taken to avoid impact;

(g) Describe the status of the Project after the impact is over; and

(h) Include schedule plots illustrating the analysis and documentation supporting dates, timelines, and entitlement.

2.1.1.6 As-Built Schedule

Upon completion of the Punch List, DB Contractor shall submit a final update which will be considered the as-built schedule.

2.1.2 Progress Report

Each month, beginning with the first full month after NTP2, DB Contractor shall submit to TxDOT a monthly Progress Report. An electronic and printed copy of the entire Progress Report shall be submitted to TxDOT.

The Progress Report shall include, at a minimum, the Project Schedule Update narrative and the submission requirements described in Section 2.1.1.3.2 in addition to the following items:

(a) A list of any Change Orders that were identified or executed during the progress period and their status;

(b) Identification and status of issues that arose during the progress period and a summary of resolutions or issues that remain to be resolved;

(c) Status of Project ROW acquisition, and a description of the survey activity performed and condemnation support services provided as described in Sections 7.2.6, 7.3.2 and 7.4.4;

(d) A report of each and every Noncompliance Event that occurred in the reporting period and Project to date, including unique number, name, description, date of occurrence, status, and date of and time of cure (if any) for each;

(e) Summary description of DB Contractor maintenance activities in accordance with Section 19.7; and

(f) Identification of requested and/or required TxDOT actions for the next month.

DB Contractor shall also provide digital progress photographs that accurately depict Project progress as outlined in the Progress Report narrative.

If requested by TxDOT, DB Contractor shall make all corrections to the monthly Progress Report and resubmit. If DB Contractor does not agree with TxDOT's comments, DB Contractor shall provide written notice of disagreement.

2.1.3 Management Organization and Personnel

The project administration component of the PMP shall contain the DB Contractor's organizational diagram and the names, contact detail, titles, and job descriptions of Key and any other DB Contractor principal personnel. DB Contractor's management organizational structure and personnel shall meet the organizational and reporting requirements below in Section 2.1.3 and as described in the Contract Documents.

In addition, the project administration component of the PMP shall contain procedures to establish how the DB Contractor will manage Subcontractors.

2.1.3.1 Project Manager

DB Contractor shall employ a Project Manager (PM) responsible for the overall design, construction, maintenance, contract administration, safety, and environmental compliance on behalf of DB Contractor during Term of the Agreement. The PM shall be in the position to take full responsibility for the prosecution of the Work and will act as a single point of contact on all matters on behalf of DB Contractor during Term of the Agreement. The PM shall be assigned to the Project full time and co-located/on-Site until Substantial Completion. The Project Manager shall be employed by either: (a) Equity Member, Lead Engineering Firm, or Lead Contractor itself; or (b) a controlled subsidiary of such Equity Member, Lead Engineering Firm, or Lead Contractor, or (c) a parent company of an Equity Member if such parent company serves as a Guarantor.

2.1.3.2 Design Manager

DB Contractor shall employ a Design Manager responsible for ensuring the Design Work is completed and design criteria requirements are met. The Design Manager shall be co-located/on-Site whenever design activities for the Project are being performed and available whenever design activities related to field design changes are being performed. The Design Manager shall be a Registered Professional Engineer (PE). The Design Manager shall report to DB Contractor's PM. The Design Manager shall be employed by either: (a) Equity Member, Lead Engineering Firm, or Lead Contractor itself; or (b) a controlled subsidiary of such Equity Member, Lead Engineering Firm, or Lead Contractor, or (c) a parent company of an Equity Member if such parent company serves as a Guarantor.

2.1.3.3 Construction Manager

DB Contractor shall employ a Construction Manager responsible for ensuring that the Project is constructed in accordance with these Technical Provisions. The Construction Manager shall be assigned to the Project full time and co-located/on-Site until Substantial Completion. The Construction Manager shall report to DB Contractor's PM. The Construction Manager shall be employed by either: (a) Equity Member, Lead Engineering Firm, or Lead Contractor itself; or (b) a controlled subsidiary of such Equity Member, Lead Engineering Firm, or Lead Contractor, or (c) a parent company of an Equity Member if such parent company serves as a Guarantor.

2.1.4 Document Management

The project administration chapter of the PMP shall contain procedures for document management including the manner in which records will be maintained in compliance with the Technical Provisions and any specific systems DB Contractor will use.

All electronic information submitted to TxDOT shall be searchable and legible. The PMP shall describe the controls exercised by DB Contractor to ensure that: documents (including the PMP itself) undergo relevant review and approval prior to release; users have access to current versions of documents; versions of documents are identified; obsolete or superseded documents are so marked and prevented from unintended use; and changes to documents undergo same level of review and approval. Document management plan shall include quality control (QC)/quality assurance (QA) processes.

2.1.4.1 Document Storage and Retrieval Requirements

DB Contractor shall establish and maintain an Electronic Content Management System (ECMS) to store, catalog, and retrieve all Agreement documents using the applicable CSJ numbers. ECMS shall be established and operational either within 30 days after NTP1, or prior to receiving first Submittals from DB Contractor, whichever comes first. The ECMS shall be compatible with SharePoint and all Submittals shall be submitted to TxDOT through TxDOT's ECMS. Unless otherwise directed by TxDOT, record retention shall comply with the requirements of the Texas State Records Retention Schedule, and shall be provided to TxDOT at the time of the expiration of the Term of the Agreement or earlier termination of the Agreement.

Construction quality acceptance test results shall be automatically transmitted to TxDOT's I2MS system using TxDOT's extensible markup language (XML) web service. A sample is shown in Attachment 2-3. DB Contractor shall coordinate with TxDOT to obtain the most current version prior to commencing construction quality acceptance testing. The responsible technician and his/her supervisor shall sign the daily test reports and the results of the daily tests shall be provided to TxDOT within 48-hours after test completion.

In the provision of a document management system, DB Contractor shall:

(a) Use data systems, standards, and procedures compatible with those employed by TxDOT and implement any new operating practices required as a result of TxDOT's amendments to any such systems, standards, and procedures;

(b) Provide a secure location for any interface as may be provided by TxDOT, such that only authorized users have access and that it is protected from loss, theft, damage, unauthorized, or malicious use;

(c) Employ appropriate standards and procedures, and train DB Contractor personnel to operate any TxDOT data management system that TxDOT may require in connection with the Project; and

(d) Provide a mechanism for the electronic transfer of metadata along with the associated PDF images for uploading into an ECMS employed by TxDOT.

To allow for disaster recovery, DB Contractor shall back-up all Project-related documents on a nightly basis and store all Project-related documents in a secure off-Site area on a weekly basis.

DB Contractor shall provide TxDOT at DB Contractor's expense, sufficient access to DB Contractor's document control database as deemed necessary by TxDOT.

2.1.4.2 Submittal Requirements

DB Contractor shall prepare and provide all Project related Submittals and documents using English units of measure.

DB Contractor shall furnish all Submittals by electronic copy in accordance with Section 2.1.2. Each Submittal shall have the signature of the PSQAF, unless otherwise expressly stated for a particular Submittal. The electronic copy shall be in a suitable format or in the format in which the Work was originally created unless stated otherwise in the Contract Documents.

DB Contractor shall include with each Submittal a transmittal cover sheet in a form acceptable to TxDOT.

The minimum sheet size for the Submittals shall be 8.5 inches by 11 inches. The maximum sheet size shall be 18 inches by 120 inches. Every page in a Submittal shall be numbered in sequence.

Each Submittal shall be full and complete and shall be assigned a unique, sequential number, clearly noted on the transmittal cover sheet. Revised Submittals shall bear an alphanumeric designation which consists of the unique Submittal number assigned to the original Submittal followed by a letter of the alphabet to represent that it is a subsequent Submittal of the original.

Any changes made on a revised Submittal, other than those made or requested by TxDOT, shall be identified and noted on the revised Submittal.

Design Submittals shall include a title block, consistent with the standard Project drawing format established as part of the QMP, with the following information:

(a) Date of issuance and including all prior revision dates;

(b) Contract title and number;

(c) The names of DB Contractor and applicable Affiliates and DB Contractor Related Entities;

(d) Stage of development;

(e) Reference to applicable technical documents and amendments;

(f) If required, review and acceptance or approval from a Governmental Entity, prior to submission to TxDOT;

(g) Review stamp;

(h) Action block space – All Submittals shall include a sufficient blank space in which DB Contractor may list required actions to be taken;

(i) When calculations accompany drawings in a Submittal, cross-references from the body of the calculations to the individual drawing to which the pages of the calculations pertain; and

(j) Organization of the CADD drawings and associated documents in a logical manner, having a uniform and consistent appearance, and clearly depicting the intention of the design.

2.2 Quality Management Plan

DB Contractor shall prepare and submit a comprehensive Quality Management Plan (QMP) to TxDOT for approval. The QMP shall describe the authority and responsibility for the administration of the QMP and describe how all requirements of the Contract Documents will be met. The QMP shall be consistent with and expand upon the quality approaches and commitments submitted with the Proposal and shall be conformed and updated annually. DB Contractor shall revise its QMP within 14 days of TxDOT or DB Contractor detection of a substantial or systemic problem related to the Work, or as directed by TxDOT. Submissions of the QMP and all updates to the QMP shall include both a clean copy and a copy tracking all changes since the previous approval.

The QMP shall consist of the Professional Services Quality Management Plan (PSQMP) and the Construction Quality Management Plan (CQMP). These distinct plans shall be coordinated with one another such that common quality management system requirements such as document control, process auditing, and corrective and preventive action can be addressed with a single approach. The QMP shall comply with the requirements of current TxDOT *Quality Assurance Program for* CDA/*Design-Build Projects with a Capital Maintenance Agreement with Three Optional 5-Year Terms (QAP for DB Projects)*.

2.2.1 General Requirements

DB Contractor shall develop, implement, and maintain the QMP for the Term. The QMP shall describe the system, policies, and procedures that ensure the Work meets the requirements of the Contract Documents and provide documented evidence of same. The QMP shall encompass all Work performed by DB Contractor and DB Sub-contractors of all tiers.

The QMP shall contain detailed procedures for DB Contractor's QC and QA activities. DB Contractor's quality process shall incorporate planned and systematic verifications and audits undertaken by an independent party. DB Contractor shall conduct all QC, QA, performance verification, and design overlay and coordination among design disciplines, all in accordance with the QMP and the requirements of the Contract Documents.

Inspections, reviews, and testing shall only be performed by personnel with appropriate training and qualifications, for each appropriate item of Work (items produced on and off the Project Site) using appropriate equipment that is accurately calibrated and maintained in good operating condition at an AASHTO (AASHTO R18-10, Establishing and Implementing a Quality System for Construction Materials Testing Laboratories) accredited facility, or at a facility with comparable accreditation (e.g., ISO 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*).

DB Contractor shall regularly maintain the QMP to contain current versions of the following information:

(a) The organizational chart that identifies all quality management personnel, their roles, authorities and line reporting relationships. Personnel relationships relating to quality shall comply with the descriptions in this Section 2.2;

(b) Names, contact details, titles, description of roles responsibilities, and specific experience of all quality management Key Personnel, for other principal personnel and those who have the authority to stop Work;

(c) Identification of testing agencies, including information on each agency's capability to provide the specific services required for the Work, certifications held, equipment and location of laboratories for products produced both on and off the Project Site; and

(d) Identification of what products or services are to be subcontracted, updated when new Subcontractor or Supplier contracts are implemented.

QMP procedures shall: (i) ensure DB Contractor personnel, including Subcontractor personnel, are familiar with all the provisions of the Contract Documents concerning their respective responsibilities; (ii) provide for the education, training and certification, as appropriate, of personnel performing activities affecting or assessing the quality of the Work to assure such personnel achieve and maintain reasonable proficiency; and (iii) ensure the Work is performed according to the QMP, Good Industry Practice, and the Contract Documents. DB Contractor shall plan the training required for each individual and maintain a register demonstrating the QMP training record of all personnel affecting quality.

DB Contractor shall make all quality records immediately available to TxDOT for review. DB Contractor shall provide TxDOT with a copy of any and/or all quality records when requested.

2.2.1.1 Lead Quality Control Manager

The Lead Quality Control Manager (LQCM) shall be responsible for the overall design, construction, and life cycle quality of the Project, implementing quality planning and training, and managing Proposer's quality management processes. The LQCM shall be a Registered PE and shall report directly to DB Contractor's Project Manager. The LQCM shall have a minimum of five years of experience in quality management, including preparation and implementation of quality plans and procedures in both design and construction and shall be an American Society for Quality-certified quality manager, or become certified within six months of NTP1 issued under the Agreement. The LQCM shall be co-located and on-site until Final Acceptance. The LQCM may also serve as either the Professional Services Quality Control Manager or the Construction Quality Control Manager. The LQCM shall be employed by either: (a) Equity Member, Lead Engineering Firm, or Lead Contractor itself; or (b) a controlled subsidiary of such Equity Member, Lead Engineering Firm, or Lead Contractor, or (c) a parent company of an Equity Member if such parent company serves as a Guarantor.

2.2.1.2 Lead Quality Assurance Manager

The Lead Quality Assurance Manager (LQAM) shall be responsible for overseeing the quality acceptance, assurance, and audit functions of the PSQMP and CQMP. The LQAM shall be a Registered PE and shall report jointly to DB Contractor's executive management team and to TxDOT. The LQAM shall have a minimum of five years of experience in quality management, including preparation and implementation of quality plans and procedures in both design and construction and shall be an American Society for Quality-certified quality manager, or become certified within six months of NTP1 issued under the Agreement. The LQAM shall be co-located and on-site until Final Acceptance. The LQAM shall work for an independent Professional Services Quality Assurance Firm (PSQAF) or an independent Construction Quality Acceptance Firm (CQAF) hired by DB Contractor.

2.2.2 DB Contractor's Senior Management Reviews

DB Contractor's senior management shall conduct a management review of the quality program identified in the QMP at least quarterly, and more frequently if necessary or upon written request by TxDOT. Senior management shall mean DB Contractor personnel who provide resources and delegate authority and who coordinate, direct, and control the DB Contractor's Project Manager and the DB Contractor's organization. TxDOT shall be invited to participate in the senior management reviews. Management reviews shall focus on ensuring continued suitability and effectiveness in satisfying the project requirements and DB Contractor's stated quality policy and objectives as stated in the QMP. DB Contractor shall provide TxDOT five days' notice prior to holding senior management review meetings.

Each senior management review shall document, in a Report on the QMP Effectiveness, and assess, at a minimum: the results of DB Contractor and TxDOT audits; corrective, and preventive actions taken; trends in nonconformances and Noncompliance Events; stakeholder feedback; status of previous management review actions; timeliness of responses and resolutions; and quality management successes and failures. The output of senior management reviews shall include any decisions and actions related to: improvement of the effectiveness of the QMP and its processes; improvement of the Work; and resource needs.

As one of the inputs to measurement of the performance of the QMP, DB Contractor shall monitor, record, and act upon all communication from TxDOT and third parties regarding the performance of DB Contractor. The methods for obtaining and using this information shall be described in the QMP.

2.2.3 DB Contractor Auditing

The QMP shall define the responsibilities and requirements for planning audits, conducting audits, establishing records, and reporting results. Audit planning shall take into consideration the risk to quality of the processes and areas to be audited, as well as the results of previous audits. Audit planning shall define the audit scope, frequency, and status, and be documented in a rolling 12 month schedule. Planned and periodic audits shall be undertaken to determine adherence to and the effectiveness of the QMP and other management plans (e.g. Safety and Health Plan, Risk Management Plan, Traffic Management Plan, etc.) The procedure for conducting audits shall describe the use of checklists of requirements, objective evidence, competent auditors independent of the scope of work being audited, and the audit result workflow through to re-audit and close-out of findings. Audit results shall be documented, reviewed, and acted upon by DB Contractor. DB Contractor shall submit to TxDOT the results of all Project quality audits within seven days of their completion.

2.2.4 Control of Nonconforming Work

The QMP shall describe the approach to ensure Nonconforming Work is identified and controlled to prevent its unintended use or delivery. This shall include identification, documentation, segregation, correction, and notification to TxDOT and, if appropriate, Governmental Entities and other third parties that are affected. This approach shall describe how DB Contractor will seek TxDOT formal approval of DB Contractor's proposed resolution to Nonconforming Work, in accordance with the Contract Documents. Resolutions to Nonconforming Work that specify a deviation from Contract Documents (e.g., accept as is), or repair (e.g., patch) shall be approved by the Engineer of Record (EOR), the applicable QA manager, and by TxDOT. The EOR shall evaluate the effect of the proposed disposition on the performance, safety, durability, and long-term maintenance of the project and the specific element affected. DB Contractor shall provide TxDOT 24 hours' notice prior to implementing

approved resolutions. All instances of Nonconforming Work shall be documented separately and their resolution recorded through the use of a nonconformance report. All instances of Nonconforming Work shall be summarized in a nonconformance log with sequential numbering. Requests for information or other forms may not be used in place of a nonconformance report.

2.2.5 Corrective and Preventive Action

The QMP shall describe the approach to eliminate the causes of actual and potential nonconformances in order to prevent occurrence or recurrence. The procedure shall define the requirements for:

(a) Reviewing nonconformances, including Noncompliance Events, and TxDOT written complaints;

(b) Determining the causes of actual and potential nonconformances, Noncompliance Events, and TxDOT written complaints;

(c) Evaluating the need for action to ensure nonconformances, Noncompliance Events, and written complaints do not recur or occur. Actions should be appropriate to the effects of the actual or potential nonconformances;

(d) Determining and implementing action needed;

(e) Records of the results of action taken; and

(f) Reviewing the effectiveness of the action taken.

2.2.6 Professional Services Quality Management Plan

DB Contractor shall prepare PSQMP that describes its policies, procedures, and staffing (including Subcontractors) to manage Professional Services quality of professional services work products in accordance with the requirements of this Section 2.2.6. The PSQAM shall oversee the implementation of the PSQMP.

2.2.6.1 PSQMP General Requirements

The PSQMP shall include all necessary forms, schedules, and requirements checklists, which may be documented in appendices. The PSQMP shall include, at a minimum, a procedure for each of the following processes needed to deliver the Professional Services:

(a) Management approach, stages of design, responsibilities, QC/QA procedures (described separately), reviews, timing, procedure or reference standard, and resulting records for all Professional Services Submittals;

(b) Contract deviations to ensure variances from Contract Documents occur only with TxDOT's approval;

(c) Validation of applicable use of computer programs and checking of inputs;

(d) Interface reviews to ensure consistency and prevention of coordination errors, conflicts, omissions, or misalignments between individuals, agencies, utility owners, disciplines, firms, other projects, existing facilities, project stages, segments, systems, etc. This shall include or reference the coordination of the review, approval, release, distribution, and revision of documents affecting such parties;

(e) Conformance checking to ensure the correct requirements are being utilized;

(f) Accuracy checking to ensure Professional Services output is correct;

(g) Format checking to ensure conformance with appearance requirements, such as CADD, calculations, and specification language;

(h) Independent calculations, without reference to the Designer's calculations, to establish the structural adequacy and integrity of critical items, elements or portions of the Work mutually agreed upon by DB Contractor and TxDOT. The PSQMP shall identify items, elements, or portions of the Work to receive an independent calculation check and the resulting records, as well as an outline of the process for resolving differences between the independent calculations and the designer's calculations;

(i) Constructability reviews to ensure the feasibility and accessibility of all items, elements or portions of the Work;

(j) Scope checking to verify the completeness of Submittals;

(k) External (TxDOT and third party) reviews to obtain input and expedite close-out of comments;

(l) QA control point release, including verification of conformance with procedures for every Submittal, and defined approach to spot checking Submittals;

(m) PSQAF entries of Noncompliance Events and verification of all DB Contractor cures;

(n) Shop drawing reviews;

(o) Maintaining accurate, timely and current documentation of design and design changes from initial release through to Record Documents. A current set of plans and specifications, inclusive of all changes shall be available at all points of use;

(p) Systems that will be used for meeting the documentation requirements for design criteria, reports and notes, calculations, Plans, specifications, schematic design, and all supporting materials needed during the Final Design. Include the specific responsibilities of personnel to satisfy these requirements;

(q) Maintaining, organizing, and indexing all Design Documents. Copies shall be made available to TxDOT upon request; and

(r) PSQAM auditing, including the audit scheduling, of the Design Firm's QC procedures under the PSQMP.

2.2.6.2 Personnel and Staffing

2.2.6.2.1 Professional Services Quality Control Manager

DB Contractor shall assign a Professional Services Quality Control Manager (PSQCM) who shall be responsible for management of the QC program for the Professional Services. The PSQCM shall not be involved with direct scheduling or delivery production activities and shall report directly to the LQCM. The PSQCM shall ensure that the methods and procedures contained in the approved PSQMP are implemented and followed by in the performance of

the Work. The PSQCM shall be a Registered PE and shall have a minimum of four years of relevant experience on projects of similar type and scope.

The PSQCM shall have authority to stop Work.

2.2.6.2.2 Engineers of Record

DB Contractor shall designate (by name) the engineers responsible for each item, Element, or phase of the Work. The engineers responsible shall possess the necessary licenses or registrations in the State of Texas and shall be personally responsible for directly supervising the Work. The named engineers shall seal, sign, and date the Professional Services product for a given item, Element, or phase of the Work as applicable.

2.2.6.2.3 Reviewing Professional Services

DB Contractor personnel performing the QC check of the Professional Services shall not be directly involved with the original development of the item, Element, or phase being checked.

2.2.6.2.4 Professional Services Quality Assurance Manager

DB Contractor shall assign a PSQAM who shall be responsible for management of the QA program for the Professional Services. The PSQAM shall work for an independent PSQAF and shall report directly to the LQAM. The PSQAM shall carry out assurance and audit functions as described in the PSQMP. The PSQAM shall be a Registered PE and shall have a minimum of four years of relevant experience on projects of similar type and scope.

The PSQAM shall have authority to stop Work.

2.2.6.2.5 Professional Services Quality Assurance Staff

The QA staff shall be provided under the direction of the PSQAM to perform oversight and review of all professional services including design, environmental, Utilities, and survey.

The QA staff shall be experienced in the respective aspects of professional services undertaken by DB Contractor. The training and experience of the QA staff shall be commensurate with the scope, complexity, and nature of the Work to be reviewed. Qualifications shall include appropriate experience, certifications, training, and licensure. Professional Services QA staff shall report to the PSQAM.

2.2.6.2.6 Professional Services Quality Assurance Staff Levels

The size of the QA staff shall reflect the volume of QA activities necessary for the Work in progress and shall be maintained in accordance with the approved PSQMP. The QA staff shall perform QA oversight and review typically performed by TxDOT on traditional projects.

The Professional Services QA staffing requirements shall be updated as necessary throughout the Term to reflect changes in the actual design schedule. DB Contractor shall ensure that adequate Professional Services QA staff is available and that PSQMP activities are undertaken in a manner consistent with the Project Schedule and in a manner that will enable DB Contractor to achieve the Substantial Completion Deadline and Final Acceptance Deadline.

2.2.6.3 Stages of Design Development

DB Contractor shall cause all work items, elements, or portions of the Work for each buildable unit packaged as described in Section 2.2.6.3 to pass through all stages of design development, in the order specified below.

(a) Preliminary Design – Plans, specifications, and reports which capture all major items, elements or portions of the Work such that DB Contractor can demonstrate a comprehensive understanding of the Project;

(b) Final Design – The complete and final Design Documents along with the required certifications and documentation showing all TxDOT comments from prior design stages have been addressed in accordance with Section 3.1.7.2 of the Agreement;

(c) Released for Construction – the Final Design issued for the purpose of construction after all prior comments by TxDOT have been addressed to TxDOT's reasonable satisfaction; and

(d) Record Documents – an organized, complete record of Plans, supporting calculations, and details that accurately reflect the actual condition of the constructed Work.

2.2.6.3.1 Submittal Preparation

DB Contractor shall prepare as part of the PSQMP a project specific Design Submittal Preparation Manual to document the formatting and CADD requirements of all Plans, specifications, reports, calculations, and Record Documents. The manual shall follow the TxDOT PS&E Preparation Manual, modified as necessary to suit the needs of DB Contractor and the Project.

DB Contractor shall host a workshop with TxDOT in order to present its Design Submittal Packaging Plan containing: (i) a list of proposed sections (i.e., Station x+xx to Station y+yy) for the Work; (ii) Professional Services packaging and content (i.e. drainage, individual structures, roadway, traffic sequencing, and others); (iii) a list of mandatory Submittals; and (iv) a proposed Submittal schedule. The Professional Services reviews shall be evenly scheduled over the duration of the design phase of the Work. Sections and packages shall be logically organized into buildable units and shall contain sufficient information and details to confirm DB Contractor intent and to validate conditions. DB Contractor shall obtain TxDOT's review and comment of the sections, packages and contents, the schedule, and the methodology prior to making the first Submittal.

The Design Manager shall conduct a series of working meetings with its Professional Services staff, the internal DB Contractor QC staff, the PSQAM, and TxDOT to establish workflow processes and procedures to be utilized during the design review process that are consistent with the Contract Documents.

DB Contractor shall conduct weekly technical working group meetings with its design staff, its QC staff, its QA staff, and TxDOT to discuss general design concepts, approaches, and application of design standards. DB Contractor shall develop, distribute, and maintain records of these meetings.

2.2.6.3.2 Pre-Submittal Workshop and Q & A

DB Contractor shall conduct a Pre-Submittal Workshop, at a location and for a duration acceptable to TxDOT, no later than five days before the scheduled date for each Final Design Submittal. The DB Contractor may elect to conduct workshops for Preliminary Design Submittals as well. Workshops may be conducted during standard weekly meetings. These workshops shall be identified on the Project Schedule. Meeting invitations, supporting materials, and agendas shall be prepared. Such supporting material shall include, at a minimum, a description of the content and scope of the Submittal and the technical disciplines and items

that are the subject of the Submittal. Supporting information shall also include a list of items that will need to be integrated into the design but are not yet advanced to the same stage as the subject Submittal, an explanation of the design status, and a plan detailing how integration will be assured.

The Design Manager shall conduct an additional Pre-Submittal Workshop repeating the process with respect to all or part of a previous Submittal if, in TxDOT's opinion the original presentation did not provide sufficient detail to conduct a review of the Submittal. The purpose of the Pre-Submittal Workshop is for TxDOT to review Professional Services products for general compliance with Project requirements, sound engineering practice, applicable Law, the Governmental Approvals, and the Contract Documents. All Submittals, which are listed in their respective Technical Provisions section, are subject to review and comment by persons designated in these Technical Provisions.

2.2.6.3.3 Preliminary Design Submittal

DB Contractor shall provide its Preliminary Design package to TxDOT prior to development of the Final Design Package. DB Contractor, as part of its Preliminary Design package, shall include all plans, specifications, and reports which capture all major items, elements or portions of the Work such that DB Contractor can demonstrate a comprehensive understanding of the Project, including:

(a) Verification of Project ROW requirements;

(b) Substantiation of design concepts including thorough site investigation and analysis of Site conditions;

(c) Identification of applicable standards and validation of design concept constructability; and

(d) Identification of design and construction interfaces including materials and equipment used.

2.2.6.3.4 Final Design Submittal

After DB Contractor has incorporated the Pre-Submittal Workshop and/or the resubmittal review comments into its design and all concerns and questions have been resolved to the satisfaction of TxDOT, DB Contractor shall provide its Final Design package to TxDOT. DB Contractor, as part of its Final Design package, shall include all:

(a) Design drawings;

(b) Design calculations;

(c) Design reports;

(d) Specifications;

(e) Electronic files (including 3-D design files);

(f) Governmental Approvals;

(g) Utility Owner approvals;

(h) Copies of TxDOT's approval of deviations for design standards and/or Design Exceptions;

(i) Quantity estimates, in units consistent with the quality assurance sampling and testing requirements in the CQMP;

(j) Identification of the designer and checker;

(k) Design Manager certification that the design meets all applicable requirements of the Contract Documents, applicable Law and Governmental Approvals and that all required Governmental Approvals and Utility Owner approvals required for design have been obtained;

(l) Construction Manager certification that the item or element is ready for construction and DB Contractor has obtained all required Governmental Approvals and Utility Owner approvals;

(m) PSQAM certification that the design has been checked in accordance with the approved PSQMP and the Design Documents incorporate all of the Submittal review comments from previous Submittals; and

(n) If applicable, Maintenance Manager certification that the Renewal Work Schedule as defined in the Capital Maintenance Agreement is consistent with the design.

DB Contractor shall obtain TxDOT review and written concurrence with the Design Manager's certification prior to issuing the Released for Construction Documents.

TxDOT's concurrence with the Design Manager's certification of compliance shall not constitute approval of the design or subsequent construction, nor will it relieve DB Contractor of its responsibility to meet the requirements hereof. Irrespective of whether TxDOT provides DB Contractor with the authority to begin construction on items, Elements, or phases of the Work prior to completion of the design for the entire Project, DB Contractor shall bear the responsibility to assure that construction meets the requirements of the Contract Documents, applicable Law, and Governmental Approvals.

Construction on any item, Element or phase covered by the Design Manager's certification of compliance of said item, Element, or phase shall only progress to the extent covered by the Design Documents included in that statement except for the Work performed in accordance with Section 2.2.6.5. Prior to issuing a Released for Construction Document and progressing further with construction of a certified package, DB Contractor shall complete the next item, Element, or phase of design, or complete the Final Design and obtain TxDOT's concurrence, except for the Work performed in accordance with Section 2.2.6.5. Any items, Elements, or phases of design, subsequent to the certification of compliance shall be checked and certified by the Design Manager and verified by the PSQAM in the same manner indicated above.

If TxDOT or the PSQAM determines that the Final Design Documents do not meet the requirements of the Contract Documents, applicable Law and/or the Governmental Approvals, TxDOT or the PSQAM will notify DB Contractor in writing of any specific deficiencies in the Final Design Documents. DB Contractor shall correct such deficiencies; modify the Final Design Documents; and, if necessary, modify construction upon receipt of TxDOT's comments.

2.2.6.3.5 Resubmittal Process

Resubmittals of any design Submittal may be required if deemed necessary by TxDOT or any Governmental Entities with jurisdiction over the Project. TxDOT will provide notification of the requirement to resubmit, in accordance with Section 3.1 of the Agreement. Each resubmittal must address all comments received from a prior Submittal in a manner satisfactory to the commenting party. Submittals shall be resubmitted as many times as necessary to address comments from TxDOT or any Governmental Entity with jurisdiction over the Project. A copy of all correspondence relating to each Submittal made to any Governmental Entity with jurisdiction over the Project shall be concurrently provided to TxDOT.

2.2.6.3.6 Released for Construction Documents

Not later than two Business Days after DB Contractor has completed design of any particular Released for Construction Document, DB Contractor's PM or designee approved by TxDOT shall submit to TxDOT Released for Construction Documents in accordance with the Submittal requirements of the PSQMP. Released for Construction Documents shall include the required certifications for the Final Design and shall be signed and sealed by an Engineer of Record. DB Contractor's Released for Construction Documents shall comply with the requirements of the Contract Documents, shall be detailed, complete, constructible, and shall allow verification of the design criteria and compliance with the Contract Documents.

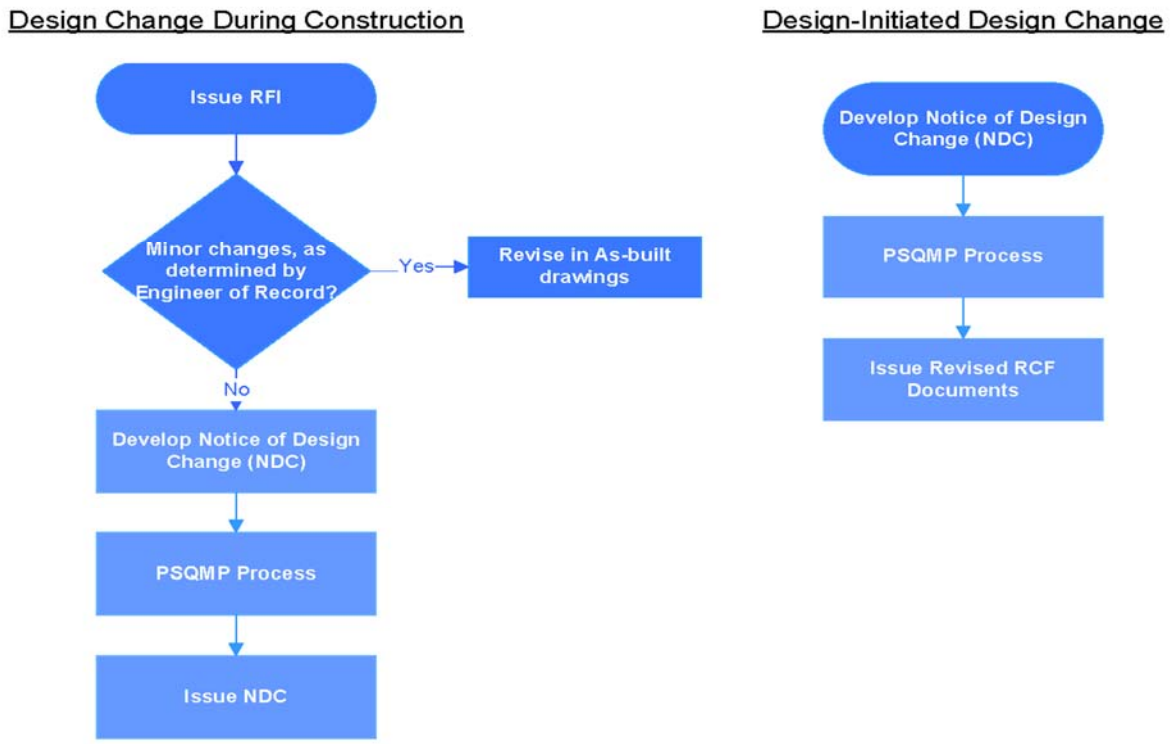
Released for Construction Documents are required for all Construction Work that will be permanently incorporated into the Project and shall also be required for temporary structural items, elements, or portions of Work to be identified by DB Contractor with in the Design Submittal Packaging Plan.

2.2.6.4 Design Changes

2.2.6.4.1 Design Changes During Construction

Design changes to previously submitted Released for Construction Documents are allowed in accordance with this Section 2.2.6.4. In every instance in which DB Contractor intends to construct the Work or has constructed the Work that deviates from the Released for Construction Documents, DB Contractor shall submit to the Engineer of Record a Request for Information (RFI) and include, at a minimum, the plan set and sheet number containing the proposed design change, a brief description of the requested or required design change, and the reason why the item of concern cannot be or was not constructed in accordance with the Released for Construction Documents. DB Contractor cannot resolve Nonconforming Work solely through the use of an RFI.

RFIs that constitute minor changes to the Work and need not initiate a design change or modified calculations shall be used to transfer that information to the as-built drawings. Minor design changes shall be those not needing specialized expertise, not in nonconformance with the project requirements and not materially affecting design intent. Those design changes that require redesign or modified calculations shall be progressed as a Notice of Design Change (NDC). The Engineer of Record, in accordance with the PSQMP, shall determine if an NDC is necessary. DB Contractor shall provide TxDOT a copy of the Engineer of Record's responses to all RFIs prior to implementation. The PSQAM shall review RFIs to ensure that they comply with the QMP. DB Contractor shall also include updated calculations, specifications and reports for all changes, as applicable in the NDC.



2.2.6.4.2 Design-Initiated Design Changes

DB Contractor may, in an effort to add clarity or address concerns with previously submitted Released for Construction Documents, issue a NDC. NDCs shall undergo the same PSQMP processes as the original design including submittal to TxDOT for review and concurrence.

2.2.6.4.3 Responsibilities of Engineer of Record

All plans, specifications, calculations, and reports for design changes shall be signed, and sealed by a Registered Professional Engineer in accordance with applicable Law. Every design change shall be:

(a) Designed in accordance with the requirements of the Contract Documents, applicable Law and the Governmental Approvals,

(b) Checked in accordance with the approved PSQMP, and

(c) Prepared consistently with other Elements of the original design.

2.2.6.4.4 Design Change Processes

DB Contractor shall define in its CQMP and PSQMP its process for:

(a) Communication between its construction and design teams regarding inquiries and design changes consistent with provisions in this Section 2.2.6.4;

(b) Notifications and submittal to TxDOT of RFIs and NDCs;

(c) Requesting and scheduling NDC Pre-Submittal Workshop and Q&A by TxDOT;

(d) Determination by the Engineer of Record of whether a design change shall follow the NDC process or shall only be captured in as-built drawings; and

(e) Identification of third parties impacted by a design change.

2.2.6.5 Early Start of Construction

The following will set forth the circumstances under which certain items, Elements, or phases of the Work may be packaged by DB Contractor to initiate an Early Start of Construction prior to obtaining TxDOT's concurrence of the Final Design for the item, Element or phase. The Early Start of Construction requirements shall apply to any Work that is performed by DB Contractor prior to receiving TxDOT's written concurrence with the Design Manager's certification of compliance of the Final Design Submittal for the Work. All such Work is performed at the sole risk of DB Contractor. TxDOT does not consider any items as satisfying the PSQMP requirements until the Design Manager has issued a certification of compliance and TxDOT has issued a written concurrence therewith.

TxDOT, at its sole discretion, may defer Early Start of Construction for any portions of the Work as requested by DB Contractor.

Any Work constructed by DB Contractor prior to receiving TxDOT's concurrence of the Design Manager's certification of the Final Design Submittal for the Work, and later determined to be unacceptable by TxDOT as described in Section 3.1.8 of the Agreement, shall be revised, removed, or otherwise reconfigured to the satisfaction of TxDOT at DB Contractor's sole cost and expense and without any consideration given to an extension of the Completion Deadline.

TxDOT and DB Contractor shall agree on procedures for Early Start of Construction. The procedures shall, among other things, include a process for distributing Construction Documents signed and sealed by a Registered PE to TxDOT and DB Contractor's field staff. The Design Manager shall also conduct a Pre-Submittal Workshop and Q&A of the Early Start of Construction design Submittal with TxDOT and provide TxDOT with the Submittal drawings, 3-D models or other documents for information and review at least five Business Days prior to the presentation date. In order for DB Contractor to proceed with early phases of construction of a portion of the Work, specific pertinent items of the design shall have been previously reviewed by TxDOT and comments from TxDOT shall have been transmitted to DB Contractor prior to the Pre-Submittal Workshop and Q&A. For example, Early Start of Construction may be rough grading of a specific portion of the Project, for which specific pertinent items of the design may include:

(a) Horizontal and vertical drainage system;

(b) Typical sections;

(c) Related Elements of the drainage system;

(d) Related Elements of the traffic control plan (TCP) specifically applicable during the term of the Early Start of Construction scope;

(e) Subsurface geotechnical investigations and recommendations;

(f) Slope stability analysis and recommendations;

(g) Preliminary structure general plans (if a structure is within the Element or portion of the nonstructural Work);

(h) Settlement monitoring program; and

(i) Construction specifications.

An Early Start of Construction shall be at the sole and complete risk of DB Contractor, and does not release DB Contractor from any of the requirements described in Section 2.2.6. If, as a result of the review process, construction modification or changes to already completed Work Elements performed under the Early Start of Construction are required, DB Contractor shall make any and all construction modifications to already completed construction activities at its sole cost and expense without any entitlement to time extensions or adjustments in the Price.

2.2.6.6 Record Documents

DB Contractor shall submit to TxDOT a complete set of Record Documents in hard copy and native electronic format for the portion of the Project actually opened to traffic. The Record Documents shall be an organized, complete record of Plans and supporting calculations and details that accurately represent what DB Contractor constructed.

DB Contractor shall ensure that the Record Documents reflect the actual condition of the constructed Work prepared from the Released for Construction Documents including any modifications resulting from approved design changes. DB Contractor shall submit to TxDOT the electronic files, including the updated 3-D model, used to prepare the Record Documents.

2.2.7 Construction Quality Management Plan

DB Contractor shall prepare a CQMP that describes its policies and procedures to manage Construction Work quality (including that of subcontractors) consisting of construction QC and QA activities and materials acceptance procedures in accordance with TxDOT's QAP for DB Projects. TxDOT approval of the CQMP shall be a condition of the commencement of Construction Work. The CQMP shall include all necessary forms, schedules, and checklists. These may be documented in appendices. The IQF shall oversee the implementation of the CQMP.

2.2.7.1 CQMP General Requirements

DB Contractor shall construct the Work in accordance with the Released for Construction Documents, or as modified by approved design changes.

The CQMP shall be consistent with the applicable procedures contained in the current TxDOT Contract Administration Handbook for Construction and establish a clear distinction between QC and QA activities and persons performing them.

The CQMP shall clearly address, at a minimum, how the DB Contractor's staff will address the following requirements:

(a) A construction QC organizational and staffing plan, which shall include the period of time that the QC staff member will be present on the Site and the experience/knowledge/skill levels of the QC staff;

(b) IQF organizational and staffing plans, which shall include the period of time that the IQF staff member will be present on the Site, a process for transitioning inspectors on and

off the field based on construction schedule and workload, a process for ensuring sufficient inspection staff for the amount of work being performed, and the required minimum knowledge, technical skills, and experience level of the personnel related to the various inspection functions, such as grading, drainage, pile-driving and structures inspections. The administrative/clerical support staff for maintenance and management of records/documents pertinent to quality assurance for the CQMP activities shall be identified;

(c) Procedures to ensure that the education, training, and qualification of personnel performing CQMP activities are achieved and maintained and that all Work is performed in accordance with the approved designs, Plans, and specifications;

(d) Procedures to ensure that DB Contractor, Suppliers, and Subcontractors designate individuals on each crew to be responsible for performing daily field inspections of their own Work and for preparing a daily QC report to document the inspection performed. Report forms to be used by the responsible QC personnel shall be included;

(e) Documents specifying that all activities undertaken by or on behalf of DB Contractor affecting the quality of the Work shall be prescribed and accomplished by documented instructions, procedures, and appropriate drawings. Such instructions, procedures and drawings shall include quantitative and qualitative criteria to be used to determine compliance;

(f) Procedures to ensure that Elements of the Work are not started or continued without formal communication with IQF personnel. Inspection or control points shall be identified and communicated to the Independent Quality Firm Manager (IQFM), Construction Quality Control Manager (CQCM), and TxDOT. Procedures to proceed beyond the inspection or control points shall be developed. The control points shall include, at a minimum, those described in Attachment 2-4. TxDOT shall be provided a minimum 24 hour notice in advance of all control points. Milestones shall be established at convenient opportunities to inspect the Work and to prevent significant cost of correction. No work may be covered until it has been subject to a control point acceptance by QA personnel. The IQFM and TxDOT may agree to modify established control points to meet the needs of the project;

(g) Procedures for inspecting, checking, and documenting the Work. Inspections, examinations, and measurements shall be performed for each operation of the Work to assure quality. The Inspection plan shall be based on critical Work items or Elements of the Work identified in the Risk Management Plan and the current PBS, and shall discuss number of inspections and when the inspections will occur. The CQMP shall contain detailed descriptions of the following items in inspection plans, test plans, and checklists:

(i) the minimum requirements;

(ii) the responsibility;

(iii) the activity to be tested/inspected;

(iv) the quantities represented;

(v) the group/laboratory to perform the test/inspection;

(vi) the timing and frequency of test/inspection including whether it is incoming, in-process, control point or final inspection/test;

(vii) the test/inspection procedure or reference standard;

(viii) the specified requirement reference; and

(ix) the records that demonstrate conformance;

And shall describe the procedures for the documentation and reporting of such test plans, inspection plans, and checklists.

(h) Procedures for identification and control of materials, equipment, and Elements of the Work. These procedures shall ensure that identification of an item is maintained by appropriate means, either on the item or on records traceable to the item, as necessary, throughout fabrication, erection, installation and use of the item;

(i) Procedures to ensure that materials, equipment or Elements of the Work that do not conform to requirements of the Contract Documents, the Governmental Approvals, applicable Law, or the Design Documents are not used or installed. These procedures shall include identification, documentation, segregation, disposition and notification to TxDOT and, if appropriate, Governmental Entities and other affected third parties, as well as procedures for TxDOT to review Nonconforming Work;

(j) Procedures for processing a Request for Information (RFI) or NDC to resolve discrepancies and/or questions in the Plans and specifications so that all changes are documented and approved by DB Contractor's design engineers, Design Manager, PSQAM and TxDOT;

(k) Procedures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the Work.

(l) A program for coordination of all IQF inspection and testing with Governmental Entities and Utility Owners;

(m) A program to ensure performance of all testing required to demonstrate that all materials, equipment, and Elements of the Work will perform satisfactorily for the purpose intended and meet the standards specified in the Contract Documents. It shall specify written test procedures which include provisions for ensuring that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. The CQMP shall require test results be documented and evaluated to ensure that test requirements have been satisfied;

(n) Procedures for reviewing and approving acceptance test results, categorizing test results in a manner acceptable to TxDOT, transmitting acceptance test results to TxDOT in a format acceptable to TxDOT for use in fulfilling its statistical validation requirements, and working collaboratively with TxDOT to resolve statistical non-validation between IQF and TxDOT test results;

(o) Measures to ensure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified and adjusted at specified periods to maintain accuracy within industry standards;

(p) The preparation of all Portland cement concrete, soil-lime treatment (stabilization or modification), soil-cement treatment, and hot mix asphaltic concrete mix designs by a IQF Registered PE. Additionally, the designs shall be reviewed and sealed by a Registered PE

attesting that the design meets TxDOT requirements for the specified class or grade for which it was prepared;

(q) Sampling and testing of all materials during the production or manufacturing processes so that only materials meeting the specifications are supplied for ultimate incorporation into the Work;

(r) Procedures to control the handling, storage, shipping, cleaning, and preservation of materials and equipment to prevent damage or deterioration;

(s) Procedures to ensure conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment, deviations, and other Nonconforming Work are promptly identified and corrected. The procedures shall ensure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to TxDOT in writing and to appropriate levels of DB Contractor's management to ensure corrective action is promptly taken;

(t) Measures to control the receipt and issuance of documents, such as instructions, procedures, training manuals and drawings, including changes thereto, which prescribe activities affecting quality. These measures shall ensure that approved documents, including authorized changes thereto, are reviewed for adequacy and approved for release by authorized personnel of DB Contractor and are distributed to and used at the location where the prescribed activity is performed. Changes to the documents shall be reviewed and approved by the same organizations that performed the original review and approval unless TxDOT consents, in writing, to another responsible organization;

(u) Procedures for IQF entries of Noncompliance Events and verification of DB Contractor's cure of all Noncompliance Event entries;

(v) The requirements and methods for controlling documents. DB Contractor's document control system shall be compatible with TxDOT's;

(w) Procedures for checking and verifying the accuracy and adequacy of construction stakes, lines, and grades established by DB Contractor; and

(x) Procedures for ensuring that construction alignment and grades are in accordance with the requirements contained in the TxDOT Survey Guide;

(y) Procedures for (i) obtaining and reviewing documentation such as material invoices, pre-approved material test results, shop drawings; (ii) ensuring quality staff and TxDOT have the latest and correct set of Plans and or 3-D model; and (iii) documenting QA inspections, including which requirements were inspected and verified;

(z) Pre-activity construction meetings to ensure all parties responsible for the quality of the Work have a common understanding of the requirements, the design intent, the applicable Design Documents, and procedures, laws, and regulations related to the Work. Pre-activity construction meetings shall be held for all significant activities and repeated whenever there are significant changes in personnel or working conditions, and when there has been a significant lapse of time since the activity was last undertaken. The applicable designer(s) and TxDOT shall be invited;

(aa) Procedures describing the form and distribution of certificates of compliance; and

(bb) Procedures for Warranty Work to control the identification and resolution of warranty issues.

2.2.7.2 Construction Quality Personnel and Staffing

2.2.7.2.1 Construction Quality Control Manager

DB Contractor shall assign a CQCM responsible for management of the QC program for the Construction Work. The CQCM shall not be involved with scheduling or production delivery activities, and shall report directly to the LQCM. The CQCM shall ensure that the methods and procedures contained in the approved CQMP are implemented and followed in the performance of the Work. The CQCM shall be a Registered PE and shall have a minimum of four years of relevant experience on projects of similar type and scope. CQCM shall be co-located and on-Site during periods of construction unless TxDOT approves of a field representative to fulfill CQCM's day-to-day functions.

The CQCM shall have authority to stop Work.

2.2.7.2.2 Construction Quality Control Staff

DB Contractor's and Subcontractors' construction work force are all considered to be members of DB Contractor's QC staff as each and every member is responsible for the quality of the Work. Personnel performing QC inspections shall ensure quality of workmanship and QC sampling/testing shall ensure that materials meet the required specifications prior to acceptance testing performed by the IQF. Personnel responsible for performing QC inspection shall be knowledgeable and receive training to perform their quality control duties. Personnel performing quality control sampling/testing shall be knowledgeable in the testing methods and procedures and do not need to be certified or direct employees of DB Contractor, but cannot be employees of the IQF.

2.2.7.2.3 Independent Quality Firm Manager

DB Contractor shall assign an independent IQFM who shall be responsible for management of the quality assurance program for the Construction Work. The IQFM shall work for the IQF and shall report directly to the LQAM. The IQFM shall carry out assurance and audit functions as described in the CQMP. The IQFM shall review, approve, authorize, examine, interpret and confirm any methods or procedures requiring the "Engineers' review, approval, authorization, examination, interpretation, confirmation, etc." which are contained in the TxDOT Standards, or similar TxDOT approved standards. The IQFM shall be a Registered PE and shall have a minimum of four years of relevant experience on projects of similar type and scope. The IQFM shall be co-located and on-site beginning at NTP2 until Final Acceptance.

The IQFM shall have the authority to stop Work.

2.2.7.2.4 IQF Staff

An IQF inspection and material sampling/testing staff shall be provided under the direction of the IQFM to perform inspection and material sampling/testing of all aspects of the Work performed and materials incorporated into the Project by any member of DB Contractor's staff. If approved in writing in advance by TxDOT, qualified individuals who are employees of or retained by manufacturers, vendors or Suppliers may inspect certain portions of Work.

The IQF inspection and testing staff shall be employees of the IQF and shall have been trained in the applicable inspection and material sampling and testing procedures. The IQF staff member shall be qualified and experienced relevant to the inspection or test they perform, including, but not limited to: highway, ITS, tolling, signalization, and signal timing inspection and material testing. The training and experience of the IQF staff shall be commensurate with the scope, complexity, and nature of the activity to be controlled and tested. Qualifications shall include appropriate TxDOT or State Highway Agency certification for testing and inspection as well as nationally recognized certifications such as American Concrete Institute certification in applicable inspection or testing activities. Construction IQF staff shall report to the IQFM.

The IQF staff shall provide inspections, oversight, and perform audits of the QC inspection and material sampling/testing operation.

The IQF inspection staff shall check compliance of all material, equipment, construction, installations, and operations. Construction activities requiring continuous field quality acceptance inspection or sampling and testing, in the sole discretion of TxDOT, shall proceed only in the presence of assigned QA personnel. The CQMP shall identify those activities.

2.2.7.2.5 IQF Staff Levels

The size of the IQF staff shall reflect the volume of quality assurance activities necessary for the Work in progress and shall be maintained in accordance with the approved CQMP. The IQF staff shall perform quality assurance oversight, inspection, and testing services typically performed by TxDOT on traditional projects, with the exception of monitoring and testing.

The IQF staffing requirements shall be updated as necessary throughout the Term to reflect changes in the actual construction schedule. DB Contractor shall ensure that adequate construction IQF staff is available and that CQMP activities are undertaken in a manner consistent with the Project Schedule and in a manner that will enable DB Contractor to achieve the Substantial Completion deadlines and Final Acceptance deadlines of each Section or Segment.

2.2.7.2.6 Responsibility and Authority of Quality Staff

Personnel assigned to perform inspection, testing, or monitoring of characteristics for assurance shall not be those personnel performing or directly supervising the Work being accepted.

DB Contractor's IQFM and IQF staff shall remain independent of the production Work and of the QC staff.

The IQFM shall prepare a monthly report of the quality inspections and tests performed, results of such inspections and tests, and occurrences and resolution of non-conformance discoveries. DB Contractor shall submit the monthly reports to TxDOT for review.

2.2.7.3 TxDOT Construction Look-Aheads

On a weekly basis, DB Contractor shall update and provide TxDOT with a rolling three-week look-ahead schedule consistent with the current PBS and showing the anticipated start and finish of Work activities. The look-ahead schedule shall include fabrication activities and planned construction activities. Anticipated inspection activities, review by third parties, and all associated control points will be shown in the look-ahead schedules for each of the Work activities.

2.2.7.4 Laboratory Requirements

IQF laboratory equipment in all laboratories shall be certified according to the requirements of Section 4.3.4 of the TxDOT *QAP for DB Projects* prior to commencing any construction activities and shall retain the certification for the duration of the Work.

2.2.7.5 Supply Source and Material Quality

Quality of all materials shall conform to requirements contained in the Contract Documents and to any requirements of affected Utility Owners. The IQF shall provide plant inspection and aggregate sampling and testing at concrete and asphalt plants. Manufacturers' test reports may supplement, but not replace, the QA inspections, sampling, testing and certification provisions.

2.3 Public Information and Communications Plan

Section 3 includes requirements for public information and communications management.

2.4 Safety and Health Plan

DB Contractor shall be responsible for the safety and health of its personnel and of the general public affected by the Project. DB Contractor shall prepare and submit to TxDOT for review and concurrence a comprehensive Safety and Health Plan that is consistent with and expands upon the preliminary Safety and Health Plan submitted with the Proposal. All members of DB Contractor's team shall adhere to DB Contractor's Safety and Health Plan. DB Contractor shall meet the following Safety and Health Plan content and preparation requirements.

DB Contractor shall take full account of the unique attributes of this Project in preparing the Safety and Health Plan, including but not limited to, the rural environment, and the size and scope of the Project. The Safety and Health Plan shall fully describe DB Contractor's policies, plans, training programs, Work Site controls, and Incident response plans to ensure the safety and health of personnel involved in the Project and the general public affected by the Project. The Safety and Health Plan shall cover all phases of the Work, and DB Contractor shall review, evaluate, and update such plan as often as necessary to reflect relevant changes during the Term of the Agreement. The Safety and Health Plan shall contain, at a minimum, the following provisions described below.

2.4.1 Safety Management

DB Contractor shall identify the personnel and responsible staff who will implement, maintain, and enforce the Safety and Health Plan policies, plans, and training programs in the Safety and Health Plan. At a minimum, DB Contractor shall provide a full time on-the-job Safety Manager. The Safety Manager's qualifications, at a minimum, shall include:

(a) Roadway construction and safety enforcement experience;

(b) Ten years of progressive heavy construction experience, five years of which must be safety management experience on complex heavy civil projects;

(c) Though not required, certification, at or before the Effective Date, as a Construction Health and Safety Technician by the Board of Certified Safety Professionals, or certification as a Certified Safety & Health Official, may be substituted for two years of safety management experience;

(d) Completion of the OSHA #500 course – Trainer Course in OSHA Standards for Construction;

(e) Training and current certification for cardiopulmonary resuscitation (CPR) and first aid;

(f) Completion of the following training sponsored by an accredited agency;

(i) Work zone traffic control; and

(ii) Flaggers in work zones.

The Safety Manager shall report directly to DB Contractor's executive management team. The Safety Manager shall have authority to stop all Work on the Project. The Safety Manager shall be employed by either: (a) Equity Member, Lead Engineering Firm, or Lead Contractor itself; or (b) a controlled subsidiary of such Equity Member, Lead Engineering Firm, or Lead Contractor, or (c) a parent company of an Equity Member if such parent company serves as a Guarantor.

In addition, DB Contractor's safety management team shall also have the minimum additional personnel. As part of DB Contractor's safety and health management, all Work shifts shall have, as a minimum, an on-Site Shift Safety Representative. The Shift Safety Representative shall have the following minimum qualifications:

(a) Three years of progressive safety experience and general competency in the construction safety disciplines related to the Work;

(b) Completion of the OSHA 10-hour safety and health course; and

(c) Training and current certification for CPR and first aid.

The Safety and Health Plan shall define the role and responsibilities of the Safety Manager and safety staff, the hierarchical relationship between the Safety Manager and other managers, supervisors, and employees, and how responsibility and accountability for safety will be incorporated at all levels on the Project.

The Safety and Health Plan shall set forth the obligations of all personnel in adhering to the Safety and Health Plan, as well as establish and communicate clear goals for safety, security, and health, including defined objectives for meeting the goals. Requirements for evaluating the effectiveness of policies and measuring success in meeting the goals and objectives of the Safety and Health Plan shall be set forth in the Safety and Health Plan and an environment and means for continuous evaluation and improvement shall be established to achieve the Safety and Health Plan goals and to identify deficiencies so that the goals and objectives can be revised as needed to improve the safety and health of DB Contractor's personnel and of the general public affected by the Project.

The Safety and Health Plan shall set forth incident response plans to ensure the safety and health of personnel involved in the Project and the general public affected by the Project. In addition, the Safety and Health Plan shall set forth procedures for immediately notifying TxDOT of all incidents arising out of or in connection with the performance of the Work, whether on or adjacent to the Project.

2.4.2 Worksite and Jobsite Analysis

The Safety and Health Plan shall establish a reliable system for allowing employees to notify management personnel about conditions that appear hazardous, and to receive timely and appropriate responses, without fear of reprisal.

DB Contractor shall keep readily available at DB Contractor's Project office Site an updated summary of Work related incidents, which may include, at a minimum, a board promoting the number of consecutive incident-free days.

2.4.3 Hazard Prevention and Personal Safety

The Safety and Health Plan shall set forth: (i) the methods and procedures to identify and detail all hazards that may be encountered by personnel while performing the Work, and (ii) practices and procedures that have been developed and implemented to address prevention of identified hazards. DB Contractor shall establish a communications protocol to ensure all employers and employees are aware of hazards in all areas and how to deal with them appropriately. Means shall be provided to evaluate all anticipated and unanticipated activities, and address potential hazards related to these activities.

DB Contractor shall provide the means to ensure personnel understand and comply with safe work practices and procedures through training, positive reinforcement, correction of unsafe performance, and if necessary, enforcement through a clearly communicated disciplinary system established within the Safety and Health Plan.

DB Contractor shall handle Hazardous Materials in compliance with Section 6.9 of the Agreement and the applicable requirements of these Technical Provisions.

2.4.4 Training

DB Contractor shall establish methods within the Safety and Health Plan to identify, develop, and provide relevant training for employees and supervisors designed to ensure that all employees understand and are aware of the hazards to which they may be exposed, and are aware of the proper methods for avoiding the hazards.

DB Contractor shall establish methods within the Safety and Health Plan to identify, develop, and provide supervisory training programs to ensure supervisors understand the key role they play in job Site safety and to enable them to carry out their safety and health responsibilities effectively; to analyze the Work under their supervision to anticipate and identify potential hazards; and to maintain physical protection in their work areas, including the establishment of policies that ensure each employee is provided with the equipment necessary to complete assigned tasks safely.

The Safety and Health Plan shall set forth the procedures to plan and prepare for Emergencies, and to conduct training and Emergency drills.

2.4.5 Drug Free Work Zone

The Safety and Health Plan shall set forth the policies and procedures to require adherence to a 100% drug/alcohol free work zone.

2.4.6 Incident and Emergency Management

DB Contractor shall establish procedures within the Safety and Health Plan to achieve at a minimum, the following:

(a) Maintenance of communication for the exchange of information between DB Contractor, TxDOT, and other involved agencies;

(b) Coordinated support through interaction with local, State, and federal Governmental Entities, as well as other entities, for safe and efficient construction;

(c) Discussion and coordination with Emergency response, traffic control, security, and operational issues affecting construction of the Project, and associated system feeders and exits;

(d) Procedures to update participating agencies regarding status of construction of the Project, and associated system feeders and exits, to assure safe and timely response to Emergency events. As a minimum, this shall include off-Site and on-Site traffic routing changes, and changes to Site access, fire suppression system modifications and in-service availability of standpipes or fire suppression water supply, if applicable, and changes in the Work that may create a greater likelihood of occurrence of a particular type of Emergency;

(e) Procedures for notifying TxDOT of Incidents arising out of or in connection with the performance of the Work;

(f) Compliance with the local hurricane evacuation plan.

2.5 Comprehensive Environmental Protection Plan

Section 4 includes requirements for environmental management.

2.6 TxDOT-DB Contractor Communications Plan

DB Contractor shall submit to TxDOT for approval a TxDOT-DB Contractor Communications Plan that is consistent with and expands upon the preliminary communications plan submitted with the Proposal. DB Contractor and shall maintain and update the plan throughout the Term.

The TxDOT-DB Contractor Communications Plan shall describe the procedures for communication of Project information including notification of incidents affecting the Project or the traveling public between DB Contractor's organization and TxDOT. The TxDOT-DB Contractor Communications Plan shall describe how DB Contractor's organization will respond to unexpected requests for information, communicate changes or revisions to necessary DB Contractor personnel, and notify affected stakeholders before and after changes are made to the Contract Documents.

2.7 Affected Third Parties Plan

Section 5 includes requirements for third party communications management.

2.8 Risk Management Plan

The Risk Management Plan shall describe the approach to identification, management, mitigation, and allocation of Project-specific risks. The Risk Management Plan shall:

(a) Describe DB Contractor's management team's role and responsibilities in risk management listing and describing positions/roles;

(b) Describe how Developer will engage with TxDOT and project stakeholders in managing risk;

(c) Include a detailed work plan and schedule for proposed meetings to discuss risk management;

(d) Describe strategies for controlling and managing project risks;

(e) Describe whether risks will be quantified for potential cost and/or schedule impact and how that will be done;

(f) Identify and describe strategies to allocate risk to the parties best able to manage their impact;

(g) Include a risk matrix which shall identify the following at a minimum:

(i) Significant risk categories during the design, construction and maintenance of the Project;

(ii) The prioritized potential consequences of the identified risks;

(iii) The probable likelihood of risks;

(iv) Proposed procedures and tools to conduct a risk sensitivity analysis;

(v) Risk-mitigation strategies to eliminate or reduce the likelihood and impact of specific risks; and

(vi) Contingency plans to cover the remaining and/or unknown risks.

The Risk Management Plan shall be updated throughout the Project as risks are retired or as additional risks are realized.

2.9 Utility Management Plan

Section 6 includes the requirements for Utility management.

2.10 Right of Way Acquisition Management Plan

Section 7 includes the requirements for ROW acquisition management.

2.11 Traffic Management Plan

Section 18 includes requirements for traffic management.

2.12 Maintenance Management Plan

Section 19 includes the requirements for maintenance management.

2.13 Sustainability Plan

DB Contractor shall provide a Sustainability Plan that describes the approach and commitment to sustainable design, construction, operational, and maintenance practices. Utilizing the FHWA "Infrastructure Voluntary Evaluation Sustainability Tool" (INVEST) program, DB Contractor shall obtain a "Silver" sustainability rating for the Project Development (PD) Module using the "Extended Rural" Scorecard. For the INVEST program, DB Contractor shall utilize INVEST 1.1 or the most recent version at TxDOT's sole discretion. The plan shall, at a minimum, include the following:

(a) Energy Efficiency. The Sustainability Plan shall describe DB Contractor's plans for maximizing energy efficiency throughout the Project, including:

(i) Minimizing energy and fuel usage during construction; and

(ii) Implementing innovative ideas for incorporation of energy generation and use of renewable energy sources.

(b) The plan shall also demonstrate DB Contractor's commitment to develop and implement at least one project feature that publicly demonstrates energy efficiency. This feature shall be a visible element of the project that demonstrates DB Contractor's and owner's commitment to energy efficiency. The feature can also serve to educate the public on other sustainable project elements and practices. Potential features could include, but are not limited to, the following:

(i) Use of solar panels to generate a portion of the energy needs of the project;

(ii) Use of wind turbine(s) to generate a portion of the energy needs of the project; and

(iii) Use of light-emitting diode (LED) fixtures for bridge illumination.

(c) Community and Environmental Justice. The Sustainability Plan shall demonstrate DB Contractor's commitment to environmental quality and enhancement above and beyond the requirements contained in the TxDOT-Provided Approvals, including:

(i) Minimizing air quality degradation during construction;

(ii) Minimizing and mitigating for disproportionately high and adverse human health or environmental effects of construction activities on surrounding communities, including minority populations and low-income populations;

(iii) Commitment to sustainable storm water management, specifically the incorporation of permanent Best Management Practices for storm water management;

(iv) Commitment to providing durable permanent Best Management Practice features that minimize long term maintenance; and

(v) Proposals for quantifying and minimizing the project's carbon footprint.

(d) Green Building. DB Contractor may propose (or commit to obtaining) a Leadership in Energy and Environmental Design (LEED) Green Building certification for the

Core Office. If DB Contractor makes this commitment, certification will be required per the third party independent certification procedures defined by the U.S. Green Building Council (refer to www.usgbc.org). The Sustainability Plan shall identify energy efficiency improvements to the office space and commitments (if made) for obtaining LEED certification for the office space.

(e) Waste Reduction and Recycling. The Sustainability Plan shall describe DB Contractor's approach to minimizing the amount of waste generated by the project. The plan shall also describe DB Contractor's plans for maximizing the re-use of materials, including construction material from structures and facilities demolished as part of this project. DB Contractor may also include plans to incorporate into the project recycled materials generated off site. Any such plan must be in conformance with Contract Documents.

(f) Green Project Administration. The Sustainability Plan shall demonstrate DB Contractor's overall commitment to green project administration, including:

(i) Tracking all environmental commitments and ensuring completion and appropriate documentation of those commitments; and

(ii) Providing construction personnel with the opportunity for construction environmental training, including best practices for minimizing impacts to the human and natural environment.

(g) Materials and Resources. The Sustainability Plan shall describe DB Contractor's commitment to using materials produced in a manner that minimizes ecosystem degradation and reduces lifecycle impacts from extraction, production, and transport of virgin materials.

(h) Construction Practices. The Sustainability Plan shall demonstrate DB Contractor's commitment to using construction practices that minimize impacts to the environment and community surrounding the Project.

(i) Sustainability Level. The Sustainability Plan shall identify the number of INVEST points that the Project will obtain as would be determined in a joint DB Contractor/TxDOT/FHWA INVEST project scoring workshop, utilizing the INVEST Project Development (PD) Module with the "Extended Rural" scorecard. DB Contractor shall indicate the number of points that the Project will score based on points that are attributable to previous TxDOT work and points obtained by DB Contractor designing and executing the constructed Work.

(j) Personnel and Staffing. The Sustainability Plan shall define the roles and responsibilities of Key Personnel in ensuring that the proposals outlined in the Sustainability Plan are carried out during construction. DB Contractor shall also assign a Sustainability Manager responsible for leading DB Contractor's efforts in obtaining sustainability certification as set forth in this Section 2.13.

2.14 Submittals

Submittals described in Section 2 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 2-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 2-2: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 2			
PMP – Project Administration Component	Within 30 days after NTP1	Approval prior to issuance of NTP2	2.1
Project Baseline Schedule (PBS2)	Prior to issuance of NTP2	Review and Acceptance	2.1.1.2.3.B
Project Baseline Schedule (PBS3)	Prior to Commencement of Construction	Review and Acceptance	2.1.1.2.3.D
Project Schedule Updates	Monthly after initial PBS2 and PBS3 submittals and as part of the Progress Report	Review and Acceptance	2.1.1.3
Schedule revisions – • DB Contractor revisions • Change Order revisions • Recovery Schedule revisions	As necessary	Review and Acceptance	2.1.1.4
Time Impact Analysis	As necessary; within 15 days of receiving the request from TxDOT	Approval	2.1.1.5
As-Built Schedule	Upon completion of the Punch List and before Final Acceptance	Approval	2.1.1.6
Progress Report	Monthly; within five days after the progress period for payment closes	Review and Acceptance	2.1.2
Progress Payment submittal	With the monthly Progress Report	Approval	2.1.2
Written notice of disagreement with TxDOT Progress Report comment	Within seven days from the receipt of TxDOT comments	Review and Acceptance	2.1.2
Progress Report resubmission	As necessary	Review and Acceptance	2.1.2
Electronic Content Management System (ECMS)	Within 30 days after NTP1 or prior first Submittals	Approval	2.1.4.1
Revisions to the QMP	1. Annually; 2. Within 14 days of detection of a substantial or systemic problem; and 3. As directed by TxDOT Prior to implementation	Approval	2.2
Quality records	When requested	For Information	2.2.1
Notification of scheduled senior management review meetings	Quarterly, five days prior to the scheduled senior management review meeting	For Information	2.2.2

Table 2-2: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Senior management review meeting minutes	Quarterly, within 14 days of meeting	For Information	2.2.2
Report on QMP effectiveness	Quarterly, within two weeks of senior management review	Review and comment	2.2.2
Results of Project quality audits	Within 7 days of completion	For Information	2.2.3
DB Contractor Non-conformance Reports	Within 24 hours of both issuance and resolution	For Information	2.2.4
Responses to TxDOT Nonconformance reports	Within 48 hours of receipt	Review and comment	2.2.4
DB Contractor Corrective and Preventive Action Requests	Within seven days of initiation and close-out	For Information	2.2.5
Responses to TxDOT Corrective/Preventive Action Requests and written complaints	Within seven days of receipt	Review and comment	2.2.5
PMP – Professional Services Quality Management Plan	Within 30 days after NTP1 and prior to submitting design packages for TxDOT review	Approval prior to issuance of NTP2	2.2.6
Copies of all Design Documents	Upon TxDOT request	For Information	2.2.6.1
Design Submittal Packaging Plan	Prior to the first Professional Services Submittal	Approval	2.2.6.3.1
Technical Working Group meeting minutes	Within 2 Business Days of the meeting	For Information	2.2.6.3.1
Pre-Submittal Workshop meeting invitations, supporting materials, and agendas	5 Business Days prior to the workshop	Information	2.2.6.3.2
Pre-Submittal Workshop meeting minutes	Within 5 Business Days of the meeting	For Information	2.2.6.3.2
Preliminary Design Submittals	Prior to Final Design Submittals	Review and comment	2.2.6.3.3
Design Exceptions and Design Waiver Requests	Prior to Final Design Submittal	Approval	2.2.6.3.4
Final Design Submittal	After the Pre-Submittal Workshop and resolution of all TxDOT comments	Concurrence	2.2.6.3.4
Released for Construction (RFC) Documents	After TxDOT concurrence and within 2 Business Days of completion	For information	2.2.6.3.6

Table 2-2: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Requests for Information and copied of EOC's determination of NDC	As necessary, prior to implementation	For Information	2.2.6.4.1
Record Documents	Prior to Final Acceptance	For information	2.2.6.6
Manufacturers' warranties, guarantees, instruction sheets, parts lists, and other product data	With the Record Documents	For Information	
PMP – Construction Quality Management Plan (CQMP)	Within 90 days after NTP1	Approval	2.2.7
Daily QA inspection and test results	Within 24 hours after the work shift	For information	2.2.7.1
QC inspection reports, process control material sampling/testing results and control charts	Within 1 Day following the inspection or test	For information	2.2.7.1
Notice of control points	24 hours prior	For Information	2.2.7.1
IQFM's Monthly Quality Report	Monthly during Construction Period	Review and Comment	2.2.7.2.6
Construction Look-a-heads	Weekly	For information	2.2.7.3
PMP – Safety and Health Plan	Within 30 days after NTP1	Concurrence prior to issuance of NTP2	2.4
PMP – TxDOT – DB Contractor Communications Plan	Within 30 days after NTP1	Approval prior to issuance of NTP2	2.6
PMP – Risk Management Plan	Within 30 days after NTP1	Approval prior to issuance of NTP2	2.8
PMP – Sustainability Plan	Within 30 days after NTP1	Approval prior to issuance of NTP2	2.13

SECTION 3.0 PUBLIC INFORMATION AND COMMUNICATIONS

3.1 General Requirements

The objective of the public information and communications program is to maintain a high level of two way communication by informing and engaging Governmental Entities, special interest groups, businesses, communities, and the general public about the Project status throughout the duration of the Project.

DB Contractor shall be responsible for developing and implementing the program in coordination with TxDOT. DB Contractor shall coordinate all public information communications with ongoing TxDOT public information activities to ensure that a consistent message is being distributed to the Customer Groups.

DB Contractor shall meet regularly, on a mutually agreed upon schedule, with the TxDOT Houston and Bryan Districts' public information officers, TxDOT Office of Public Involvement and other stakeholders to coordinate efforts.

Complete copies of all materials to be presented to the public or the media shall be provided to TxDOT at least three Business Days prior to dissemination.

3.2 Administrative Requirements

3.2.1 Public Information and Communications Plan

DB Contractor shall submit to TxDOT for approval a comprehensive Public Information and Communications Plan (PICP) in accordance with this Section 3.2.1, based upon the preliminary PICP submitted with DB Contractor's Proposal, which informs, educates, and engages the Customer Groups throughout the Project. TxDOT and DB Contractor shall jointly organize a communications planning workshop (TxDOT/DB Contractor workshop) within 14 days following issuance of NTP1 to discuss development of the PICP and to ensure the contents of the draft PICP meet TxDOT expectations. TxDOT and DB Contractor will jointly develop a draft agenda and determine a suitable location for the workshop.

DB Contractor shall submit the PICP to TxDOT for approval within 30 days after issuance of NTP1. The PICP shall contain the following information:

(a) Organization

(i) DB Contractor's main contractual arrangements; and

(ii) Organizational structure covering the activities to be performed in accordance with the Contact Documents.

(b) Personnel

(i) DB Contractor's plan to provide experienced personnel to perform Work in accordance with Section 3 of the Technical Provisions; and

(ii) Arrangements for coordinating and managing staff interaction with TxDOT and its consultants, including colocation of Key personnel and a description of approach to coordinating work of off-site personnel.

(iii) Names and contact details, titles, job roles and specific experience required for Key Personnel and for other principal personnel; and

(iv) Names and contact details, titles, and job roles of principal personnel for Subcontractors and any third party with which DB Contractor will coordinate his activities.

(c) Subcontractors

(i) Overall control procedures for Subcontractors, including consultants and subconsultants;

(ii) Responsibility of Subcontractors and Affiliates; and

(iii) Steps taken to ensure Subcontractors and suppliers meet the obligations imposed by their respective contracts.

(d) Interfaces

(i) Procedures for liaison with the public, the media, and other Customer Groups in accordance with the Section 3 of the Technical Provisions and the press media policy of TxDOT; and

(ii) Procedures to coordinate with Project Stakeholders such as Governmental Entities and other Customer Groups.

(e) Procedures

(i) Procedures describing how the principal activities will be performed.

(f) Quality Control

(i) Quality control procedures including a resource table for monitoring and auditing all public information and communication services;

(ii) Procedures to ensure accuracy, completion, and quality in submittals to TxDOT, Governmental Entities and Customer Groups; and

(iii) Procedures to establish and encourage continuous improvement.

(g) Audit

(i) Name of DB Contractor's representative with defined authority for establishing, maintaining, auditing, and reporting on PMP; and

(ii) Name, title, roles and responsibilities of supporting quality management staff reporting to the person with defined authority.

(h) Document Management

(i) The manner in which records will be maintained in compliance with the Technical Provisions, including any specific systems DB Contractor will use; and

(ii) Document management procedures in compliance with Section 2 of the Technical Provisions.

The PICP shall identify specific outreach or engagement activities, the frequency of those activities, what modes of communication will be used, and what process DB Contractor will use in order to measure the effectiveness of the PICP. DB Contractor shall pay particular attention to the different stakeholder dynamics of the two counties. Furthermore, DB Contractor shall develop unique information dissemination techniques to reach underserved communities along the Project. Submittal shall be in both hardcopy form and electronic format compatible with TxDOT software.

In preparing this plan, DB Contractor shall identify the Customer Groups and develop specific plans to respond to their concerns and needs in all respects regarding the Project. After incorporation of comments from TxDOT in the PICP, DB Contractor shall implement the various activities and initiatives contained therein. DB Contractor shall continually maintain the plan to ensure delivery of high-quality, well executed communications throughout the Project.

The PICP shall be flexible to capture the full magnitude of yet-to-be-determined impacts from Project activities and the public's reaction to these and other impacts. Together with TxDOT's designated point of contact for the Houston and Bryan Districts' public information offices, DB Contractor shall periodically review the PICP on a basis not less than annually to forecast, plan and coordinate updates in the plan, and implement strategies needed to effectively accomplish the stated goals and objectives. The PICP shall also be resilient to successfully implement the outlined strategies, given the ever-changing desire for depth, breadth, and frequency of information by a variety of important Customer Groups such as the media, elected officials, and the general public.

The PICP shall include a general timeline listing public information activities throughout the Project. This timeline shall be used as an initial guide and shall be updated by DB Contractor as the Project is implemented no less than on an annual basis.

TxDOT may audit DB Contractor's performance of the activities set forth in the PICP. DB Contractor shall make appropriate changes to the PICP as required to meet the findings of any audit or review and to suit the changing goals and needs of the Project. DB Contractor shall cooperate with TxDOT to amend the PICP as required to suit circumstances as yet unknown, including public reaction to the impacts, real or perceived, from the Work and the depth, breadth, and frequency of information necessitated by Customer Groups. DB Contractor shall document the efforts and results of the PICP in measurable terms to clearly indicate compliance.

DB Contractor shall provide sufficient qualified staffing to effectively implement the PICP.

In developing the PICP, DB Contractor shall develop appropriate provisions to achieve the following requirements:

(a) Gain and maintain support or informed consent from Customer Groups, building on existing community partnerships and communication networks;

(b) Provide Customer Groups with regular opportunities for input early and often throughout the development process;

(c) Demonstrate to Customer Groups that the Project will be developed pursuant to a well-executed program;

(d) Notify Customer Groups in advance of key Project ROW acquisition, construction, and maintenance activities and communicate the potential impacts of these activities using a variety of methods that are tailored to specific stakeholder needs. For example, mailed communications and flyers are proven to be effective notification techniques for regional stakeholders;

(e) Provide public information which facilitates alternative trip planning during construction;

(f) Address the Project-specific concerns of Customer Groups, including interests in Emergency Services vehicle access, business owner and patron driveway access, delivery access, adjacent neighborhood access, changes to bicycle and pedestrian access and neighborhood traffic patterns, changes to mobility access associated with ADA, construction noise and lighting, and ongoing noise issues; and

To achieve these goals, DB Contractor shall use, but not be limited to, the following implementation strategies as described below.

3.2.1.1 Public Information and Communication

(a) Develop a forum to coordinate on-going dialogue among Customer Groups, TxDOT, and DB Contractor. DB Contractor shall pay particular attention to the older aged, minority, and limited English proficiency communities within the region and develop unique information dissemination techniques to reach these and other underserved communities;

(b) Develop a strategy for communicating stakeholder comments to TxDOT, incorporating stakeholder comments into the Project, and informing the public of decisions made at TxDOT's direction, in a timely manner;

(c) Prepare and distribute Project-related materials in a user-friendly format to inform Customer Groups through appropriate means such as: meetings, business owner task force meetings, interviews, website, media kits, news releases, telephone correspondence, newsletters, brochures, e-mail, text messaging service, social media, mobile phone applications, hotlines, Highway Conditions Report System (HCRS), dynamic message signs (DMS), web alerts, public opinion polls/surveys, videos, display booths, presentations, public access information kiosks, open houses, milestone events, and special events;

(d) Organize and manage meetings and communications with Customer Groups. Meetings can be held on an ad hoc basis or, as appropriate, on a regular basis as established in consultation with TxDOT;

(e) Attend events and meetings when invited and seek opportunities to attend meetings, conferences, and other events at which Project information can be exchanged with Customer Groups;

(f) Notify Customer Groups in advance of Work being performed, including key Project ROW acquisition, construction, maintenance activities, and communicate the potential impacts of these activities;

(g) Develop, disseminate and display timely, high-quality, innovative, user-friendly, accurate and appropriate community information concerning the Project, including exhibits showing slope grading, drainage, bridge structures, retaining walls, noise walls, Project ROW acquisition, and aesthetic characteristics using easy-to-understand language;

(h) Develop and manage a public relations campaign and communication strategy to convey key messages, branding, and pertinent information about the Project. Include Work elements, timing, and durations. Provide contact information for inquiries by Customer Groups;

(i) At appropriate times and phases and as requested by TxDOT, coordinate and perform tours of the Project;

(j) Comply with the latest requirements of the TxDOT *Guidelines for Analysis and Abatement of Highway Traffic Noise* (2011);

(k) Develop materials and make arrangements for multi-lingual and hearing impaired groups when it can be reasonably anticipated that material will be presented to multi-lingual or hearing impaired Customer Groups;

(l) Communicate impacts and design for accommodation of pedestrians and bicyclists throughout the Project;

(m) Conduct tabletop exercises with stakeholders and Governmental Entities to help prepare for potential emergency situations during construction phase; and

(n) Compile database of all customer group contacts and make readily available to TxDOT in an easily accessible format.

3.2.1.2 Media

(a) Utilize existing TxDOT media resources or create and develop advertising messages, including graphics, logos, and slogans;

(b) Place Project-related messages in the appropriate media;

(c) Develop and distribute public service announcements, paid advertising, news reports, and other communication materials as appropriate;

(d) Manage media relations with key transportation and business reporters and prepare and distribute news releases and media kits;

(e) Develop and implement communications plans that anticipate and minimize traffic impacts on the Project from public, special, and seasonal events;

(f) Monitor local, state, and national media coverage for accuracy and to gauge local opinion. Coordinate with TxDOT regarding TxDOT's response to inaccurate information. Respond in a method, time, form and message approved by TxDOT to such inaccurate information as soon as possible but no later than within one day;

(g) Document and make available Project-specific media clips to the entire Project team; and

(h) Employ the use of an internet based communications, including the use of social media, media alert, press release, and special list notifications system/service that provides information in real time with an up to date database of major media contacts in the area and subscriber lists.

3.2.1.3 Communication Hierarchy

The PICP shall detail the communication hierarchy for information distribution. The PICP shall include names and contact information, including emergency contact information, and the preferred methods of routine, and emergency communication distribution.

3.2.2 Public Information Coordinator

DB Contractor shall provide a Public Information Coordinator to lead DB Contractor's public involvement activities on a day-to-day basis throughout the Project. The Public Information Coordinator shall have a minimum of four years of relevant experience on projects of similar type and scope, and the ability to competently perform the following:

(a) Serve as the primary point of contact between DB Contractor and Customer Groups, and in partnership with TxDOT's Office of Public Involvement and the Houston and Bryan Districts' public information offices for the dissemination of Project information, and act as clearinghouse for the receipt of and response to written or verbal comments or complaints regarding the Project;

(b) Coordinate all elected official interface with TxDOT's Houston and Bryan Districts' public information offices and Government Relations Office;

(c) Lead the production, implementation, QC, and update of the PICP;

(d) Coordinate and supervise day-to-day activities of DB Contractor's personnel in performing the public information activities described in the PICP;

(e) Facilitate communication among DB Contractor, TxDOT personnel (including TxDOT's Houston and Bryan Districts' public information officers), and Customer Groups;

(f) Interact with Customer Groups and represent the interests of the Project at meetings and other formal and informal events;

(g) Develop a "first-hand feel" for Customer Groups' concerns and reactions regarding the Project and public information program and incorporate that knowledge into improving the PICP;

(h) Liaise with the person assigned to coordinate the initial response to any Incident or Emergency and any Governmental Entity that may have jurisdiction in the Emergency;

(i) Liaise with the appropriate staff and Customer Groups as appropriate to outline the impacts and benefits of the Project in relation to parks and pedestrian/bicyclist access; and

(j) Create and manage a Customer Group database. Allow TxDOT access to database as requested.

The Public Information Coordinator shall actively engage, inform, and seek appropriate support from Customer Groups for the Project throughout every phase of the Project.

3.2.3 Public Information Office

DB Contractor shall maintain a public information office throughout the Project. The hours of operation for this office shall be as outlined below. This office shall serve as the primary business location for the Public Information Coordinator and shall be conveniently located along one of the existing cross roads within one mile of the Project Site. The public information office shall provide a centralized location for residents and other Customer Groups to obtain information on the Project, including Project maps and Plans, fact sheets, alternative routes, lane closures, construction updates, community impacts, and commute options.

The public information office shall have readily available access to conference rooms capable of hosting Customer Group meetings. The rooms shall be ADA-compliant, convenient to and accessible by Customer Groups, and appropriately supplied with electrical outlets, tables and chairs, and other equipment to meet meeting requirements. DB Contractor shall provide sufficient parking to accommodate use of the public information office.

During design and construction, the minimum hours of operation of the public information office shall be in accordance with normal Monday to Friday business hours. Additionally, DB Contractor shall be available for appointments on Saturday and/or Sunday as needed and available to extend hours of operation to appropriately service Customer Groups.

In addition to the services listed above, DB Contractor shall provide a 24-hour telephone hotline that is manned locally during the public information office's normal business hours and that provides a recorded message describing Emergency procedures after hours. DB Contractor shall respond to voicemail messages left after hours within 24 hours of receiving the voicemail message.

3.2.4 Meetings with the Public and Customer Groups

DB Contractor shall organize and manage meetings with the general public and Customer Groups throughout the Project and will coordinate with TxDOT regarding the list of invitations to attend meetings and other events.

The frequency of such meetings shall be addressed in DB Contractor's PICP and will increase or decrease as needs arise to better inform and engage the Customer Groups. DB Contractor shall propose a schedule of meetings with the general public and Customer Groups to TxDOT. The meetings will be conducted at a minimum, shall address Project construction and maintenance, and will provide public input opportunities. From time-to-time, upon the request of TxDOT, DB Contractor shall modify its meeting schedule to better inform and engage the Customer Groups.

To maximize public participation, DB Contractor shall advertise meetings hosted by DB Contractor with sufficient advance notice. Advertisement shall include utilization of e-alerts, social media, and its website and in the appropriate media outlets, such as the Texas Register, local newspapers, and television and radio stations, or via media advisories and media releases. DB Contractor shall be solely responsible for all meeting advertisements except that the Texas Register advertising, when appropriate, shall be routed through TxDOT's Houston and Bryan Districts' public information offices. DB Contractor should also work in partnership with TxDOT's Office of Public Involvement to ensure a comprehensive approach to meeting notifications and feedback opportunities, and to conform to agency public outreach standards.

During such meetings, DB Contractor shall inform the participants of the Project's progress and discuss key issues as they emerge. DB Contractor shall provide timely and useful information regarding subjects of interest to the Customer Groups, including:

(a) Design and construction issues affecting adjacent residential areas, access roads, local streets, and Utilities, including such issues as Project ROW, Project ROW acquisition process, grading, drainage, access, lighting, aesthetics and noise, and retaining walls;

(b) Street and roadway detour design and implementation;

(c) Scheduling and duration of Work, including hours of construction;

(d) Haul routes;

(e) Methods to minimize noise and dust;

(f) Environmental mitigation measures, including noise workshops;

(g) Other environmental issues; and

(h) Tolling plans and ingress and egress points to the managed lanes.

DB Contractor shall conduct a ROW open house at the direction of TxDOT and invite all affected and potentially affected property owners

DB Contractor shall notify TxDOT a minimum of 30 days in advance of any meetings with the public, unless otherwise specified by TxDOT. TxDOT reserves the right to attend any such meetings. When requested by TxDOT, DB Contractor shall participate in and provide support for any meetings with the Customer Groups called and conducted by TxDOT. When TxDOT decides to conduct such meetings, DB Contractor shall share, in a readily manipulative form, all necessary information regarding potential Customer Groups at TxDOT's request.

3.2.5 Meeting Summaries

For all meetings which DB Contractor conducts or directly participates in, DB Contractor shall prepare meeting summaries. DB Contractor shall submit draft versions of all meeting summaries to TxDOT for review and comment in readily accessible form (e-mail, Project intranet site, or file sharing site). TxDOT comments shall be incorporated before distributing final versions to the meeting attendees and appropriate Customer Groups. At a minimum, DB Contractor shall include the following items in the meeting summary:

(a) A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses);

(b) Documentation of the exhibits, presentations, and handouts available at the meeting;

(c) Documentation of the issues discussed and any associated solutions; and

(d) Description of remaining open issues and action items (including the person(s) responsible for follow-up and date for action or resolution).

For any formal public meetings or open houses at which a court reporter is required, DB Contractor shall also include detailed verbal transcripts in the summary.

3.2.6 Emergency Event Communications

For all Emergency events including major vehicle collisions, severe weather conditions, and Hazardous Material spills, the Public Information Coordinator shall take timely and appropriate action to inform TxDOT and Customer Groups of all pertinent details. The Public Information Coordinator shall provide these details through the use of appropriate tools to ensure effective communication. These tools include, but are not limited to: DMS, TxDOT's HCRS, TxDOT Houston District and Bryan District Office Highway Advisory Report, email/web/text alerts, telephone notification, facsimiles, and media releases/interviews, as appropriate. The Public Information Coordinator shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists.

In the event of an unforeseen Emergency, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the occurrence. DB Contractor shall follow TxDOT's general guidelines requiring Emergency notification when an unforeseen Emergency results in delays for motorists in traffic extending beyond 20 minutes. If advanced warning is available for an Emergency event such as ice/snow, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the time the information is available. In both situations, the Public Information Coordinator shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists.

3.2.7 Disseminating Public Information

DB Contractor shall prepare and distribute public information paying particular attention to the older age, minority, and limited English proficiency communities, and using all appropriate methods, including but not limited to materials for meetings, news releases, telephone correspondence, newsletters, emails, text messages, mobile device applications, hotlines, HCRS, DMS, web alerts, maps, displays, renderings, presentations, milestone events, business owner taskforce meetings, open houses, postcards, brochures, pamphlets, highway advisory radio, and video news releases. Copies of draft public information materials shall be submitted to TxDOT for review and comment. Subsequent to incorporation of TxDOT comments, complete copies of all final materials shall be provided to TxDOT.

DB Contractor shall create a public website to convey Project-related information. The public website shall adhere to TxDOT's *Brand Guidelines*. DB Contractor shall coordinate with TxDOT during design of the website, and DB Contractor shall submit website design elements to TxDOT for review and acceptance prior to publishing of the website. DB Contractor shall also submit applicable materials that serve as website updates to TxDOT for review and acceptance prior to publishing the update.

The public website shall convey Project-related information, including, but not limited to:

(a) Contact information;

(b) Project maps;

(c) Frequently asked questions;

(d) Current Project activities addressing design, construction, and maintenance;

(e) Timing of street and ramp closures and openings;

(f) Recommended route alternatives during closures;

(g) Newsletter and meeting materials;

(h) Calendar of and announcements for meetings and special events;

(i) Links to TxDOT HCRS and the Houston District Real-Time Construction Schedule;

(j) Links to other related sites as deemed appropriate by TxDOT;

(k) Information on TxTags, TollTags and a toll calculator, if applicable;

(l) Job opportunities;

(m) Subcontractor information;

(n) Comment form;

(o) Mailing list request form;

(p) Historical archive of photos taken during construction;

(q) Renderings or video animations of the Project, as appropriate; and

(r) Published materials in Spanish or other languages as needs warrant, as well as TxDOT advised translated materials.

Website design and creative development shall be coordinated with TxDOT's Communications Division to ensure TxDOT brand management and concurrence. The website shall also contain other general Project-related information that enhances the engagement or education of the general public. DB Contractor shall regularly review and update information on this public website as it becomes available throughout the Project to provide current and appropriate information, and the website shall provide for question and feedback opportunities for public communication. DB Contractor shall develop and implement a plan to make the Customer Groups aware of the Project website.

All written materials produced for Customer Groups shall follow the TxDOT *Brand Guidelines* and other appropriate spelling/writing guidelines.

DB Contractor, working collaboratively with TxDOT, shall assess the need for multi-lingual and hearing impaired communications and, where appropriate, also furnish Project-related materials in Spanish or other demographic adaptations.

DB Contractor shall track all incoming comments and inquiries and requests for information related to the Project. The following information shall be collected with each contact, and a summary of all contacts without contact information shall be reported to TxDOT:

(a) Name of individual;

(b) Address (not required);

(c) Phone number;

(d) E-mail address;

(e) Subject matter;

(f) Specific comment, question, or request;

(g) Date of comment, question, or request; and

(h) Response given.

DB Contractor shall track requests for language assistance services and provide information to TxDOT for the Office of Civil Rights' Limited English Proficiency Report.

3.3 Submittals

Submittals described in Section 3 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 3-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 3-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 3			
PMP – Public Information and Communications Plan	Within 30 days after NTP1	Approval prior to issuance of NTP2	3.2.1
Draft meeting summaries	Within 2 Business Days after the meeting date	Review and comment	3.2.5
Final meeting summaries (to TxDOT and meeting attendees)	Within 2 Business Days after receipt of TxDOT comments	For Information	3.2.5
Drafts of all materials to be presented to the public/media	At least 5 Business Days prior to final editing	Review and comment	3.2.7
Final copies of all materials to be presented to the public/media	At least 3 Business Days prior to dissemination	For Information	3.2.7
Website design elements	5 Business Days prior to publishing	Review and acceptance	3.2.7
Public comment/ inquiry log	Monthly	For Information	3.2.7
Language assistance log	Quarterly	For Information	3.2.7

SECTION 4.0 ENVIRONMENTAL

4.1 General Requirements

DB Contractor shall deliver the Environmental Commitments required by the Request for Proposals (RFP), Contract Documents, Environmental Laws, Governmental Entities, Governmental Approvals, and all applicable federal and State Laws and regulations. To that end, DB Contractor shall develop, operate and maintain a Comprehensive Environmental Protection Program (CEPP) for the Work to ensure environmental compliance with all applicable Environmental Laws and commitments. The CEPP shall obligate DB Contractor to protect the environment and document the measures taken during the performance of the Work to avoid and minimize impacts on the environment from the design, construction, maintenance, operation, and rehabilitation activities of the Project. A summary of Environmental Commitments is provided in Attachment 4-1.

The CEPP shall be designed to incorporate all features and guidelines of ISO 14001. The CEPP shall effectively demonstrate in detail DB Contractor's knowledge of all applicable Project-specific Environmental Approvals, Permits, Issues, and Commitments and applicable Environmental Laws as set forth in these Technical Provisions, and shall describe the processes that will be followed during the course of the Work to comply with those Environmental Approvals, Permits, Issues, and Commitments and Laws, as well as the documentation required to validate compliance. All monitoring and reporting activities shall be concise, consistent throughout the Term of the Agreement as applicable to the activities being performed, and in accordance with the requirements set forth in the Environmental Laws and TxDOT policies. The CEPP shall also effectively describe the QC and QA measures that DB Contractor will implement to verify the compliance of the CEPP with all applicable Environmental Laws.

The CEPP shall establish and implement Environmental Permits, Issues, and Commitments (EPIC) consistent with the Environmental Approvals. The CEPP shall establish a goal of zero environmental violations during the performance of all Work activities. However, should violations occur, the CEPP shall set forth detailed processes for rectifying such violations in an appropriate and timely manner.

DB Contractor shall cause Work to comply with Environmental Approvals and compliance requirements for any additional actions throughout the Term of the Agreement. Should actions be required, DB Contractor shall notify TxDOT and provide a plan to remain in compliance with the Environmental Approvals or obtaining additional Environmental Approvals. DB Contractor shall monitor and document Work activities so that documents providing evidence for compliance are available to TxDOT for inspection at any time.

4.2 Environmental Approvals

4.2.1 New Environmental Approvals and Amended TxDOT-Provided Approvals

TxDOT-Provided Approvals are based on the concept Plans as presented in the Environmental Approvals. As design and work progresses, if any changes are made beyond what is specifically presented in the Environmental Approvals and/or existing agency coordination documentation, additional Environmental Approvals (to include, but not limited to, environmental reevaluations and/or additional agency coordination) may be required. Changes to the concept Plans and/or the addition of (or changes to) ROW (for activities such as, but not limited to, design changes, temporary and/or permanent easements utilized for construction) not included

in the Environmental Approvals and/or existing agency coordination documentation shall require reassessment.

DB Contractor shall be responsible to provide TxDOT all design-related information (to include, but not limited to, design plan sheets and .dgn files for the proposed design changes). TxDOT will be responsible for assessing whether the changes will require New Environmental Approvals and/or coordination with Governmental Entities. If TxDOT determines New Environmental Approvals are necessary, TxDOT will instruct DB Contractor to provide all necessary documentation and/or submittals for the New Environmental Approvals. DB Contractor shall submit all new Environmental Approvals to TxDOT for review and acceptance. If TxDOT determines coordination with Governmental Entities is necessary, TxDOT will instruct DB Contractor to either coordinate with the Governmental Entity and/or provide all necessary documentation and/or submittals required to conduct the coordination. DB Contractor submittals shall be subject to TxDOT review periods as described in the Agreement, plus any review periods by governmental entities and/or agencies.

DB Contractor shall be responsible for ensuring compliance with the conditions and schedules set forth in amendments to any TxDOT-Provided Approvals or New Environmental Approvals. TxDOT may, in its discretion, provide assistance in securing New Environmental Approvals or amendments to TxDOT-Provided Approvals.

4.2.2 Responsibilities Regarding Environmental Studies

DB Contractor shall be responsible for conducting continuing environmental studies with TxDOT oversight and guidance based on the Project approved National Environmental Policy Act (NEPA) documents and concept Plans.

DB Contractor shall be responsible for conducting environmental studies and re-evaluations caused by actions not identified in the Environmental Approvals, actions not covered specifically by existing resource agency coordination, or incorporation of Additional Properties into the Project. DB Contractor shall be responsible for all coordination of environmental studies with appropriate Governmental Entities, except where TxDOT has agreements with Governmental Entities to perform such coordination.

4.2.3 TxDOT Review and Approval of DB Contractor Submissions

TxDOT reserves the right to review, comment on, require revisions to, and reject for resubmission documentation submitted for environmental compliance or Environmental Approvals. Documentation shall conform to current TxDOT submission standards and the requirements of all applicable Governmental Entities and Laws. TxDOT shall accept documentation meeting current submission standards. TxDOT shall return approved documentation to DB Contractor for submittal to the appropriate Governmental Entity in cases where DB Contractor performs coordination. TxDOT, acting reasonably, shall approve those submissions for which TxDOT signature or other approval is required. Documentation not meeting current submission standards or requirements of Governmental Entities will be returned to DB Contractor, and shall be revised by DB Contractor to meet standards or requirements.

4.2.4 TxDOT-Provided Approvals

The TxDOT-Provided Approvals are located in Exhibit 4 of the Agreement:

(a) The Segment 1 Draft Environmental Impact Statement (DEIS), approved on January 5, 2015;

(b) The Segment 1 FEIS/ROD; issued by TxDOT on January 12, 2016;

(c) The Segment 1 Re-evaluation of the FEIS/ROD anticipated to be approved by TxDOT by January 2017;

(d) The Segment 1 United States Army Corps of Engineers (USACE) Individual Permit (IP) (Sections 404 and 401), issued by the USACE on August 12, 2016;

(e) The Segment 2 Final Enivironmental Assessment, approved by TxDOT on September 9, 2016; and

(f) The Segment 2 Finding of No Significant Impact (FONSI), issued by TxDOT on September 9, 2016.

4.3 Comprehensive Environmental Protection Program

As part of the PMP, DB Contractor shall develop and implement a CEPP, applicable throughout the Term of the Agreement to establish the approach, requirements, and procedures to be employed to protect the environment. The CEPP shall be developed in the form of a comprehensive Environmental Management System (EMS) incorporating all features and guidelines outlined in ISO 14001. All component parts shall reflect in order of priority: impact avoidance, minimization and as last resort mitigation. The CEPP shall satisfy applicable FHWA, TxDOT and resource agency requirements, including those detailed as commitments in any Environmental Approvals.

The CEPP shall be the overarching program by which DB Contractor shall cause Environmental Commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work.

At a minimum, the CEPP shall include the following component parts:

(a) EMS;

(b) Environmental Compliance and Mitigation Plan (ECMP);

(c) Environmental Protection Training Plan (EPTP);

(d) Hazardous Materials Management Plan (HMMP);

(e) Communication Plan (CP);

(f) Construction Monitoring Plan (CMP);

(g) Recycling Plan (RP); and

(h) Environmental Team (ET) resumes.

DB Contractor shall submit the CEPP to TxDOT for approval within 30 days after issuance of NTP1, and TxDOT approval of the CEPP shall be a condition to the issuance of NTP2. The CEPP must contain the information listed below, with the exception of the items specified below for submission to TxDOT within 90 days after NTP1. TxDOT approval of these specified items

shall be included in an updated CEPP and a condition to the commencement of Construction Work.

(a) Organization

(i) DB Contractor's main contractual arrangements; and

(ii) Organizational structure covering the activities to be performed in accordance with the Contact Documents.

(b) Personnel

(i) DB Contractor's plan to provide experienced personnel for the Environmental Team;

(ii) Arrangements for coordinating and managing staff interaction with TxDOT and its consultants, including colocation of Key personnel and a description of approach to coordinating work of off-site personnel;

(iii) Names and contact details, titles, job roles and specific experience required for Key Personnel and for other environmental personnel; and

(iv) Implementation of the EPTP for all DB Contractor employees in accordance with Section 4.3.3 of the Technical Provisions (to be submitted by DB Contractor within 90 days after issuance of NTP1).

(c) Subcontractors

(i) Overall control procedures for Subcontractors, including consultants and subconsultants;

(ii) Responsibility of Subcontractors and Affiliates; and

(iii) Implementation of the EPTP for all employees of Subcontractors in accordance with Section 4.3.3 of the Technical Provisions (to be submitted by DB Contractor within 90 days after issuance of NTP1).

(d) Environmental

(i) Establishment of the component parts of the ECMP in accordance with 4.3.2 of the Technical Provisions (to be submitted by DB Contractor within 90 days after issuance of NTP1).

(e) Quality Control / Quality Assurance

(i) Procedures to ensure accuracy, completion, and quality submittals to TxDOT, Governmental Entities and other third parties;

(ii) Procedures to establish and encourage continuous improvement; and

(iii) Procedures for environmental compliance (to be submitted by DB Contractor within 90 days after issuance of NTP1).

(f) Audit

(i) Name, title, roles and responsibilities of supporting quality management staff reporting to the person with defined authority.

(g) Document Management

(i) The manner in which records will be maintained in compliance with the Technical Provisions, including any specific systems DB Contractor will use; and

(ii) Identify environmental documentation and reporting requirements, including environmental permits, issues and commitments (to be submitted by DB Contractor within 90 days after issuance of NTP1).

Amendments and updates to the CEPP as necessary to address changing conditions and environmental requirements shall be in accordance with the procedures for amendments to the PMP.

4.3.1 Environmental Management System

The EMS shall be the overarching system by which DB Contractor shall cause environmental commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work. DB Contractor shall utilize the EMS to track on-going issues, identify environmental compliances, non-compliances and identify actions required/taken to correct any such non-compliance.

The EMS shall establish a schedule for periodic CEPP review by TxDOT to ensure it is up to date. The EMS shall provide a means to track the reviews and results. At a minimum, the EMS shall require documents in the following list to be on file at the Site, provided to appropriate field personnel, and available at any time for TxDOT review:

(a) CEPP component parts;

(b) Weekly Environmental Monitoring Reports;

(c) Investigative Work Plans (IWPs), Site Investigation Reports (SIRs), and remedial action plans as necessary for hazardous material discovery/remediation to be prepared by DB Contractor Hazardous Materials Specialists meeting the qualifications as indicated in Section 4.3.7;

(d) Wetlands delineations and appropriate Section 404 permit application if changes to the design or temporary construction impacts are necessary to be prepared by DB Contractor Water Quality Specialists meeting the qualifications as indicated in Section 4.3.6;

(e) Mitigation or resource monitoring reports, as required by resource-specific mitigation plans

(f) TxDOT accepted designs for wetland and floodplain mitigation;

(g) Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP) (TXR150000), Notice of Intent (NOI);

(h) TPDES CGP (TXR150000), Notice of Termination for Work completed;

(i) Storm Water Pollution Prevention Plan (SW3P) and amendments, as required to reflect Project development and staging, including off-Site plans, controls, and reporting from borrow sites, waste sites, and plant location sites;

(j) Completed permit applications and permits as issued;

(k) Pre-construction inspection report;

(l) Post-construction inspection report;

(m) Training documentation including verification of employee completion;

(n) DB Contractor's final noise analysis, to be conducted by qualified personnel, if different than that included in the TxDOT-Provided Approvals;

(o) EPIC sheets (EPICs will be included in each plan set provided to all field personnel);

(p) Plan sheets showing all avoidance areas such as wetland areas, etc.;

(q) Construction Stage Gate Checklist (Form 2448);

(r) Construction SW3P Field Inspection and Maintenance Report (Form 2118);

(s) Documentation of any right-of-way reduction considerations;

(t) Copies of correspondence between DB Contractor and federal, State, and local agencies;

(u) All detour plans associated with the Project; and

(v) Public involvement/public notification.

4.3.2 Environmental Compliance and Mitigation Plan

The ECMP shall document and fully detail compliance strategies and procedures in accordance with requirements of applicable Environmental Laws and Environmental Approvals. The ECMP shall discuss the methods to be employed to cause Work performance in accordance with requirements of applicable Environmental Laws and Environmental Approvals to accomplish the goal of zero environmental violations. This plan shall establish and/or document schedules, protocols, and methodologies to be used in accomplishing Work, with an emphasis on monitoring, reporting, corrective actions, and adaptive management.

The plan shall include a Compliance Action Plan (CAP). The CAP shall consist of a decision making matrix which will define the triggers for initiating or re-initiating environmental compliance actions for construction and maintenance activities including construction noise mitigation measures and the triggers for initiating mitigation measures. For each trigger, the CAP shall identify the appropriate type or level of environmental study, or other compliance action necessary, per the EPICs and the summary of Environmental Commitments as provided in Attachment 4-1 to ensure the ongoing validity of Project Environmental Approvals and Commitments. In addition, the ECMP shall detail any mitigation required by Environmental

Approvals and DB Contractor's approach to satisfying mitigation requirements, including mitigation requirements identified after completion of the ECMP.

The ECMP shall include the following components as described below.

4.3.2.1 Environmental Permits, Issues, and Commitments Sheets

DB Contractor shall develop and maintain TxDOT accepted EPIC construction plan sheets. DB Contractor shall identify applicable permits and Environmental Commitments on EPIC sheets and keep them updated throughout the construction period to identify on-Site conditions.

EPIC sheets shall include all Environmental Commitments as described in the Environmental Approvals, including detailed descriptions of areas to be avoided during Construction Work (if any). EPICs shall refer to the Plan sheets that include each avoidance area.

4.3.2.2 Clean Water Act – Sections 404 and 401: Waters and Wetlands of the United States

DB Contractor shall document how they will comply with the terms and conditions for all Section 404 permit(s) issued to TxDOT by the USACE and associated Section 401 State Water Quality Certification(s) as administered by the Texas Commission on Environmental Quality (TCEQ) as well as any additional USACE Section 404 permit(s) and 401 certifications issued to DB Contractor during the life of the Project. The documentation at a minimum shall include:

(a) Process for training personnel to recognize waters of the U.S. that fall under the jurisdiction of the USACE;

(b) Process for identifying Section 404 impacts associated with the Project;

(c) Process for obtaining required Section 404 permits;

(d) Process for communicating the terms and conditions of all USACE Section 404 permits and TCEQ 401 certifications and other permits as necessary;

(e) Procedures for carrying out any required mitigation and/or avoidance areas;

(f) Procedures for handling off-ROW Project Specific Locations (PSL) as required by all USACE Section 404 permits issued to either TxDOT or DB Contractor by the USACE; and

(g) Process to handle changes that may occur to USACE Section 404 permit(s) provided by TxDOT.

4.3.2.2.1 Segment 1

TxDOT obtained a USACE Section 404 IP for Segment 1 of the Project on August 12, 2016. TxDOT has entered into an advanced funding agreement (AFA) with Montgomery County in which Montgomery County will be responsible for the development of the mitigation plan, implementation of the mitigation plan, monitoring, and maintenance of the mitigation site for impacts associated with the Segment 1 USACE IP. The executed AFA between TxDOT and Montgomery County is located in the RIDs. DB Contractor acknowledges that the TxDOT-provided Segment 1 USACE Section 404 IP is based on the concept Plans and Preliminary ROW; consequently, the existing USACE IP may require amending by DB Contractor or additional Section 404 permits may be required as the Work progresses. DB Contractor shall submit any design changes that may warrant amendments to the existing USACE IP or

additional USACE permits to TxDOT. TxDOT will provide a determination based on the information provided by DB Contractor whether a change to the USACE IP is necessary or if additional USACE permits are required. If TxDOT decides a change in the USACE IP or additional permit(s) is necessary, all required amendments and/or additional documentation (including wetlands/waters of the U.S. delineations, wetland delineation report, supporting documentation, figures, etc.) will be provided by DB Contractor and submitted to TxDOT for review and comment prior to submittal to USACE. If additional wetlands or waters of the U.S. mitigation is required for Segment 1, DB Contractor would be responsible to provide an assessment for mitigation, as well as options for mitigation, to TxDOT for review and acceptance prior to submittal to USACE. DB Contractor would be responsible for obtaining all approvals, implementation, monitoring, and maintenance of additional mitigation sites per 33 Code of Federal Regulations (CFR) Part 332. DB Contractor shall provide monitoring and maintenance of any additional mitigation sites for the term stipulated by the USACE, or for the full term of the Agreement (as determined by TxDOT), whichever expires first. If the Agreement term is terminated, at the discretion of TxDOT, prior to the mitigation, monitoring, and maintenance term set forth by the USACE, TxDOT will assume monitoring and maintenance responsibilities.

4.3.2.2.2 Segment 2

DB Contractor shall be responsible for performing full on-site investigations and wetland/waters of the U.S. delineations to determine the extent of Section 404 impacts within Segment 2. DB Contractor shall prepare all materials necessary for coordination with the USACE and submit them to TxDOT for review and comment prior to submittal to the USACE. DB Contractor shall obtain all necessary permits and plan for, implement, and maintain all required mitigation for Segment 2 in accordance with 33 CFR Part 332. If permittee-responsible mitigation sites are required in Segment 2, the sites shall not be located on or adjacent to the Project Limits and DB Contractor shall be responsible for the monitoring and maintenance of the mitigation site for the term stipulated by the USACE, or for the full Term of the Agreement (as determined by TxDOT), whichever expires first. If the Agreement is terminated, at the discretion of TxDOT, prior to the mitigation, monitoring, and maintenance term set forth by the USACE, TxDOT will assume monitoring and maintenance responsibilities. DB Contractor shall submit any design changes that warrant amendments to USACE permits or additional USACE permits to TxDOT. TxDOT will provide a determination based on the information provided by DB Contractor whether a change to the USACE permit is necessary or if additional USACE permits are required. If TxDOT decides a change in the USACE permit or additional permit(s) is necessary, all required amendments and/or additional documentation (including wetlands/waters of the U.S. delineations, wetland delineation report, supporting documentation, figures, etc.) will be provided by DB Contractor and submitted to TxDOT for review and comment prior to submittal to USACE. If additional wetlands or waters of the U.S. mitigation is required, DB Contractor would be responsible to provide an assessment for mitigation, as well as options for mitigation, to TxDOT for review and acceptance prior to submittal to USACE. DB Contractor would be responsible for obtaining all approvals, implementation, monitoring, and maintenance of additional mitigation sites per 33 CFR Part 332. DB Contractor shall provide monitoring and maintenance of any additional mitigation sites for the term stipulated by the USACE or for the full Term of the Agreement (as determined by TxDOT), whichever expires first. If the Agreement is terminated, at the discretion of TxDOT, prior to the mitigation, monitoring, and maintenance term set forth by the USACE, TxDOT will assume monitoring and maintenance responsibilities.

4.3.2.3 Clean Water Act – Sections 402: Texas Pollutant Discharge Elimination System

DB Contractor shall document compliance with Section 402 of the Clean Water Act (CWA). The documentation shall include that DB Contractor has day-to-day operational control over activities necessary to ensure compliance with the SW3P and has the sole responsibility for any potential non-compliance issue. The documentation shall also include that DB Contractor is responsible for submitting a NOI to TCEQ. The documentation at a minimum shall include:

(a) Process for training personnel on the requirements and conditions of the Texas CGP for storm water discharges from construction sites;

(b) Procedures for incorporating Additional Properties outside the original NEPA approved ROW and/or any changes to concept Plans and any off-ROW PSL within one linear mile of the Project Limits to comply with the CGP and the Project's SW3P;

(c) Procedures for handling non-compliance issues;

(d) Escalation procedures for SW3P items; and

(e) Procedures for handling all applicable Municipal Separate Storm Sewer System (MS4) requirements.

4.3.2.4 State Listed Species and Unregulated Habitat

DB Contractor shall address and document state listed species and unregulated habitat. The documentation shall be in agreement with the Memorandum of Understanding (MOU) TxDOT has with the Texas Parks and Wildlife Department (TPWD), including the requirement for coordination with TPWD to be conducted by TxDOT. The documentation at a minimum shall include:

(a) Process for completing surveys and documentation regarding state threatened and endangered species;

(b) Process for communicating any commitments regarding state listed species and unregulated habitat; and

(c) Procedures for complying with any commitments including mitigation.

4.3.2.4.1 Segment 1

Due to lack of access, DB Contractor shall be responsible for completing on-Site state threatened and endangered species field investigations prior to construction. DB Contractor shall utilize the most current state threatened and endangered species list to identify all state listed species that have potential to occur, and determine the extent of impacts to the species. DB Contractor shall conduct any field visits and prepare any materials and documentation needed for coordination or consultation with regulatory agencies, at TxDOT's direction. TxDOT shall review and accept all documentation necessary for coordination prior to submittal to applicable agencies. If it is determined that any state listed species will incur impacts as a result of the Project, DB Contractor shall conduct analysis and provide recommendations for best management practices and mitigation options to TxDOT for review, acceptance, and submittal to applicable agencies. TxDOT will conduct coordination or consultation with the applicable agencies unless otherwise specified by TxDOT. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or

consultation. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional state threatened and endangered species field surveys are required. DB Contractor shall perform such field surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all best management practices and mitigation requirements identified in the TxDOT-Provided Approvals, Environmental Approvals, and from additional regulatory agency coordination or consultation.

DB Contractor shall use minimization and avoidance practices to preserve vegetation communities within the Project to the greatest extent practicable. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional vegetation surveys are required. DB Contractor shall perform such vegetation surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation.

4.3.2.4.2 Segment 2

Due to lack of access, DB Contractor shall be responsible for completing on-Site state threatened and endangered species field investigations prior to construction. DB Contractor shall utilize the most current state threatened and endangered species list to identify all state listed species that have potential to occur, and determine the extent of impacts to the species. DB Contractor shall conduct any field visits and prepare any materials and documentation needed for coordination or consultation with regulatory agencies, at TxDOT's direction. TxDOT shall review and accept all documentation necessary for coordination prior to submittal to applicable agencies. If it is determined that any state listed species will incur impacts as a result of the Project, DB Contractor shall conduct analysis and provide recommendations for best management practices and mitigation options to TxDOT for review, acceptance, and submittal to applicable agencies. TxDOT shall conduct coordination or consultation with the applicable agencies unless otherwise specified by TxDOT. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional state threatened and endangered species field surveys are required. DB Contractor shall perform such field surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all best management practices and mitigation requirements identified in the TxDOT-Provided Approvals, Environmental Approvals, and from additional regulatory agency coordination or consultation.

DB Contractor shall use minimization and avoidance practices to preserve vegetation communities within the Project to the greatest extent practicable. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present

the design change and potential impacts to TxDOT. TxDOT shall determine if additional vegetation surveys are required. DB Contractor shall perform such vegetation surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation

4.3.2.5 Endangered Species Act, Fish and Wildlife Coordination Act and Migratory Bird Treaty Act

DB Contractor shall document compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act (FWCA) and Migratory Bird Treaty Act (MBTA). The documentation shall reflect that TxDOT will conduct all coordination with U.S. Fish and Wildlife Service (USFWS). The documentation at a minimum shall include:

(a) Process for completing surveys and documentation regarding federal threatened and endangered species;

(b) Process for training personnel on the requirements of the Endangered Species Act, FWCA and MBTA;

(c) Process for communicating any commitments regarding Endangered Species Act, FWCA and MBTA; and

(d) Procedures for complying with any commitments including mitigation.

4.3.2.5.1 Segment 1

Due to lack of access, DB Contractor will be responsible for completing on-Site federal threatened and endangered species field investigations prior to construction. DB Contractor shall utilize the most current federal threatened and endangered species list to identify all federally listed species that have potential to occur, and determine the extent of impacts to the species. DB Contractor shall prepare any materials and documentation needed for coordination or consultation with regulatory agencies, at TxDOT's direction. TxDOT shall review and accept all documentation necessary for coordination prior to submittal to applicable agencies. If it is determined that any federally listed species will incur impacts as a result of the Project, DB Contractor shall conduct analysis and provide best management practice and mitigation option recommendations to TxDOT for review, acceptance, and submittal to applicable agencies. TxDOT will conduct coordination or consultation with the applicable agencies unless otherwise specified by TxDOT. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional federal threatened and endangered species field surveys are required. DB Contractor shall perform such field surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all best management practices and mitigation requirements identified in the TxDOT-Provided Approvals, Environmental Approvals, and from additional regulatory agency coordination or consultation.

DB Contractor shall adhere to all MBTA guidelines as specified in the TxDOT-Provided Approvals.

4.3.2.5.2 Segment 2

Due to lack of access, DB Contractor will be responsible for completing on-Site federal threatened and endangered species field investigations prior to construction. DB Contractor shall utilize the most current federal threatened and endangered species list to identify all federally listed species that have potential to occur, and determine the extent of impacts to the species. DB Contractor shall prepare any materials and documentation needed for coordination or consultation with regulatory agencies, at TxDOT's direction. TxDOT shall review and approve all documentation necessary for coordination prior to submittal to applicable agencies. If it is determined that any federally listed species will incur impacts as a result of the Project, DB Contractor shall conduct analysis and provide best management practice and mitigation option recommendations to TxDOT for review, acceptance, and submittal to applicable agencies. TxDOT will conduct coordination or consultation with the applicable agencies unless otherwise specified by TxDOT. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional federal threatened and endangered species field surveys are required. DB Contractor shall perform such field surveys, identify mitigation options, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all best management practices and mitigation requirements identified in the TxDOT-Provided Approvals, Environmental Approvals, and from additional regulatory agency coordination or consultation.

DB Contractor shall adhere to all MBTA guidelines as specified in the TxDOT-Provided Approvals.

4.3.2.6 Traffic Noise

DB Contractor shall address and document traffic noise mitigation. TxDOT will provide approvals and proposed permanent noise mitigation measures based on the approved concept Plans and Preliminary ROW based on the approved FEIS/ROD, Environmental Assessment (EA), and FONSI. If DB Contractor proposes to make modifications to the approved concept Plans and/or Preliminary ROW, DB Contractor will be responsible for verifying the validity of the TxDOT approved permanent noise mitigation via a noise assessment performed in accordance with the 2011 TxDOT *Guidelines for the Analysis and Abatement of Roadway Traffic Noise,* and for determining whether additional noise abatement measures will be required. DB Contractor shall employ qualified personnel to perform such analyses if required. As of the Effective Date of this document, public involvement (noise workshops) associated with proposed noise abatement measures identified within the Environmental Approvals have not been performed. DB Contractor will be responsible for notification of affected property owners, the surveying/balloting of affected property owners, and final design and construction of approved noise barriers. Any changes to approved noise barrier designs that result from the final design process must be analyzed according to *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (2011) and submitted to TxDOT for acceptance. DB Contractor shall perform all noise workshops per the TxDOT *Guidelines for Analysis and Abatement of Roadway Traffic Noise (2011)* and in accordance with Section 3. DB Contractor shall allow 15 days for adjacent affected property owner comments after each noise workshop. DB Contractor shall coordinate all results of all noise workshops with TxDOT. The documentation at a minimum shall include:

(a) Process for performing noise workshops in accordance with the TxDOT *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (2011) and Section 3;

(b) Process for carrying out noise mitigation measures as identified and discussed in the approved NEPA document and schematic, and any supplemental noise studies in accordance with TxDOT *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (2011) completed by DB Contractor;

(c) Process for carrying out noise mitigation measures determined throughout the life of the Project; and

(d) Process to handle changes that may occur to proposed permanent noise mitigation in the approved NEPA document and schematic.

To fulfill the commitments of the previously mentioned TxDOT-Provided Approvals, DB Contractor shall be responsible for implementing all noise mitigation measures to minimize construction and long-term impacts of the Work as prescribed in TxDOT-Provided Approvals and subsequent TxDOT-Provided Approvals secured by DB Contractor. DB Contractor acknowledges that TxDOT-Provided Approvals and proposed permanent noise mitigation are based on the concept Plans and Preliminary ROW; consequently, the proposed permanent noise mitigation may require amending by DB Contractor as the Work progresses. Such amendments may require a revised noise analysis and shall be submitted to TxDOT for review and approval.

DB Contractor shall be responsible for all coordination with adjacent property owners and Governmental Entities necessary to obtain all such amendments to TxDOT-Provided Approvals and for ensuring compliance with the conditions and schedules set forth in the amendment of any TxDOT-Provided Approvals.

4.3.2.7 Water Well Impacts and Requirements

DB Contractor shall document how they will address wells (i.e., municipal, domestic, irrigation, oil and gas, unplugged, or monitoring and observations wells) encountered during the life of the Project and have this process accepted by TxDOT prior to action being taken on water wells. The documentation shall include that DB Contractor is responsible for plugging and abandoning all wells in accordance with Item 103, Disposal of Wells, from TxDOT Standard Specifications, as well as DB Contractor is responsible for any required remediation efforts. The documentation at a minimum shall include:

(a) Process for training personnel on recognition of wells;

(b) Procedures for handling wells; and

(c) Procedures for handling contamination of a well that results from DB Contractor's work. Procedures shall include a requirement to notify TxDOT and with TxDOT's concurrence notify appropriate regulatory agencies within 24 hours of the discovery.

4.3.2.8 Cultural Resource Studies

DB Contractor shall be responsible for ensuring compliance with cultural resource Laws on the Project through the Term of the Agreement. TxDOT shall perform consultation for the Project according to current procedures for implementing Section 106 of the National Historic Preservation Act (NHPA), and the Antiquities Code of Texas.

Antiquities Permits shall be obtained from the Texas Historical Commission (THC) for archeological surveys, testing, monitoring, and data recovery. DB Contractor shall coordinate all necessary Antiquities Permits through TxDOT.

DB Contractor shall document efforts to avoid impacts to cultural resources that are listed on or determined to meet the eligibility criteria for listing to the National Register of Historic Places as specified in 36 CFR 60.4, or that are designated or determined to meet the criteria for designation as State Archeological Landmarks as specified in 13 TAC 26.8 as identified in the NEPA Approvals.

If evidence of possible cultural resources is encountered during the course of the Work, DB Contractor shall immediately cease Work in the immediate area and contact TxDOT to initiate post-review discovery procedures under the provisions of the Programmatic Agreement among TxDOT, State Historic Preservation Office, FHWA, and Advisory Council on Historic Preservation (PA-TU), as well as the MOU between TxDOT and the THC. DB Contractor shall undertake appropriate measures to protect the Site from further intrusion to the extent feasible until an appropriate evaluation of the Site can be made by a qualified representative. Work shall not be resumed in the area until DB Contractor receives notification and approval from TxDOT.

4.3.2.8.1 Segment 1

In accordance with Section 106 of the NHPA, 36 CFR, Part 800, Subpart B and the PA-TU, DB Contractor shall perform the remaining intensive archeological field surveys per the Segment 1 archeological report, consisting of shovel testing for approximately 7.2 miles of the road route and approximately 78 acres within four proposed detention ponds, and backhoe trench testing for approximately 0.2 mile of the road route. In order to provide safe access for field surveys, DB Contractor will also be responsible for clearing areas of wildfire debris away from various locations to be surveyed. The Segment 1 archeological survey is located in the RIDs. Based on their field investigations, DB Contractor shall prepare all required materials and documentation, submit documentation to TxDOT for review, acceptance, and further coordination with the appropriate entities. If a design change occurs that would potentially result in impacts to an area outside the footprint of the Project ROW as shown on the concept Plans and defined by the Environmental Approvals, DB Contractor shall present the design change and potential impacts to TxDOT. TxDOT shall determine if additional cultural resource field surveys are required. DB Contractor shall perform such field surveys, prepare all necessary documentation, and submit documentation to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation.

4.3.2.8.2 Segment 2

In accordance with the Antiquities Code of Texas and 13 TAC Part 2 Chapter 26, DB Contractor shall be responsible for performing all necessary cultural resource surveys remaining for Segment 2 per the Segment 2 archeological survey located in the RIDs. DB Contractor shall also be aware that TxDOT is currently finalizing the Segment 2 alignment; consequently, there may be areas that were not studied during the development of the existing Segment 2 archeological survey located in the RIDs. DB Contractor shall be responsible for completing all remaining and necessary archeological surveys associated with Segment 2. Based on the results of field investigations, DB Contractor shall prepare all required materials and documentation, and submit these to TxDOT for review, acceptance, and further coordination with the appropriate entities. If a design change occurs that will cause impact to areas outside of the footprint of the Project ROW as shown on the concept Plans and defined within the

Environmental Approvals, DB Contractor shall present a detailed description of the design change to TxDOT. TxDOT shall determine if additional field investigations are required to assess potential adverse effects to cultural resources. DB Contractor shall perform all required field surveys, prepare all required materials and documentation, and submit these to TxDOT for review, acceptance, and submittal to applicable agencies. DB Contractor shall be responsible for implementing all mitigation requirements identified from regulatory agency coordination or consultation.

4.3.2.9 Public Involvement

DB Contractor shall document how they will comply with all public involvement requirements, including public involvement requirements specifically related to cultural resources. The documentation shall comply with all applicable requirements including, but not limited to, 43 TAC §2.4, Section 106 of the National Historic Preservation Act (36 CFR 800), Chapter 26 of the Texas Parks and Wildlife Code, the Civil Rights Act of 1964, and the Civil Rights Restoration Act of 1987. The documentation shall include that DB Contractor is responsible for gaining TxDOT acceptance of location and date of public involvement; preparing all draft and final public involvement materials; submitting and gaining TxDOT acceptance of public involvement materials; and conducting the necessary public involvement activities with the appropriately trained personnel for the life of the Project except where TxDOT has agreements with Governmental Entities to perform public involvement requirements. The documentation at a minimum shall include:

(a) Process for handling public involvement requirements; and

(b) Procedures for documenting public involvement.

4.3.2.10 Standard Operating Procedures

DB Contractor shall develop standard operating procedures for the following activities (and any other activities as deemed necessary per the summary of commitments in Attachment 4-1 or TxDOT's polices including Best Management Practices) and include them in the ECMP:

(a) Controlling dust during construction;

(b) Mitigating vibration during construction;

(c) Mitigating light intrusion on adjacent properties;

(d) Complying with the MBTA; and

(e) Complying with jurisdictional waters and wetlands permits.

4.3.3 Environmental Protection Training Plan

DB Contractor shall develop and implement an EPTP that shall meet the minimum requirements set forth herein. The EPTP shall include methods and procedures documented in the ECMP to:

(a) Educate every worker to:

(i) Recognize the overall importance of environmental issues to constructing, operating, and maintaining a successful Project; and

(ii) Appreciate the various environmental sensitivities of the Project.

(b) Train every worker to:

(i) Recognize environmentally sensitive resources that may be encountered during the Work;

(ii) Avoid or take appropriate action to minimize environmental impacts from the Work;

(iii) Know the required actions, practices, and procedures regarding regulated resources;

(iv) Understand protocols for meeting environmental commitments for post-review discoveries;

(c) Foster DB Contractor's management and supervisory personnel's attitude of commitment to the Project's environmental quality;

(d) Convey to all workers DB Contractor's management commitment to the Project's environmental quality; and

(e) Convey to all workers TxDOT's and DB Contractor's commitment to zero tolerance for violations.

4.3.3.1 EPTP Scope and Content

The goal of the EPTP is to educate Project personnel about the following:

(a) Overall importance of environmental protection to the Project;

(b) Compliance responsibility and Governmental Entity authority including background and environmental issues regulatory overview;

(c) Overview of DB Contractor's environmental commitments and responsibilities at the Project level;

(d) Worker responsibilities;

(e) Waters of the U.S. (including wetlands) identification (actual waters of the US delineations, if needed, would be conducted by DB Contractor Water Quality Specialist meeting the qualifications as indicated in Section 4.3.6;

(f) Environmental Approvals terms and conditions including an overview of the provisions of the Endangered Species Act, MBTA (16 U.S.C. § 703, et seq., as amended), and Storm Water Pollution Prevention Program;

(g) Terms and commitments as indicated in the Segment 1 USACE Section 404 IP, the TCEQ general construction permit and any other applicable local, State, and/or federal project specific permitting;

(h) Ability to identify potential Threatened or Endangered Species as well as species of greatest conservation need as identified on the EPICs;

(i) Best management practices (BMPs) for environmental compliance, including pollution prevention, erosion, sedimentation, post construction controls, and dust control measures to maintain water and air quality;

(j) Required mitigation measures;

(k) Procedures and precautions in the event of spills of or discovery of Hazardous Materials or unknown chemicals or contamination;

(l) Ability to identify potential skeletal remains or other archeological or paleontological resources, and procedures and precautions in the event human skeletal remains or other archeological or paleontological resources are discovered;

(m) Procedures regarding the identification of historical markers (i.e., THC Subject Markers, Daughters of the American Revolution Old San Antonio Road Markers, Texas Centennial Markers, Texas Highway Department Markers, and local/county markers);

(n) Groundwater protection requirements;

(o) CWA regulations and surface water protection requirements;

(p) Overview of noise and residential impact reduction procedures;

(q) Air quality requirements; and

(r) Penalties and/or fines for violations of and noncompliance with Environmental Approvals and Environmental Laws, including termination of employment.

DB Contractor shall submit to TxDOT for review and approval course outlines containing learning objectives designed to achieve stated goals and suggested staff attendance for all anticipated training requirements through the Term of the Agreement. Course outlines shall be submitted to TxDOT for review and approval within 90 days after NTP1. Approval of the EPTP by TxDOT shall be a condition of commencement of Construction Work.

4.3.4 EPTP Participation

DB Contractor shall require all non-administrative employees to participate in the EPTP and shall keep accurate records documenting attendance, as well as materials presented.

In addition to English, the workers must be provided the opportunity to receive their training and training materials in Spanish.

4.3.4.1 EPTP Schedule

DB Contractor shall include activities for implementation of the EPTP in the Project Schedule. The length of training sessions and their frequency shall be sufficient to achieve the goals set forth above. Periodic training sessions at key times (e.g., prior to construction, major maintenance in sensitive areas, or construction timing restrictions to protect Threatened or Endangered Species) shall be used to update workers on specific restrictions, conditions, concerns, and/or requirements.

4.3.5 Hazardous Materials Management Plan

DB Contractor shall prepare an HMMP for the safe handling, storage, treatment and/or disposal of Hazardous Materials, whether encountered at or brought onto the Site by DB Contractor, encountered or brought onto the Site by a third party, or otherwise, during the Term of the Agreement. DB Contractor shall submit the final HMMP to TxDOT for review and approval in its good faith discretion within 90 days of NTP1; approval of the HMMP by TxDOT shall be a condition of commencement of Construction Work.

The HMMP shall include procedures compliant with all applicable Environmental Laws and include, at a minimum:

(a) For all chemicals to be used on the Project, DB Contractor shall keep and update Material Safety Data Sheets, per OSHA requirements, for the Term of the Agreement;

(b) Designated individuals responsible for implementation of the HMMP;

(c) Procedures for identifying and documenting potential contaminated sites which might impact Project development;

(d) Procedures for mitigation of known contaminated sites anticipated to impact construction;

(e) Procedures for mitigation of unanticipated contaminated sites encountered during construction;

(f) Procedures for mitigation of contamination during the operation and maintenance of the Project;

(g) Procedures for developing a detailed spill response plan for the Term of the Project;

(h) Process for training personnel for responding to and mitigating Incidents involving contamination or waste;

(i) Provisions for appropriate storage and disposal of all waste encountered or disposed of on the Project for the Term of the Agreement;

(j) Provision for a Hazardous Materials training module as an element of the EPTP component of the CEPP;

(k) Procedures for preparing an IWP and SIR in the event that Hazardous Materials are discovered during construction, operations, or maintenance activities; and

(l) Identification and contact information for designated responsible individuals.

The HMMP shall include provisions for making all on-Site workers aware of and able to recognize the potential Hazardous Materials to which they may be exposed, limiting DB Contractor, Subcontractors and other Site workers' exposure to Hazardous Materials and providing all necessary personal protection equipment to protect workers from exposure. The HMMP shall require DB Contractor to provide any non-DB Contractor personnel who visit the Project with the appropriate personal protection equipment.

The HMMP shall require that all personnel of DB Contractor-Related Entities handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 1910.120 (Hazardous Waste Operations and Emergency Response [HAZWOPER] Training).

Further, the HMMP shall include procedures for ensuring that all applicable certifications, licenses, authorizations and Governmental Approvals for DB Contractor personnel handling Hazardous Materials are current and valid through the duration of the Work.

4.3.5.1 Investigative Work Plans and Site Investigation Reports

If Hazardous Materials are encountered within any of the Project ROW or Additional Properties (including, but not limited to DB Contractor's staging area, field office site, plant sites, borrow site, stockpile location, DB, and/or new area resulting from a design change), DB Contractor Hazardous Materials Specialist shall prepare an investigation work plan that addresses the methods, techniques, and analytical testing requirements to adequately characterize the extent of the contaminated media (soil and/or groundwater) potentially impacting the Project. DB Contractor shall locate and assess the likely source of contamination.

A Registered PE and other qualified professionals, as needed, shall provide TxDOT documentation regarding areas that potentially need an IWP and/or other Hazardous Materials related work and present this documentation to TxDOT for review and acceptance. If TxDOT agrees with the need for IWP and/or other Hazardous Materials work, DB Contractor would prepare the IWP and other necessary reports in accordance with applicable federal, state, and TxDOT guidance and submit to TxDOT for review and acceptance. Once the IWP and/or other recommended next steps for Hazardous Materials is accepted by TxDOT, DB Contractor Hazardous Materials Specialist shall conduct the accepted scope of work.

Upon satisfactorily completing the investigative work, DB Contractor Hazardous Materials Specialist shall summarize the findings within a SIR and make recommendations regarding potential response actions necessary for Project development. The SIR shall address the characterization of the impacted area, sampling efforts and findings, opportunities to avoid the contamination by adjusting the design, level of response action warranted if the contamination cannot be avoided, feasibility of initiating response actions prior to construction, pursuit of cost-reimbursement from responsible parties, the need for completing response actions concurrent with construction, and nature of any special specifications and provisions necessary for incorporation into the Project. DB Contractor Hazardous Materials Specialist would provide the SIR and recommendations to TxDOT for review and acceptance. DB Contractor would be responsible to submit the SIR and/or other related project information to appropriate agencies for approval and /or concurrence unless otherwise directed by TxDOT.

DB Contractor will, if found to be appropriate by TxDOT and/or other appropriate federal, and State agencies, develop a preventative or corrective action to be reviewed and accepted by TxDOT and/or appropriate federal or State agencies. Once the preventative or corrective action (if necessary) has been reviewed and approved by appropriate agencies, DB Contractor will fulfill the commitments as outlined in the preventative or corrective action.

DB Contractor shall take Hazardous Materials contamination into account as agreed upon with TxDOT during all subsequent phases of Project development, including additional Properties negotiation and acquisition, property management, design, and construction.

4.3.6 Communication Plan

DB Contractor shall develop a CP which describes in detail the communication hierarchy for information distribution related to the compliance with the CEPP. The CP will include names and contact information, including emergency contact information, and the preferred methods of routine, and emergency communication distribution.

4.3.7 Construction Monitoring Plan

The CMP shall identify times, locations, and other conditions where monitoring of construction activities are to be performed to maintain and cause compliance with Environmental Laws, Environmental Approvals, and the Contract Documents. The CMP shall establish and/or document schedules, protocols and methodologies to be used for monitoring Work with an emphasis on timely reporting, corrective actions and adaptive management. The CMP shall establish reporting procedures, identify reporting requirements and establish controls for report distribution and records retention. DB Contractor shall make available all Environmental Monitoring Reports for review by TxDOT at TxDOT's request. Should any non-compliance or violation be observed that represents an imminent danger to human health or the environment, the CMP shall include procedures to cause immediate notification to TxDOT.

Prior to NTP2, DB Contractor and TxDOT shall jointly inspect and photo document existing facilities, structures, and environmentally sensitive areas in the vicinity of the Site but not included as part of the Work. DB Contractor shall provide a minimum of ten Business Days advance notice to TxDOT of this joint inspection. The inspection shall document the pre-construction condition of vegetation, streets, sidewalks, landscaping, residential and commercial property, creeks, storm drainage, and infrastructure. The purpose of the inspection is to provide a point of reference from which TxDOT can determine if any facility, structure, and environmentally sensitive area damaged during the Work is restored to its pre-construction condition. DB Contractor shall document the inspection with a report that shall include photographs, sketches, maps, and narratives clearly depicting the pre-construction Site condition.

All photographs shall be archival quality and shall be accompanied by a caption describing the date, time of day, location, and direction in which the photograph was taken. If the photograph shows existing damage, the damage must be clearly shown and noted in the caption. All sketches and maps must be no larger than 11 inches x 17 inches. All photographs must be 4 inches x 6 inches.

The post award inspection shall inspect the MS4 located within and adjacent to the Site. During the inspection, DB Contractor shall note the following:

(a) Storm drains, culverts, swales, and other components of the MS4 that DB Contractor verified as free of floatable trash, silt, debris, and functioning as originally intended;

(b) Storm drains or culverts that do not function or appear not to function as originally intended;

(c) Siltation of culverts, concrete swales, and other components of the MS4;

(d) The presence of construction on adjacent, up-gradient, or down-gradient properties. If construction on other properties is noted, DB Contractor shall photographically document the general condition of these properties and their compliance with storm water regulations;

(e) Pre-existing off-Site tracking from the Site or surrounding properties;

(f) Potential pre-existing contamination (i.e., any areas of soil discoloration or distressed vegetation); and

(g) Any other pre-existing condition that, by its nature, could be construed as a violation of the TPDES General Construction Permit.

Within 90 days following Substantial Completion, DB Contractor shall conduct an inspection to monitor and repair any of the above mentioned deficiencies in the storm water system. DB Contractor shall complete all repairs as a condition of Final Acceptance.

4.3.8 Recycling Plan

The RP shall document and fully detail DB Contractor's commitment to recycling, waste minimization, and use of "green products" during all aspects of Work. The RP shall document DB Contractor's recycling initiatives, as well as methods and procedures for maximizing the use of recycled materials in all aspects of the Work. If recyclable materials shall be used in lieu of TxDOT approved construction and maintenance materials, DB Contractor shall follow the TxDOT Material Specification DMS 11000.

4.4 Environmental Team

DB Contractor, acting through the Environmental Compliance Manager (ECM), shall designate an ET, as detailed in this Section 4, to prevent, minimize, and/or correct any violation of or noncompliance with Environmental Approvals. The ET shall include Environmental Training Staff, Environmental Compliance Inspectors (ECIs), Archeologist, meeting the requirements as indicated in Section 4.4.4, Historian meeting the qualifications as indicated in Section 4.4.4, Natural Resource Biologist meeting the qualifications as indicated in Section 4.4.5, Water Quality Specialist meeting the qualifications as indicated in Section 4.4.6, and Hazardous Materials Manager meeting the qualifications as indicated in Section 4.4.7. All of the ET shall be deemed other principal personnel.

In the CEPP, DB Contractor shall establish a detailed approach, procedures and methods for:

(a) Staffing and availability of ECM and all ET personnel; and

(b) ET staff response times during the Work.

4.4.1 Environmental Compliance Manager

DB Contractor shall designate a full-time ECM for the Work. The ECM shall report and coordinate all issues directly with TxDOT and DB Contractor's PM. In the event the ECM, in consultation with DB Contractor's PM and TxDOT, is unable to reach satisfactory resolution of environmental issues, the ECM shall provide written notification to DB Contractor and TxDOT outlining the concerns, actions taken in attempt to correct the concerns, and provide a recommendation as to the suggested course of action.

The ECM shall direct the work of the ET and shall monitor, document, and report the current status of environmental compliance for the Work. The ECM shall be responsible for implementation and maintenance of the SW3P. The ECM shall report immediately to TxDOT and DB Contractor any violation or non-compliance and shall include with any such report, the appropriate recommendations for corrective action including stoppage of Work.

The ECM shall coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities. The ECM shall submit all necessary environmental documentation and monitoring reports to the appropriate Governmental Entities and when applicable, through TxDOT, to the extent necessary to maintain compliance with applicable Environmental Approvals.

DB Contractor shall not have the ability to relieve the ECM of his or her duty without the written consent of TxDOT. Should DB Contractor desire to replace ECM, DB Contractor shall submit to TxDOT the resume of a replacement candidate. The replacement candidate shall be available fulltime within 30 days after delivery of TxDOT's written acceptance. In the absence of the ECM, DB Contractor's Hazardous Materials Manager shall act as an interim ECM.

The ECM candidate shall have at least five years of experience successfully managing environmental compliance of freeway construction. The ECM shall have the following experience:

(a) Developing and managing a SW3P;

(b) Developing and managing a hazardous substance and petroleum products management plan;

(c) Implementing environmental mitigation plans;

(d) Providing environmental and personal protection training;

(e) Monitoring compliance with the MBTA; and

(f) Monitoring compliance with Section 404/401 permit conditions.

The ECM's qualifying experience must demonstrate the ECM is familiar with:

1. The scope and terminology of American Society of Testing and Materials (ASTM) E 1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process;

2. Provisions of the TPDES CGP (TXR 150000);

3. Requirements of Section 404/401 and permit provisions; and

4. FHWA and TxDOT guidance on NEPA and environmental compliance.

4.4.2 Environmental Training Staff

Under the direction of the ECM, the Environmental Training Staff shall develop, schedule and conduct environmental awareness and environmental compliance training for DB Contractor's personnel. All training shall be in accordance with the requirements set forth in Section 4.3.3. Each Environmental Training Staff member shall have at least one year of experience providing environmental compliance inspection for freeway construction.

4.4.3 Environmental Compliance Inspectors

The ECIs shall conduct on-Site environmental monitoring, prepare documentation, and report to the ECM daily (at a minimum) all violations, compliance, and noncompliance with Environmental Approvals.

The ECI shall report immediately to the ECM any violation or non-compliance and shall include with any such reports, the appropriate recommendations for corrective action, including, but not limited to stoppage of Work.

Each ECI shall have at least one year operational control experience of SW3P activities.

4.4.4 Cultural Resource Management Personnel

The ECM shall designate an Archeologist and Historian to provide expertise in monitoring impacts to cultural resources during the course of the Work.

The Cultural Resource Management Personnel shall meet the certification requirements of TxDOT Precertification Work Category, 2.8.1 “Surveys, Research and Documentation of Historic Buildings, Structures, and Objects,” 2.9.1 “Historic Architecture,” 2.10.1 “Archeological Surveys, Documentation, Excavations, Testing Reports and Data Recovery Plans,” and 2.11.1 “Historical and Archival Research,” as applicable.

4.4.5 Natural Resource Biologist

The ECM shall designate a Natural Resource Biologist to provide expertise in monitoring impacts on wildlife and the natural environment during the course of the Work.

The Natural Resource Biologist shall meet the certification requirement of TxDOT Precertification Work Category 2.6.1 “Protected Species Determination (Habitat)” and 2.6.3 “Biological Surveys.”

4.4.6 Water Quality Specialist

The ECM shall designate a Water Quality Specialist to provide expertise in waters of the U.S. delineations and Section 404 permitting, storm water pollution prevention, and the protection of jurisdictional waters during the course of the Work.

The Water Quality Specialist shall have verifiable experience implementing SW3P and be able to demonstrate a working knowledge of the TPDES and MS4 permit requirements applicable to the Project.

The Water Quality Specialist shall meet the certification requirements of TxDOT Precertification Work Category 2.4.1 “Nationwide Permit” and 2.3.1 “Wetland Delineation.”

4.4.7 Hazardous Materials Manager

The ECM shall designate a Hazardous Materials Manager to provide expertise in the safe handling of Hazardous Materials required to perform the Work and those that may be discovered/impacted during the duration of the Agreement. The Hazardous Materials Manager shall conduct appropriate activities such as the following:

(a) Schedule and/or conduct training for DB Contractor’s employees;

(b) Verify all employee certifications prior to and required for any handling of Hazardous Materials; and

(c) Maintain records of all incidents involving Hazardous Materials and notify the ECM, TxDOT and appropriate authorities in writing of any such incidents.

The Hazardous Materials Manager shall be a qualified professional with 40-hour HAZWOPER certification and at least five years' experience in similar projects in the following areas:

(a) Experienced in developing IWPs, SIRs, and remedial action plans or equivalent reports necessary and acceptable to the TCEQ in material discovery and remediation efforts of Hazardous Materials; and

(b) Experienced in TCEQ guidance for the investigation and remediation of Hazardous Materials under the TCEQ Voluntary Cleanup Program and Texas Risk Reduction Program rules.

The Hazardous Materials Manager shall meet the certification requirements of TxDOT Precertification Work Category 2.13.1 "Hazardous Materials Initial Site Assessment."

4.5 Property Access

To fulfill the obligation of the TxDOT-Provided Approvals to maintain current access during and after construction, DB Contractor shall make reasonable efforts to minimize the inconvenience to vehicles, bicycles, and pedestrians during the Term of the Agreement. DB Contractor shall maintain access to adjacent properties during construction and ensure that visibility of businesses is maintained.

4.6 Dust Control

DB Contractor shall institute dust control measures to minimize air quality impacts. The measures shall be adjusted as necessary based on construction traffic, forecasted wind speeds, and persistent dry weather conditions.

4.7 Asbestos Containing Material

DB Contractor shall identify, inspect, notify TxDOT, amend notifications as necessary, pay notification fees, and abate asbestos found on any structure, including but not limited to bridges and buildings, in accordance with appropriate or relevant regulations or guidance. DB Contractor shall provide TxDOT any inspection reports, proposed abatement plan, and/or report documenting abatement (as necessary).

4.8 Lead-Based Paint

DB Contractor shall test, identify, inspect, notify, amend notifications as necessary, pay notification fees, and abate for lead-based paint on any structure, including but not limited to bridges and buildings, in accordance with appropriate or relevant regulations or guidance.

4.9 Submittals

Submittals described in Section 4 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 4-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 4-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 4			
PMP – Comprehensive Environmental Protection Program (CEPP)	Within 30 days after NTP1	Approval prior to issuance of NTP2	4.3
PMP – Comprehensive Environmental Protection Program (CEPP) (Items specified in 4.3 to be submitted in an updated CEPP)	Within 90 days after NTP1	Approval prior to commencement of Construction	4.3
Environmental Monitoring Reports	Weekly	For Information	4.3.1
Investigative Work Plans	As necessary	Review and acceptance	4.3.1 4.3.5.1
Site Investigation Reports	As necessary	Review and acceptance	4.3.1 4.3.5.1
Remedial Action Plans	As necessary	Review and acceptance	4.3.1 4.3.5.1
Segment 2 Wetland Delineations	Prior to construction	Review and acceptance	4.3.1 4.3.2.2.2
Section 404 Permit Application	As necessary/prior to construction	Review and acceptance	4.3.1 4.3.2.2.2
Mitigation/Resource Monitoring Reports	As necessary	For information	4.3.1
TPDES CGP/NOI	Prior to construction	For information	4.3.1 4.3.2.3
TPDES CGP Notice of Termination	Prior to Substantial Completion	For information	4.3.1
SW3P	Prior to construction	For information	4.3.1 4.3.2.3
Pre-construction Inspection Report	Prior to construction	For information	4.3.1
Post-construction Inspection Report	Prior to Substantial Completion	For information	4.3.1
Final Noise Analyses	As necessary	Review and acceptance	4.3.1 4.3.2.6
EPICs	Prior to construction	Review and acceptance	4.3.1 4.3.2.1
Avoidance Area Plan Sheets	Prior to construction	For information	4.3.1
Detour plans	As necessary/Prior to implementation	For information	4.3.1
Right-of-way reduction documentation	As necessary	For information	4.3.1

Submittals	Submittal Schedule	Department Action	Reference Section
Federal, state, and local correspondence	As necessary	For information	4.3.1
Construction Stage Gate Checklist (Form 2448)	Prior to construction	For information	4.3.1
Construction SW3P Field Inspection and Maintenance Report (Form 2118)	As necessary	For information	4.3.1
Public Involvement Materials	As necessary	Review and acceptance	4.3.1 4.3.2.9
Segment 1 & 2 Biological Surveys	Prior to construction	Review and acceptance	4.3.2.4.1 4.3.2.4.2 4.3.2.5.1 4.3.2.5.2
Segment 1 & 2 Archeological Resource Surveys	Prior to construction	Review and acceptance	4.3.2.8.1 4.3.2.8.2

SECTION 5.0 THIRD PARTY AGREEMENTS

5.1 General Requirements

TxDOT has existing agreements with local Governmental Entities along the Project corridor that define the requirements for construction, operations, and facility maintenance. TxDOT anticipates the need for additional agreements with local Governmental Entities for the operation of traffic signals and illumination along the corridor. These agreements do and will specify the local Governmental Entities' responsibilities and TxDOT's responsibilities with respect to the requirements and are provided in the attachments noted in this Section 5 and the RIDs, which include but are not limited to third-party agreements such as the *Local Transportation Project AFA for SH 249 Extension Project and FM 2978 Widening Project between TxDOT and Montgomery County*.

For the purpose of the Agreement, DB Contractor will assume and execute TxDOT's responsibilities and duties as defined in the current and future agreements. DB Contractor is responsible for providing TxDOT and Governmental Entities with all information necessary for it to fulfill TxDOT's responsibilities under these agreements.

In accordance with current and subsequent agreements requiring TxDOT to reimburse the local Governmental Entity for their role in operating and/or maintaining certain facilities, DB Contractor shall reimburse TxDOT the said costs. DB Contractor shall make payment to TxDOT within the timeframe stated in Table 5-1.

Third party agreements which DB Contractor shall assume and execute TxDOT's responsibilities and duties include, but are not limited to:

(a) Construction, Operation and Maintenance Agreement between TxDOT and Montgomery County; and

(b) MOU between TxDOT and City of Navasota.

These executed agreements can be found in Attachment 5-1.

5.2 Traffic Signals

New construction or modifications to the existing traffic signals are defined in Section 16.

DB Contractor shall assume and execute TxDOT's responsibilities and duties for traffic signals, as described in the appropriate third party agreements in Section 5.1.

5.3 Roadway Illumination

Some local Governmental Entities may request continuous illumination along the access roads within the Project Limits. Should this occur, additional agreements between TxDOT and the Governmental Entity will be required. DB Contractor shall coordinate with and provide reasonable accommodations to the third party to carry out the installation, operations, and maintenance obligations as specified in such agreements. Design and construction of additional illumination by DB Contractor will be treated as a TxDOT-Directed Change.

For sections of continuous lighting specified by these additional agreements, safety lighting included in that section is considered a component of the overall system, and responsibilities for said safety lighting shall be those in the terms of the additional agreement.

New construction or modifications to the existing illumination are defined in Section 16.

5.4 Other Affected Third Parties

When Work interfaces with other third party facilities, DB Contractor is responsible for coordinating the Work with all third parties potentially affected by the Work. DB Contractor shall prepare a plan, the Affected Third Parties Plan, which describes how DB Contractor will mitigate the impact of the Work upon potentially-impacted third parties, for TxDOT's approval prior to initiating discussions with potentially-impacted third parties.

5.5 Submittals

Submittals described in Section 5 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 5-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 5-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 5			
Third Party operation and maintenance reimbursement	Within 30 days from receipt of request for payment	N/A	5.1
PMP – Affected Third Parties Plan	Within 30 days after NTP1 and prior to initiating discussions with third parties	Approval	5.4

SECTION 6.0 UTILITY ADJUSTMENTS

6.1 General Requirements

A number of existing Utilities are located within or in the vicinity of the Project ROW, some pursuant to statutory rights and some pursuant to property rights. Certain of those existing Utilities will need to be relocated or otherwise adjusted in order to accommodate the Project. This Section 6 establishes procedures and requirements for Utility Adjustments including such processes as coordination with Utility Owners, administration of the engineering, construction, and other activities necessary for Utility Adjustments and required documentation. This Section 6 references certain TxDOT forms for DB Contractor's use in Utility Adjustments. Copies of those forms are included in Attachment 6-1. Except as otherwise provided in this Section 6 or directed by TxDOT, whenever a TxDOT form is provided, DB Contractor shall prepare all forms of the same type using the TxDOT form and obtain TxDOT approval of all changes to the forms prior to execution by the Utility Owner.

DB Contractor shall cause all Utility Adjustments necessary to accommodate construction, operation, maintenance, and/or use of the Project. Some Utility Adjustments may be performed by the Utility Owner with its own employees and/or contractors and consultants (i.e., Owner-Managed); all others shall be performed by DB Contractor with its own employees and/or Subcontractors and consultants (subject to any approval rights required by the Utility Owner for those working on its facilities) (i.e., DB Contractor-Managed). The Utility Agreement shall specify the allocation of responsibility for the Utility Adjustment Work between DB Contractor and the Utility Owners as described in Section 6.1.3 (Agreements Between DB Contractor and Utility Owners).

The Project will be subject to 23 CFR Part 645 Subpart A, 23 CFR Section 635.410 (Buy America) and FHWA's associated policies. DB Contractor shall comply (and shall require the Utility Owners to comply) with 23 CFR Part 645 Subpart A and 23 CFR Section 635.410. TxDOT form SPD ROW-U-1818 Buy America (Material Statement) is required for all work performed for the Utility Owner prior to the Utility Owners receiving final payment from DB Contractor or TxDOT to document compliance with Buy America requirements, as identified in Attachment 6-1, if applicable. DB Contractor's obligations regarding reimbursement to Utility Owners for eligible costs of Utility Adjustment Work, and DB Contractor's obligations regarding the accommodation of Utilities from and after NTP2, are set forth in Sections 6.8.1.1 and 6.8.6 of the Agreement.

This Section 6 does not address Utility services to the Project. Utility services to the Project shall be the subject of separate agreements between DB Contractor and the Utility Owners.

DB Contractor shall prepare and submit to TxDOT no later than 30 days after NTP1, a Utility Management Plan in accordance with the requirements of this Section 6. The Utility Management Plan shall include the following:

(a) DB Contractors organization structure including names, contact details, titles, job roles and qualifications of Utility Key Personnel and other Utility personnel;

(b) Procedures for coordination with Utility Owners to obtain Utility Assemblies and establishing procedures for Utility Adjustment Concept Plans, Utility Adjustment Field Modifications, Utility strip map, inspection of Utility Owner construction, quality control/quality assurance, emergency procedures with respect to Utility Adjustment Work and close out procedures;

(c) Integration of the Utility Adjustment Work in the Project Baseline Schedule; and

(d) Procedures to address a Utility Adjustment Field Modification (UAFM) as described in Section 6.4.7.

6.1.1 When Utility Adjustment is Required

A Utility Adjustment may be necessary for the following reasons: (a) a physical conflict between the Project and the Utility, or (b) an incompatibility between the Project and the Utility based on the requirements in Section 6.2.1 (Standards), even though there may be no physical conflict. The physical limits of all Utility Adjustments shall extend as necessary to functionally replace the existing Utility, whether inside or outside of the Project ROW. Section 6.2.4.2 (Acquisition of Replacement Utility Property Interests) contains provisions that address the acquisition of Replacement Utility Property Interests for Utilities to be installed outside of the Project ROW.

Utilities may remain in their existing locations within the Project ROW if (a) the requirements of Section 6.2.1 (Standards) are met, (b) the existing location will not adversely affect the construction, operation, safety, maintenance, or intended use of the Project and Utility, and (c) the Utility Owner agrees to the Utility remaining in its existing location.

Existing Utilities located on an Existing Utility Property Interest that cross a roadway centerline at less than 90 degrees may remain in the existing alignment, as long as the Utility crosses at no less than a 30 degree angle to the roadway centerline and does not cross diagonally through connecting intersections. The existing Utilities may remain or be relocated in place in these areas only if all other conditions of the Utility Accommodation Rules (UAR) are met and the affected Utility Owners agree and approve all proposed Utility Adjustment plans.

6.1.2 Certain Components of the Utility Adjustment Work

6.1.2.1 Coordination

DB Contractor shall communicate, cooperate and coordinate with TxDOT, the Utility Owners and potentially affected third parties, as necessary, for performance of the Utility Adjustment Work. DB Contractor shall be responsible for preparing and securing execution (by DB Contractor, the Utility Owner and TxDOT) of all necessary Utility Agreements.

All Utility Agreements must be approved by TxDOT prior to any Utility Adjustment construction related activity.

6.1.2.2 Betterments

Replacements for existing Utilities shall be designed and constructed to provide service at least equal to that offered by the existing Utilities, unless the Utility Owner specifies a lesser replacement. Utility Enhancements are not included in the Work; however, any Betterment work furnished or performed by DB Contractor as part of a Utility Adjustment shall be deemed added to the Work, on the date the Utility Agreement becomes effective, as set forth in Section 6.8.2 of the Agreement. DB Contractor shall perform all coordination necessary for Betterments.

6.1.2.3 Protection in Place

DB Contractor shall be responsible for Protection in Place of all Utilities impacted by the Project as necessary for the continued safe operation and structural integrity of each Utility, and to satisfy the requirements described in Section 6.2.1 (Standards). For each impacted Utility, DB

Contractor shall obtain Utility Owner's approval of DB Contractor's proposed Protection in Place prior to beginning Construction Work.

6.1.2.4 Abandonment and Removal

DB Contractor shall make all arrangements and perform all work necessary to complete each abandonment or removal (and disposal) of a Utility in accordance with the requirements listed in Section 6.2.1 (Standards), including obtaining Governmental Approvals and consent from the affected Utility Owner and any affected landowner(s), or shall confirm that the Utility Owner has completed these tasks. Utility facilities that will be abandoned in place must be clearly identified in the Utility Assembly plans. The Utility Assembly plans must detail the method of abandonment to be utilized for TxDOT to determine if UAR requirements are met. The plans must also detail the age, condition, material type, active status and size of each Utility. If a Utility is to be abandoned, the plans shall (i) state that the Utility Owner continues to own and maintain the abandoned Utility facility and keep records of its location, and (ii) include a certification from the Utility Owner stating that the facility doesn't contain nor is composed of hazardous/contaminated materials. Voids and abandoned pipe beneath the roadway are prohibited unless allowed at TxDOT's discretion. In accordance with jurisdictional requirements or as directed by TxDOT, all voids must be filled with cement slurry or backfilled, and any pipe to be abandoned in place must be grout filled and capped.

6.1.2.5 Service Lines and Utility Appurtenances

Whenever required to accommodate construction, operation, maintenance, or use of the Project, DB Contractor shall cause Service Line Adjustments and Utility Appurtenance Adjustments. Each Service Line shall have a definitive point of termination such as a meter or point of sale. On completion of these, DB Contractor shall cause full reinstatement of the roadway, including reconstruction of curb, gutter, sidewalks, and landscaping, whether the Utility Adjustment Work is performed by the Utility Owner or by DB Contractor.

6.1.2.6 Early Adjustments

At TxDOT's discretion, there may be early Utility Adjustment Work accomplished by TxDOT through a direct contract with the utility company to coordinate Utility Adjustment Work that would progress the Project. TxDOT will coordinate with and notify the Proposers of all early Utility Adjustment Work during the procurement and negotiation phases. If any Work is performed by TxDOT, an adjustment to the Price may be required.

6.1.3 Agreements Between DB Contractor and Utility Owners

Except as otherwise stated in this Section 6 or in the Agreement, DB Contractor shall address each Utility Adjustment in a Project Utility Adjustment Agreement (PUAA) or in a Utility Adjustment Agreement Amendment (UAAA), as described elsewhere in this Section 6. DB Contractor is responsible for preparing, negotiating (to the extent allowed by this Section 6) and obtaining execution by the Utility Owners of all Utility Agreements, (including preparing all necessary exhibits and information about the Project, such as reports, Plans and surveys).

A Utility Agreement is not required for any Utility work consisting solely of Protection in Place in the Utility's original location within the Project ROW, unless the Utility Owner is being reimbursed for costs incurred by it on account of such Protection in Place. If no reimbursement is required to the Utility Owner, a Utility Joint Use Acknowledgment or Utility Installation Request, Form 1082, as required in Section 6.2.4.5 and plans detailing UAR compliance is required pertaining to the Adjustment or Protection in Place work. If a Utility Owner requests that

DB Contractor relocate a Utility and the cost of that Utility Adjustment is the Utility Owner's sole responsibility in accordance with Transportation Code 203.092, then DB Contractor shall enter into a DB Contractor-Managed PUAA with the Utility Owner providing for the Utility Owner to be responsible for all costs of that Utility Adjustment Work.

6.1.3.1 Project Utility Adjustment Agreements

DB Contractor shall enter into one or more PUAAs with each affected Utility Owner to define the design, material, construction, inspection, and acceptance standards and procedures necessary to complete Utility Adjustments, and to define DB Contractor's and the Utility Owner's respective responsibilities for Utility Adjustment costs and activities, including material procurement, construction, inspection and acceptance. A PUAA may address more than one Utility Adjustment for the same Utility Owner. Additional Utility Adjustments may be added to an existing PUAA by a Utility Adjustment Agreement Amendment (UAAA).

DB Contractor shall prepare each PUAA using the TxDOT form SPD ROW-U-PUAA-OM (Owner-Managed) or SPD ROW-U-PUAA-DM (DB Contractor-Managed), included in Attachment 6-1. DB Contractor shall not modify the forms except by approval of TxDOT.

Promptly following issuance of NTP1, DB Contractor shall begin negotiations with each affected Utility Owner to reach agreement on one or more PUAAs and UAAAs. DB Contractor shall finalize the necessary PUAAs with each affected Utility Owner within a reasonable time period after issuance of NTP1. Utility Assemblies may not be submitted to TxDOT for approval prior to issuance of NTP2. DB Contractor shall include any proposed changes to the form (other than filling in the blanks specific to a particular Utility Owner) in a track-change format that clearly identifies the changes and the party requesting the changes. Each PUAA (including the Utility Adjustment Plans attached thereto) shall be subject to TxDOT review and approval as part of a Utility Assembly.

DB Contractor shall obtain approval by TxDOT of any language modification to a PUAA by the Utility Owner and DB Contractor prior to the submission of a Utility Assembly.

6.1.3.2 Utility Adjustment Agreement Amendments

Except where Utility Adjustment Field Modifications are permitted pursuant to Section 6.4.7 (Utility Adjustment Field Modifications), modification of an executed PUAA or any component thereof, after it has been approved by TxDOT as part of a Utility Assembly, shall be stated in a UAAA. A UAAA may be used only when the allocation of responsibility for the Utility Adjustment Work covered by that UAAA is the same as in the parent Utility Agreement; otherwise, an additional PUAA will be required.

Each UAAA (including any Utility Adjustment Plans attached thereto) shall be subject to TxDOT's approval. Except as otherwise directed by TxDOT or provided in an applicable Utility Agreement, DB Contractor shall prepare all UAAAs using the form included in Attachment 6-1. DB Contractor shall include any proposed changes to the form (other than filling in the blanks specific to a particular Utility Owner) in a Utility Owner-specific addendum.

DB Contractor shall obtain TxDOT approval of all changes to a UAAA prior to execution by the Utility Owner.

6.1.4 Recordkeeping

DB Contractor shall maintain construction and inspection records in order to ascertain and demonstrate that Utility Adjustment Work is accomplished in accordance with the approved Utility Adjustment Plans and as required by the Contract Documents and the applicable Utility Agreement(s).

6.2 Administrative Requirements

6.2.1 Standards

All Utility Adjustment Work shall comply with all applicable Laws, Codes (including, but not limited to 43 TAC, Part 1, Chapter 21, Subchapter C, Utility Accommodation Rules), Regulations and Technical Provisions of the Agreement, including the Utility Adjustment Standards, the TxDOT *ROW Utility Manual*, Section 6.8 of the Agreement, and the requirements specified in this Section 6.

6.2.2 Communications

6.2.2.1 Communication with Utility Owners

DB Contractor is responsible for holding meetings and otherwise communicating with each Utility Owner as necessary to timely accomplish the Utility Adjustments in compliance with the Contract Documents.

DB Contractor shall notify TxDOT of all meetings, and TxDOT may participate in these meetings if requested by the Utility Owner or DB Contractor or otherwise as TxDOT deems appropriate.

Before distribution of any mass mailings to Utility Owners, DB Contractor shall submit to TxDOT, 21 Days in advance of distribution for its review and comment, the form, content and addressees of any such mass mailings. For purposes of this Section 6, the term “mass mailing” means correspondence that is sent to 50% or more of Utility Owners within a three week time period, and contains substantially the same content with respect to each Utility Owner.

6.2.2.2 Meetings

At least three Business Days in advance of each scheduled meeting, DB Contractor shall provide notice and an agenda for the meeting separately to TxDOT and to the appropriate Utility Owner unless otherwise provided. DB Contractor shall prepare minutes of all meetings and shall keep copies of all correspondence.

DB Contractor shall prepare meeting minutes within five Business Days after the conclusion of each meeting. At a minimum, DB Contractor shall include the following items in the meeting minutes:

(a) A complete list of attendees (including their affiliations, telephone numbers and e-mail addresses)

(b) Documentation of the issues discussed and any associated solutions or resolutions

(c) Description of remaining open issues and action items (including the person(s) responsible for follow-up and target date for resolution)

DB Contractor shall submit draft versions of all meeting minutes to TxDOT for review before distributing final versions to the meeting attendees and appropriate Customer Groups.

6.2.3 Utility Adjustment Team

DB Contractor shall provide a Utility Adjustment team whose members have all appropriate qualifications and experience to perform the Utility Adjustment Work. DB Contractor shall provide a list of the names and contact details, titles, job roles and specific experience of the team members in the PMP. Specifically, DB Contractor shall provide a Utility Manager (UM) and a Utility Design Coordinator (UDC) to manage all aspects of the Utility Adjustment process. If DB Contractor assigns the construction activities to a Subcontractor or Affiliate, DB Contractor shall provide a DB Contractor Utility Coordinator (DUC) as described herein.

The UM's primary work responsibility shall be the performance of all DB Contractor's obligations with respect to Utility Adjustments. The UM shall have a bachelor's degree and have at least five years of relevant experience in coordinating and solving complex Utility Adjustments on highway improvement projects. DB Contractor shall authorize the UM to approve all financial and technical modifications associated with Utility Adjustments and modifications to the Utility Agreement.

The UDC shall be a Registered Professional Engineer (PE). The UDC shall be responsible for coordinating the Utility Adjustment design with the overall design features during the planning, design and construction phases of the Work.

If applicable, the DUC shall hold a bachelor's degree and have at least five (5) years of relevant experience in ROW and Utility coordination activities involving large transportation projects. The DUC will be responsible for tracking and following DB Contractor's Affiliate's and Subcontractor's activities and communicating the progress to DB Contractor. The DUC will assist with developing good working relationships with the Utility Owners and assisting DB Contractor in all Utility coordination matters.

6.2.4 Real Property Matters

DB Contractor shall provide the services described below in connection with the existing and future occupancy of property by Utilities.

6.2.4.1 Documentation of Existing Utility Property Interests – Affidavits

For each Existing Utility Property Interest within the Project ROW claimed by any Utility Owner, DB Contractor shall include an Affidavit of Property Interest in the applicable Utility Assembly, with documentation of the Existing Utility Property Interest (e.g., an easement deed) attached. Any such claim shall be subject to TxDOT's review as part of a Utility Assembly approval. Except as otherwise directed by TxDOT, DB Contractor shall prepare all Affidavits of Property Interest using the forms included in Attachment 6-1.

6.2.4.2 Acquisition of Replacement Utility Property Interests

Each Utility Owner will be responsible for acquiring any Replacement Utility Property Interests that are necessary for its Utility Adjustments. DB Contractor shall have the following responsibilities for each acquisition:

(a) DB Contractor shall coordinate with, and provide the necessary information to, each Utility Owner as necessary for the Utility Owner to acquire any Replacement Utility Property Interests required for its Utility Adjustments;

(b) If any DB Contractor-Related Entity assists a Utility Owner in acquiring a Replacement Utility Property Interest, such assistance shall be by separate contract outside of the Work, and DB Contractor shall ensure that the following requirements are met:

(i) The files and records must be kept separate and apart from all acquisition files and records for the Project ROW;

(ii) The items used in acquisition of Replacement Utility Property Interests (e.g., appraisals, written evaluations and owner contact reports) must be separate from the purchase of the Project ROW; and

(iii) Any DB Contractor-Related Entity personnel negotiating the acquisition of Replacement Utility Property Interests must be different from those negotiating the acquisition of the Project ROW.

DB Contractor is not responsible for Utility Owner condemnation proceedings except for DB Contractor's cost share set forth in Section 6.8.6 of the Agreement. The Utility Owner is responsible for utilizing its authority for condemnation proceedings for all Replacement Utility Property Interests.

6.2.4.3 Relinquishment of Existing Utility Property Interests

DB Contractor shall cause the affected Utility Owner to relinquish to the State each Existing Utility Property Interest within the Project ROW, unless the existing Utility occupying such interest is either (a) remaining in its original location or (b) being reinstalled in a new location still subject to such interest.

6.2.4.4 Quitclaim Deeds

Except as otherwise directed by TxDOT, DB Contractor shall prepare a Quitclaim Deed for each relinquishment of an Existing Utility Property Interest using the TxDOT form included in Attachment 6-1. Each Quitclaim Deed is subject to TxDOT's approval.

DB Contractor understands and expects that a Utility Owner will not relinquish any Existing Utility Property Interest until after the Utility Adjustment has been accepted by the Utility Owner in its new location. Accordingly, instead of an executed Quitclaim Deed, the Utility Assembly for such Utility Adjustment shall include a letter signed by the Utility Owner's authorized representative confirming that the interest will be quitclaimed upon completion of the Utility Adjustment, with a copy of the unsigned Quitclaim Deed. In these cases, DB Contractor shall obtain the executed Quitclaim Deed within 90 Days of completion of the Utility Adjustment or unless otherwise approved by TxDOT in writing. The Quitclaim Deed must be approved by TxDOT prior to DB Contractor recording such deed in the local real property records.

6.2.4.5 Utility Joint Use Acknowledgments and Utility Installation Request, Form 1082 Requirements

DB Contractor shall prepare a Utility Joint Use Acknowledgment (UJUA) for each Utility that will remain within the boundaries of its Existing Utility Property Interest location within the Project ROW. DB Contractor shall prepare all UJUAs using the TxDOT form included in Attachment 6-1. DB Contractor also shall prepare all required documentation to be included with each UJUA.

DB Contractor shall arrange for the Utility Owner to execute each UJUA or Utility Installation Request, Form 1082, which shall be subject to TxDOT's written approval as part of a Utility Assembly.

DB Contractor shall prepare a Utility Installation Request, Form 1082, for each Utility that will remain or be relocated within the Project ROW and is not located within an Existing Utility Property Interest held by the Utility Owner.

6.2.4.6 Documentation Requirements

DB Contractor shall prepare, negotiate (to the extent permitted by this Section 6.2.4), and obtain execution by the Utility Owner of (and record in the appropriate jurisdiction, if applicable) all agreements and deeds described in this Section 6.2.4, including all necessary exhibits and information concerning the Project (e.g., reports, Plans and surveys). Each agreement or deed shall identify the subject Utility(ies) by the applicable Utility Assembly Number and shall also identify any real property interests by parcel number or highway station number, or by other identification acceptable to TxDOT.

6.3 Design

6.3.1 DB Contractor's Responsibility for Utility Identification

DB Contractor bears sole responsibility for locating and identifying, at its own expense, all Utilities, including all Service Lines, within the Project ROW or otherwise affected by the Project, whether located on private property or within an existing public ROW.

DB Contractor shall prepare and submit to TxDOT, no later than 90 days after NTP2 or 30 days before the first assembly package is submitted, whichever is earlier, a Utility strip map showing the information obtained and confirmed pursuant to this Section 6.3.1. DB Contractor's Utility strip map shall show in plan view all Utilities within the Project ROW and those outside of the ROW which are otherwise impacted by the Project. The map shall detail the type of Utility facility (e.g., communication, gas, oil, water, etc.) size, material, and the Utility Owner's name and contact information. The scale of DB Contractor's Utility strip map shall be 1" = 100'. DB Contractor shall verify and update the information provided in the RID Utility Strip Map with SUE data obtained by the DB Contractor and incorporate into DB Contractor's Utility strip map.

6.3.2 Technical Criteria and Performance Standards

DB Contractor shall ensure that all design plans for Utility Adjustment Work, whether furnished by DB Contractor or by the Utility Owner, are consistent and compatible with the following:

(a) The applicable requirements of the Contract Documents, including Section 6.2.1 (Standards)

(b) The Project design

(c) Any existing and proposed Utility facility

(d) All applicable Governmental Approvals

(e) Private approvals of all third parties necessary for such Work

6.3.3 Utility Adjustment Concept Plans

DB Contractor shall prepare and submit to TxDOT, no later than 90 days after NTP2 or 30 days before the first assembly package is submitted, whichever is earlier, a proposed conceptual Utility design (a Utility Adjustment Concept Plan) for the Project (or proposed Utility Adjustment Concept Plans for various segments of the Project, as appropriate), showing the approximate location of each existing Utility in accordance with Section 6.3.1 (DB Contractor's Responsibility for Utility Identification), the existing Utilities to remain, the proposed location of each Utility, and DB Contractor's Utility Adjustment recommendations.

In accordance with the PMP, DB Contractor shall submit the proposed Utility Adjustment Concept Plan(s) to TxDOT for its review. The Utility Adjustment Concept Plan(s) shall be submitted in both tabular and plan formats. The tabular format shall identify and numerically list each Utility conflict and each associated Utility. The plan(s) shall be color-coded and shall utilize a scale that clearly depicts all of the required information. DB Contractor shall coordinate with each affected Utility Owner as necessary to obtain its respective concurrence with the Utility Adjustment Concept Plan(s) and with any subsequent revisions. The Utility Adjustment Concept Plan is a working document and DB Contractor shall modify the plan as more project information becomes available. DB Contractor shall make the updated Utility Adjustment Concept Plans available to TxDOT upon request. Each executed PUAA or UAAA will identify and approve the Utility location.

6.3.4 Utility Adjustment Plans

DB Contractor shall ensure that all Utility Adjustment Plans, whether furnished by DB Contractor or by the Utility Owner, are signed and sealed by a Registered Professional Engineer (PE), unless waived by TxDOT at its discretion and as allowed by governmental regulations and industry practice.

6.3.4.1 Plans Prepared by DB Contractor

In the event that DB Contractor and the Utility Owner have agreed that DB Contractor will furnish a Utility Adjustment design, DB Contractor shall prepare and obtain the Utility Owner's approval of plans, specifications and cost estimates for the Utility Adjustment (collectively, "Utility Adjustment Plans") by having an authorized representative of the Utility Owner sign the plans as "reviewed and approved for construction". The Utility Adjustment Plans (as approved by the Utility Owner) shall be attached to the applicable Utility Agreement, which DB Contractor shall include in the appropriate Utility Assembly for TxDOT's approval.

Unless otherwise specified in the applicable Utility Agreement(s), all changes to Utility Adjustment Plans previously approved by the Utility Owner (excluding estimates, if the Utility Owner is not responsible for any costs) shall require written Utility Owner approval. DB Contractor shall transmit any TxDOT comments to the Utility Owner and shall coordinate any modification, re-approval by the Utility Owner and re-submittal to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.2 Plans Prepared by the Utility Owner

For all Utility Adjustment Plans furnished by a Utility Owner, DB Contractor shall coordinate with the Utility Owner as necessary to confirm compliance with the applicable requirements as referenced in Section 6.2.1 (Standards). Utility Owner prepared Utility Adjustment Plans shall be attached to the applicable Utility Agreement, which DB Contractor shall include in the appropriate Utility Assembly for TxDOT's approval. DB Contractor shall transmit any TxDOT

comments to the Utility Owner and shall coordinate any modification, review by DB Contractor, and re-submittal to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.3 Design Documents

Each existing Utility and each proposed Utility Adjustment shall be shown in the Design Documents, regardless of whether the Utility Adjustment Plans are prepared by DB Contractor or by the Utility Owner.

6.3.4.4 Certain Requirements for Underground Utilities

Casing as specified in the UAR shall be used for all underground Utilities crossing the Project ROW. However, high-pressure gas and liquid petroleum pipelines may be allowed to cross the Project ROW without steel casing as long as the requirements of the UAR are met. All high-pressure gas pipelines within the Project ROW shall comply with a design factor "F" = 0.6 or less as required by the class location of the pipeline. The Utility Owner is required to submit or approve in writing the Barlow's Formula calculation(s) to be included in the Utility Assembly.

Underground communication facilities that cross the roadway, including side roads, shall be encased in Schedule 80 PVC or SDR 11 HDPE pipe up to and including 4" casings. Casings larger than 4" shall be steel pipe, unless other methods of protection are approved by TxDOT. Multiple conduits shall be encased in steel pipe, unless other methods of protection are approved by TxDOT.

Refer to Section 14 – Rail for design requirements for underground Utilities within the potential railroad corridor.

6.3.4.5 Utility Assemblies

Each Utility Adjustment, in addition to each Utility remaining in place in the Project ROW and not requiring any Protection in Place or other Utility Adjustment, shall be addressed in a Utility Assembly prepared by DB Contractor and submitted to TxDOT for its review and comment and for TxDOT's approval of any items for which this Section 6 requires TxDOT's approval. Temporary Adjustments that are installed within the Project ROW must also be included with an assembly for TxDOT's prior approval, unless TxDOT waives or allows other approval methods concerning temporary Adjustments. Each Utility Adjustment shall be addressed in a full Utility Assembly, unless it is appropriate for a Utility Adjustment Agreement Amendment or Abbreviated Utility Assembly, as described below. DB Contractor shall coordinate with the Utility Owner to prepare all components of each Utility Assembly. Completion of the review and comment process for the applicable Utility Assembly, as well as issuance of any required TxDOT approvals, shall be required before the start of construction for the affected Utility Adjustment Work.

Provisions governing the procedure for and timing of Utility Assembly Submittals are in Section 6.5 (Submittals).

All Utility Adjustments covered by the same parent PUAA can be addressed in a single full Utility Assembly.

Each Utility Assembly shall include the following:

(a) A transmittal memo recommending approval and detailing any unique characteristics or information pertaining to the Adjustment. The transmittal memo shall also describe any applicable amendment (UAAA) and explain why the amendment is necessary;

(b) A completed Utility Assembly Checklist;

(c) A TxDOT approved Utility Adjustment Agreement;

(d) Plans which:

(i) Show the existing and proposed Utility facilities;

(ii) Show existing and proposed grades for all Utility crossings;

(iii) Show the existing and Project ROW lines along with the control of access denial line;

(iv) Show an offset distance from the Project ROW line to all longitudinal Utilities within the Project ROW;

(v) Present sufficient information to enable TxDOT to verify compliance with the UAR requirements for each Utility located within the Project ROW, including highway design features; and

(vi) Are folded to 8.5 inch x 11 inch size, unless waived by TxDOT.

(e) Estimate(s) from the Utility Owner (and also from DB Contractor, where DB Contractor is furnishing design and/or performing construction), which estimates shall, without limitation, detail material type and quantity (material quantities detailed on the estimates must correlate to the materials shown on the plans described in (d) above), labor and engineering. The estimate must list and identify the estimated amount of reimbursement to the Utility Owner, taking into consideration the Betterment credit calculation, salvage credit and any applicable eligibility ratio. The estimated cost(s) associated with DB Contractor's internal coordination costs and overheads shall not be included in this estimate;

(f) A proposed Utility Joint Use Acknowledgment (UJUA) or Utility Installation Request, Form 1082;

(g) Statement of Work form, if applicable;

(h) Affidavit(s) of Property Interest form (with property interest instrument of conveyance attached), if applicable;

(i) A ROW map showing the existing and proposed Utility facilities identified on a plan view. This ROW map will only be required to be included with TxDOT's copy of the Utility Assembly, unless otherwise approved by TxDOT;

(j) All Utility No Conflict Sign-Off Forms; and

(k) Proposed starting date and estimated time to completion for the Adjustment.

Utility Adjustment Agreement Amendments. For each UAAA, DB Contractor shall prepare an additional Utility Assembly for the relevant initial PUAA (an Assembly), covering all Utility

Adjustments addressed in the UAAA. The UAAA Assembly shall contain all requirements listed in (a) through (k) as identified in this Section 6.3.4.5.

Abbreviated Utility Assemblies. DB Contractor shall prepare an Abbreviated Utility Assembly for each Utility proposed to remain in its original location within the Project ROW that is not required to be addressed in a PUAA or UAAA, unless an Adjustment is required pursuant to Section 6.1.1 (When Utility Adjustment is Required). If DB Contractor is reimbursing the Utility Owner any of its costs, a PUAA or UAAA is required. Each Abbreviated Utility Assembly shall contain a transmittal memo recommending that the subject Utility(ies) remain in place, a set of plans detailing UAR compliance, a completed Utility Assembly Checklist, a certification from the Utility Owner approving leaving the Utility(ies) in place, as well as Utility Joint Use Acknowledgment(s) or Utility Installation Request, Form 1082 as required in Section 6.2.4.5, Utility No Conflict Sign-Off Forms, and Affidavit(s) of Property Interest, if applicable. Each of the foregoing items shall comply with the requirements for same described in Attachment 6-1.

6.4 Construction

6.4.1 Reserved

6.4.2 General Construction Criteria

All Utility Adjustment construction performed by DB Contractor shall conform to the requirements listed below. In addition, DB Contractor is responsible for verifying that all Utility Adjustment construction performed by each Utility Owner conforms to the requirements described below. In case of nonconformance, DB Contractor shall cause the Utility Owner (and/or its contractors, as applicable) to complete all necessary corrective work or to otherwise take such steps as are necessary to conform to these requirements:

(a) All criteria identified in Section 6.3.2 (Technical Criteria and Performance Standards);

(b) The Utility Adjustment Plans included in the Utility Agreement approved by TxDOT (other than Utility Adjustment Field Modifications complying with Section 6.4.7 (Utility Adjustment Field Modifications);

(c) All Project safety and environmental requirements;

(d) All pre-construction meeting requirements;

(e) The ROW acquisition schedule described in Section 7 (ROW); and

(f) Utility(ies) standards provided in the Utility Agreement.

6.4.2.1 Reinstatement of Utility Cuts

After installation of drainage structures, storm sewers or any other public or private Utility facility by open cut across existing pavements, the pavement shall be restored and maintained to a normal satisfactory riding surface equal to or better than the existing.

6.4.3 Inspection of Utility Owner Construction

DB Contractor shall set forth procedures in the PMP for inspection of all Utility Adjustment Work performed by Utility Owners (and its contractors) to verify compliance with the applicable requirements described in Section 6.4.2 (General Construction Criteria). DB Contractor is

responsible for quality control and quality assurance for all Work performed by the Utility Owners and its contractors.

6.4.4 Scheduling Utility Adjustment Work

The Utility Adjustment Work (other than construction) may begin at any time following issuance of NTP1. Refer to Section 4.4 of the Agreement for the conditions to commence construction of Utility Adjustment Construction Work by DB Contractor. DB Contractor shall not arrange for any Utility Owner to begin any demolition, removal or other construction work for any Utility Adjustment until all of the following conditions are satisfied:

(a) The Utility Adjustment is covered by an executed Utility Agreement (and any conditions to commencement of such activities that are included in the Utility Agreement have been satisfied);

(b) Pre-construction meeting, in accordance with Section 6.2.2.2, shall be required after execution of the Utility Agreement and prior to commencement of any construction activities, unless otherwise approved by TxDOT;

(c) Availability and access to affected Replacement Utility Property Interests have been obtained by the Utility Owner (and provided to DB Contractor, if applicable);

(d) If any part of the Utility Adjustment construction work will affect the Project ROW, availability and access to that portion of the Project ROW has been obtained in accordance with the applicable requirements of the Contract Documents;

(e) If applicable, the Alternate Procedure List has been approved by TxDOT, as authorized by the FHWA, and either (a) the affected Utility is on the approved Alternate Procedure List, as supplemented, or (b) the Utility Owner is on the approved Alternate Procedure List, as supplemented;

(f) The review and comment process has been completed and required approvals have been obtained for the Utility Assembly covering the Utility Adjustment;

(g) All Governmental Approvals necessary for the Utility Adjustment construction have been obtained and any pre-construction requirements contained in those Governmental Approvals have been satisfied; and

(h) All other conditions to that Work stated in the Contract Documents have been satisfied.

6.4.5 Standard of Care Regarding Utilities

DB Contractor shall carefully and skillfully carry out all Work impacting Utilities and shall mark, support, secure, exercise care, and otherwise act to avoid damage to Utilities. At the completion of the Work, the condition of all Utilities shall be restored to existing condition.

6.4.6 Emergency Procedures

DB Contractor shall provide Emergency procedures with respect to Utility Adjustment Work in the PMP. DB Contractor shall obtain Emergency contact information, establish Emergency procedures with each Utility Owner and immediately notify the Utility Owner in the event of rupture, break or damage to the Utility Owner's Utility facilities.

6.4.7 Utility Adjustment Field Modifications

DB Contractor shall establish a procedure in the Utility Management Plan to address a Utility Adjustment Field Modification (UAFM) as proposed by either DB Contractor or a Utility Owner, after the Utility Assembly (which includes the Utility Adjustment Plans) has been approved. The procedure shall provide, at minimum, the following:

(a) Letter detailing the UAFM information;

(b) A process for establishing a vertical and horizontal threshold requiring a UAFM, subject to TxDOT's concurrence;

(c) The Utility Owner's review and approval of a UAFM proposed by DB Contractor, or DB Contractor's review and approval of a UAFM proposed by the Utility Owner. DB Contractor shall obtain all required approvals of the UAFM prior to commencement of construction. All revisions shall be signed and sealed by a Registered Professional Engineer (PE), unless waived by TxDOT at its discretion;

(d) Transmittal of UAFMs to the appropriate construction field personnel; and

(e) Any UAFMs in the Record Drawings for the Project.

DB Contractor shall cause the procedure to be followed for all UAFMs, whether the construction is performed by DB Contractor or by the Utility Owner.

6.4.8 Switch Over to New Facilities

After a newly adjusted Utility has been accepted by the Utility Owner and is ready to be placed in service, DB Contractor shall coordinate with the Utility Owner regarding the procedure and timing for placing the newly adjusted Utility into service and terminating service of the Utility being replaced.

6.4.9 Record Drawings

DB Contractor shall provide Record Drawings to each Utility Owner for its adjusted Utilities where the Utility Adjustment Work was performed by the DB Contractor. For the purpose of this Section 6, Record Drawings means construction drawings and related documentation revised to show significant changes made during the construction process, usually based on marked-up Final Design Documents furnished by DB Contractor, also known as as-built plans.

DB Contractor shall provide Record Drawings to TxDOT (regardless of whether design and/or construction of the subject Utilities was furnished or performed by DB Contractor or by the Utility Owner). As-built drawings shall show the location of all abandoned Utilities, shall show and label all other Utilities (both remaining in place and relocated) that are located within the Project ROW or impacted by the Project, and shall comply with Section 2 (Project Management). DB Contractor shall provide the Record Drawings for each Adjustment to TxDOT no later than 90 Days after Utility Owner acceptance as defined in the Utility Agreement, the Adjustment or before such earlier deadline as is specified elsewhere in the Contract Documents.

Within 90 days after a final Utility Adjustment is complete, DB Contractor shall provide to TxDOT a plan view of all final Utility facility locations (both Owner-Managed and DB Contractor-Managed) that include Utilities that remained in place, were adjusted in place or relocated. The plan view must detail the Utility facility horizontal alignment with highway stationing, ROW lines,

roadway features, Utility Owners name, Utility facility type, size and Utility Assembly Number. This overall inventory set of plans is separate from the individual Record Drawing plans required for each Utility Assembly. In addition to the final plan view map, DB Contractor shall submit a preliminary plan view map for TxDOT review upon completion of 50% of the required Utility Adjustment Work.

6.4.10 Maintenance of Utility Service and Access

All Utilities shall remain fully operational during all phases of construction, except as specifically allowed and approved in writing by the Utility Owner. DB Contractor shall schedule Utility Adjustment Work in order to minimize any interruption of service, while at the same time meeting the Project Schedule and taking into consideration seasonal demands.

Each Utility Adjustment or remain in place location must allow for adequate access during construction and after completion of the Project. All access and access locations to the Utility facility must be agreed to by TxDOT and the Utility Owner.

6.4.11 Traffic Control

DB Contractor shall be responsible for the Traffic Management Plan (TMP). The TMP shall cover all traffic control made necessary for Utility Adjustment Work, whether performed by DB Contractor or by the Utility Owner. Traffic control for Adjustments shall be coordinated with, and subject to approval by, the local agency(ies) with jurisdiction. Traffic control shall comply with the guidelines of the TMUTCD and of Section 18 (Traffic Control).

6.5 Submittals

DB Contractor shall time all Submittals described in this section to meet the Project Schedule, taking into account the maximum number of Submittals set forth in this Section 6.5 or, if not stated therein, then as stated in Section 3.1 of the Agreement. Submittals shall conform to the standards required in the Project Management Plan. Any deliverable submitted by DB Contractor to TxDOT Right of Way office for review after 11:59 a.m. will be considered as submitted on the next Business Day.

Table 6-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 6			
Any proposed changes to the provided TxDOT SPD ROW Utility forms	As necessary	Approval	6.1
SPD ROW-U-1818 (Buy America Material Statement), if applicable	Prior to the Utility Owners receiving final payment from DB Contractor or TxDOT	Approval	6.1
PMP – Utility Management Plan	Within 30 Days after NTP1	Approval prior to issuance of NTP2	6.1
Project Utility Adjustment Agreement	After NTP2, based on DB Contractor schedule	Approval	6.1.3.1

Table 6-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Utility Adjustment Agreement Amendments	After NTP2, based on DB Contractor schedule	Approval	6.1.3.2 & 6.3.4.5
Any mass mailings to Utility Owners	21 Days in advance of distribution	Review and Comment	6.2.2.1
Meeting Agendas	3 Business Days in advance of each scheduled meeting	Information	6.2.2.2
Meeting Minutes	After attendee comment and 5 Business Days after the conclusion of the meeting and prior to final distribution	Review and Comment	6.2.2.2
Names, contact details, etc. for the Utility coordination team	In the applicable chapter of the PMP	Approval	6.2.3
Affidavit of Property Interest	In the applicable Utility Assembly	Approval	6.2.4.1
Draft Quitclaim Deeds	Prior to submission of Utility Assembly	Approval	6.2.4.4
Letter of Confirmation (relinquishment of interest once Adjustment completed) from Utility Owner and/or Utility Owner's authorized representative, if applicable	In the applicable Utility Assembly, including copy of unsigned Approved Draft Quitclaim Deed	Approval	6.2.4.4
Executed Quitclaim Deeds	1. Prior to recording deed in local real property records, and 2. Within 90 Days of completion of Utility Adjustment, or unless otherwise directed by TxDOT in writing	Information	6.2.4.4
Utility Joint Use Acknowledgments	In the applicable Utility Assembly	Approval	6.2.4.5
Utility Installation Request, Form 1082	In the applicable Utility Assembly	Approval	6.2.4.5
DB Contractor's Utility Strip Map	Within 90 days after NTP2 or 30 days before the first assembly package submission	Review and information	6.3.1
Utility Adjustment Concept Plan(s)	Within 90 days after NTP2 or 30 days before the first assembly package submission (this plan is a working document and shall be continuously updated and modified as more project information becomes available)	Review and, if applicable, Comment	6.3.3

Table 6-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Utility Adjustment Plans	In the applicable Utility Assembly	Approval	6.3.4.1 & 6.3.4.2
Utility Assemblies	Prior to start of the affected Utility Adjustment Work	Approval	6.3.4.5
Temporary Adjustments	In the applicable Utility Assembly, if applicable, unless TxDOT waives/allows other method	Approval	6.3.4.5
Abbreviated Utility Assemblies	As necessary	Approval	6.3.4.5
QC/QA procedures for Utility Adjustment Work	In the applicable chapter of the PMP and PSQMP	Approval	6.4.3 & 6.5.3
Utility Adjustment Work emergency procedures and contact information	In the applicable chapter of the PMP and PSQMP, and prior to any construction activities	Approval	6.4.6
Set of Record Drawings and overall plan view maps of final Utility locations	1. Within 90 Days after Utility Owner acceptance, Utility Adjustment completion, or prior to deadline specified elsewhere in the Contract Documents or by TxDOT 2. Preliminary overall plan view map upon completion of 50% of required Utility Adjustment Work	Review, Comment, and if applicable, Approval	6.4.9 & 6.5.3
Individual Record Drawing plans	In the applicable Utility Assembly, and at Project closeout	Approval	6.4.9 & 6.5.3
Utility Tracking Report (UTR)	Monthly	Information	6.5.2
Closeout information and documentation	Within 90 days after each Utility has been relocated, fully reimbursed and accepted by the Utility Owner	Information	6.5.3
Alternate Procedure List	Prior to commencement of any demolition, removal or other construction work for any Utility Adjustment	Approval	6.5.4

6.5.1 Maximum Number of Submittals

DB Contractor shall coordinate all Submittals required pursuant to this Section 6.5. In each ten Business Day period, DB Contractor shall not submit more than:

(a) Two Utility Assemblies (excluding Abbreviated Utility Assemblies); and

(b) Two of any other Submittals required under this Section 6 and requiring TxDOT review and approval.

Where the number of Submittals exceeds these limits, the Submittals shall be considered excess and TxDOT may defer its review of any such excess Submittals to a subsequent ten Business Day period, as necessary.

6.5.2 DB Contractor's Utility Tracking Report

DB Contractor shall maintain a Utility Tracking Report (UTR) in tabular form, listing all Utilities located within the Project ROW or otherwise potentially affected by the Project. DB Contractor shall submit the UTR to TxDOT on a monthly basis in the format described below unless otherwise approved by TxDOT. The UTR shall, at a minimum, contain the following information for each Utility:

(a) The name of the Utility Owner and the Utility Assembly Number;

(b) Utility size and type;

(c) Location of the Utility based upon station and offset;

(d) The proposed method of treatment;

(e) State whether the Adjustment will be Owner or DB Contractor-Managed;

(f) Dates on which the PUAA/UAAA was executed by TxDOT, the Utility Owner and DB Contractor;

(g) Dates on which the UJUA or Utility Installation Request, Form 1082, was executed by the Utility Owner and TxDOT;

(h) The Utility Owner's existing right of occupancy of the ROW for each Utility (e.g., UJUA, permit, easement or combination);

(i) Whether any Replacement Utility Property Interest will be necessary;

(j) Estimated cost approved in the PUAA/UAAA;

(k) Amounts and dates of payments made by DB Contractor to the Utility Owner, listing in each case the type of payment (final, partial or lump sum);

(l) Scheduled start and completion date for construction of each Adjustment;

(m) Percent complete of construction;

(n) Whether any Betterment is included in the Adjustment; and

(o) Whether TxDOT form SPD ROW-U-1818 (Buy America Material Statement) is required for each Adjustment.

The UTR shall also include a separate section for Replacement Utility Property Interest including each necessary Replacement Utility Property Interest with the names of property owners or parcel number(s), Utility Assembly Numbers, status of the acquisition, acquisition

cost and other information as necessary. DB Contractor shall maintain this section of the UTR and submit to TxDOT in the same manner as all other portions of the UTR.

6.5.3 Utility Assembly Submittals and Final Closeout Procedures

The following procedures shall govern Submittal, review and final closeout of each Utility Assembly, including UAAA and Abbreviated Utility Assemblies:

(a) Before submitting a Utility Assembly to TxDOT, DB Contractor shall:

(i) Verify that each subject Utility (or the Utility Owner) is on the approved Alternate Procedure List, if applicable;

(ii) Submit the complete Utility Assembly to the quality control/quality assurance entity designated by DB Contractor in accordance with the PMP and the PSQMP; and

(iii) Resolve all comments made by the quality control/quality assurance entity, coordinating with the Utility Owner as appropriate.

(b) DB Contractor shall submit to TxDOT three identical and complete originals of each Utility Assembly, each of which shall be bound and labeled "DB Contractor Copy," "TxDOT Copy," or "Utility Owner Copy," as appropriate. The "TxDOT Copy" shall be color-coded and shall include the Project ROW map with the existing and proposed Utility facilities identified on a plan view. These Submittals shall be for TxDOT's review and comment, except for any components of the Utility Assembly for which TxDOT's approval is required by this Section 6.5.

(c) DB Contractor shall submit to TxDOT a Utility Assembly Submittal log with each Submittal or group of Submittals. The Utility Assembly Submittal log shall establish the review priority.

(d) TxDOT will review the Utility Assembly for compliance with the requirements of this Section 6.5.3, and within ten Business Days will return the Utility Assembly to DB Contractor with the appropriate notations pursuant to Section 3.1 of the Agreement to reflect its responses. DB Contractor shall transmit any TxDOT comments to the Utility Owner and shall coordinate any modification, review and approval by the Utility Owner and re-submittal to TxDOT, as necessary to resolve all TxDOT comments and/or obtain TxDOT's approval, as applicable. Upon (a) TxDOT's approval of any Utility Assembly components for which TxDOT's approval is required, and (b) completion of the review and comment process for all other Utility Assembly components, TxDOT will sign three originals of any approved UJUA and of any other components of the Utility Assembly for which this Section 6 requires TxDOT signature.

(e) DB Contractor shall provide closeout information and documentation within 90 days after each Utility has been relocated, fully reimbursed and accepted by the Utility Owner. The closeout information shall contain the following:

(i) The Utility Agreement form (PUAA, UAAA, et al);

(ii) Record Drawings ("as-built") plans;

(iii) UJUA or Form 1082;

(iv) Quitclaim form (D-15-30);

(v) Actual cost and summary of the Adjustment; and

(vi) TxDOT form SPD ROW-U-1818 Buy America Material Statement.

DB Contractor shall address conditions of approval, if any, for each Utility Assembly prior to completing the final closeout procedure.

6.5.4 FHWA Alternate Procedure

DB Contractor shall develop the Alternate Procedure List that includes the Utility Owner's name, approximate station numbers and estimated cost of Utility Adjustments. TxDOT is authorized by the FHWA to utilize the Alternate Procedure process. Upon receipt of the required information, TxDOT shall then consider and approve the list and notify DB Contractor. Promptly upon determining that any additional Utility Owner not referenced on the Alternate Procedure List is impacted by the Project, DB Contractor must submit to TxDOT all documentation as referenced above in order to amend the Alternate Procedure List.

SECTION 7.0 RIGHT OF WAY (ROW)

7.1 General Requirements

DB Contractor's obligations in respect of the acquisition of Project ROW are set forth in Section 6 of the Agreement.

This Section 7 sets forth the ROW activities assigned to DB Contractor, including pre-acquisition and acquisition activities, and designates which ROW activities TxDOT will conduct. This section also sets forth the requirements applicable to the Work assigned to DB Contractor related to the acquisition of Project ROW. DB Contractor shall provide all services necessary to acquire title to the Project ROW, in form and substance acceptable to TxDOT, in the name of the State; relocate displacees; and clear/demolish improvements from the Project ROW, as more fully described in the following sub-sections.

Except as otherwise set forth in the Agreement, DB Contractor's Project ROW staff and/or Subcontractors will function as independent contractors while acquiring Project ROW, and not as an agent, representative, or employee of TxDOT.

DB Contractor shall provide TxDOT copies of all property agreements it obtains to facilitate design, construction or maintenance in relation to the Project. No conveyance documents shall be used for the purpose of Construction Work other than a Possession and Use Agreement (PUA), deed, or award unless otherwise approved by TxDOT.

7.2 Administrative Requirements

7.2.1 Standards

DB Contractor shall acquire all Project ROW in accordance with State and Federal Law and the practices, guidelines, procedures, and methods contained in the following:

(a) TxDOT *Right of Way Manual* Collection (available online at http://onlinemanuals.txdot.gov/manuals)

(b) TxDOT *Access Management Manual* (available online at http://onlinemanuals.txdot.gov/manuals)

(c) TxDOT Survey Manual

(d) TxDOT ROW Appraisal and Review Manual

Pursuant to the applicable Federal regulations, DB Contractor shall (i) acquire ROW parcels for the Project on behalf of the State, but without the direct participation of TxDOT, subject to TxDOT's rights of review, approval, and audit; (ii) utilize the TxDOT *Right of Way Manual*; (iii) provide adequate access to all occupied properties; (iv) maintain Utility service to occupied properties until relocation is complete; and (v) not permit open burning within 1,000 feet of an occupied dwelling.

DB Contractor shall maintain a complete set of the TxDOT *Right of Way Manual* Collection, Volumes 1 through 8 (available online at http://onlinemanuals.txdot.gov/manuals), TxDOT *Access Management Manual*, TxDOT *ROW Appraisal and Review Manual*, and a current approved Project ROW map for public use. DB Contractor's complete set of ROW Manuals shall

be current at the time of contract execution. Any TxDOT forms referenced in this section may be found in the TxDOT *Right of Way Manual* Collection or will be provided by TxDOT.

All real estate activities of the Project ROW must be completed and documented in compliance with all applicable Laws, including the Uniform Act, the rules and regulations for implementing the Uniform Act, and 23 CFR 710 governing the use of Federal funds for acquisition, management and disposal of real property.

7.2.2 Software Requirements

DB Contractor shall utilize software that is fully compatible with the software in use by TxDOT, or fully transferable to TxDOT's systems, including TxDOT's interactive SharePoint site (for uploading, review, document retrieval, etc.). DB Contractor must supply and maintain a parcel-by-parcel status information that incorporates the fields and information required by TxDOT's ROW tracking system: ROWIS. DB Contractor must maintain and participate in any other required ROW tracking system required by the Contract Documents. The database shall be fully accessible to Persons authorized by TxDOT.

7.2.3 ROW Acquisition Management Plan

DB Contractor shall prepare a ROW Acquisition Management Plan in accordance with the requirements of this Section 7. The ROW Acquisition Management Plan shall set forth:

(a) DB Contractor's main contractual arrangements;

(b) DB Contractor's organizational structure covering the activities to be performed in accordance with the Contract Documents;

(c) Arrangements for coordinating and managing staff interaction with TxDOT and its consultants, including collocation of Key Personnel and description of approach to coordinating work of off-site personnel;

(d) DB Contractor's organization including names, contact details, titles, job roles, and qualifications of Project ROW Key Personnel and other Project ROW personnel;

(e) Integration of the Project ROW schedule into the Project Baseline Schedule; the Project ROW schedule shall contain logic linked ROW acquisition and relocation assistance activities on a parcel-by-parcel basis, including adequate time periods for TxDOT review and condemnation activities in accordance with this Section 7;

(f) Interfacing between the DB Contractor, Subcontractors and the IQF during Project ROW acquisition, including interface between design, Project ROW activities, and quality review processes;

(g) Responsibilities of Subcontractors and Affiliates, DB Contractor's overall control procedures for Subcontractors, including consultants and subconsultants, and steps taken to ensure Subcontractors and Suppliers meet the obligations imposed by their respective Contracts;

(h) Environmental controls including:

(i) Control of the interface between environmental requirements (including Hazardous Materials and demolition) and Project ROW acquisition activities;

(ii) Applicable procedures for the Hazardous Materials Management Plan (HMMP) in accordance with Section 4;

(iii) Reference to relevant component parts of the Comprehensive Environmental Protection Plan (CEPP) into the ROW Acquisition Management Plan;

(i) Procedures describing how the principal activities will be performed during the Project ROW acquisition, whether directly undertaken or subcontracted;

(j) Documentation and reporting, including management procedures in compliance with Section 2;

(k) Quality control procedures and quality review standards to establish and encourage continuous improvement; and

(l) Audit procedures including name, title, roles and responsibilities of supporting quality management staff reporting to the person with defined authority.

The ROW Acquisition Management Plan shall contain, as a minimum, the following:

1. The name of TxDOT approved title company(ies) to be used for title services;

2. The name and qualifications of the proposed ROW Acquisition Manager (ROW AM); and

3. The resumes and qualifications for appraisers, appraisal reviewers, land planners, relocation agents, negotiators, real estate attorneys, eminent domain specialist and ROW personnel specified in Section 7.2.7 (ROW Personnel Qualifications).

The ROW Acquisition Management Plan shall describe the specific means by which DB Contractor shall:

A. Provide sufficient personnel to achieve, in accordance with the Project Schedule, the goals and milestones established for Project ROW acquisition, relocation assistance, appraisals and appraisal review, and clearance/demolition of the improvements from the Project ROW;

B. Provide administrative support;

C. Provide for language, visually impaired, or hearing impaired translation, as necessary;

D. Provide documentation and reports and the manner in which records will be maintained in compliance with the Technical Provisions, including any systems DB Contractor will use;

E. Produce and distribute acquisition and relocation brochures as approved by TxDOT;

F. Establish, implement, and maintain quality control procedures and quality review standards for the acquisition for Project ROW to ensure accuracy, completion, and quality in Submittals to TxDOT and Governmental Entities; and

G. Prevent fraud, waste and mismanagement; and

H. Perform all items in this Section 7.

DB Contractor shall update the ROW Acquisition Management Plan regularly, at least quarterly, in accordance with the Contract Documents and when any changes occur to the personnel required by Section 7.2.7.

7.2.4 Schedule and Review Procedures

The Project Schedule shall indicate the date to begin the acquisition of the Project ROW and the anticipated completion date of acquisition activities for each parcel. DB Contractor shall advise TxDOT of all Additional Properties and temporary rights or interests in real property to be acquired by DB Contractor. In developing the Project Schedule, DB Contractor shall give priority to the acquisition of parcels that have significant impact on the Project Schedule or affect the Critical Path. The monthly status reports required by Section 2.1.1 (Project Schedule) shall provide updated projections for the acquisition date of each parcel.

In developing the Project Schedule, DB Contractor shall incorporate adequate time periods for TxDOT review and approval of Acquisition Packages and Condemnation Packages. TxDOT intends to review the completed Acquisition Packages and Condemnation Packages as expeditiously as possible; *however,* for the purposes of the Project Schedule, DB Contractor shall assume that the reviews performed by TxDOT will require ten Business Days for Acquisition Packages and Condemnation Packages (collectively) that DB Contractor submits as final and complete in accordance with Section 7.3.6 (Project ROW Acquisition Package Approval) and Section 7.4.4, Item 6 (Condemnation Support), up to a maximum of ten Acquisition Packages and Condemnation Packages (collectively), unless otherwise directed by TxDOT. Any Submittals that would require TxDOT to review more than ten Acquisition Packages and Condemnation Packages (collectively) within any given ten Business Day period shall be considered excess, and TxDOT may defer its review of any such Acquisition Packages and/or Condemnation Packages to a subsequent ten Business Day period (or periods as necessary). TxDOT will notify DB Contractor of its election to defer any excess Acquisition Packages and/or Condemnation Packages within ten Business Days after receipt. The balance of Acquisition Packages and Condemnation Packages (collectively) in excess of ten will be rolled over to the next ten Business Day period and added to the Acquisition Package and Condemnation Package Submittals made by DB Contractor in that period. When DB Contractor submits more than ten Acquisition Packages and Condemnation Packages (collectively) at any given time, DB Contractor shall indicate the priority of review. Any deliverable submitted by DB Contractor to TxDOT Right of Way office for review after 11:59 a.m. will be considered as submitted on the next Business Day.

DB Contractor shall also assume that the reviews performed by TxDOT will require ten Business Days for the following Submittals: payment Submittals, relocation Submittals, administrative settlement Submittals, and closing Submittals, up to a maximum of ten submissions for each type of Submittal noted above, in addition to the Acquisition Packages and Condemnation Packages. With the combination of the above, these Submittals shall not exceed 25 total submissions, in any given ten Business Day period.

If TxDOT notifies DB Contractor that any submitted Acquisition Package and/or Condemnation Package have a deficiency, DB Contractor shall correct such deficiency and resubmit the package to TxDOT. Resubmissions shall be treated as a new Acquisition Package and Condemnation Package (collectively) as described above. An Acquisition Package and/or Condemnation Package shall be deficient, as determined by TxDOT, if any of its components fails to meet any of the criteria established by this section for such component, or contains any material errors or omissions. Schedule delays resulting from inadequate or incomplete

submissions of Acquisition Packages and/or Condemnation Packages shall be the responsibility of DB Contractor and will not be eligible for treatment as a Change Order.

TxDOT reserves the right to undertake additional review on Acquisition Packages and/or Condemnation Packages that contain or identify facts or issues of an unusual nature or which do not clearly fit within TxDOT standards and will notify DB Contractor in writing that the review period will be extended by an additional ten Business Days before rendering a decision to DB Contractor.

DB Contractor may request TxDOT to perform a preliminary review of the survey, Project ROW map and appraisal before the complete Acquisition Package is submitted. TxDOT may elect in its sole discretion to review the preliminary submission of the survey, map and appraisal and notify DB Contractor of any deficiencies after TxDOT's receipt and review of such preliminary submission. Unless otherwise directed by TxDOT, there will be no time limits associated with these preliminary reviews.

7.2.5 DB Contractor's Project ROW Scope of Services

DB Contractor shall complete all administrative activities and prepare all documentation sufficient for DB Contractor to acquire the Project ROW. DB Contractor shall obtain TxDOT's review and prior written approval of all Project ROW maps and surveys, appraisals, legal descriptions, acquisition documentation, purchase price, requests to acquire Project ROW, condemnation-related activities, and funding/closing procedures. TxDOT will (a) approve and return the Project ROW acquisition documentation, (b) provide review comments for incorporation by DB Contractor in accordance with Section 7.2.4 (Schedule and Review Procedures), or (c) in the case of an Acquisition Package that is deficient, notify DB Contractor of the deficiency(ies) to be corrected by DB Contractor in accordance with Section 7.2.4 (Schedule and Review Procedures). Except as otherwise authorized by applicable State and Federal policy and regulations for early acquisition and approved by TxDOT, DB Contractor shall not proceed with acquisition of the Project ROW until the NEPA Approval is issued, public involvement procedures have been completed, and ROW maps and legal descriptions for the applicable constructible segment as established by the logical termini of the Project have been prepared and approved by TxDOT. TxDOT will provide a separate release for each NEPA approved highway segment. Further, DB Contractor shall not commence any negotiations with landowners, and TxDOT will not begin eminent domain procedures until after the specific Acquisition Package for that particular parcel is approved by TxDOT.

If DB Contractor and the landowner cannot negotiate an agreed-upon conveyance by deed acceptable to TxDOT, DB Contractor shall recommend for TxDOT to commence acquisition of the property through eminent domain procedures. TxDOT will initiate eminent domain procedures at its discretion. DB Contractor shall not recommend any condemnation action through the statutory "Special Deposit and Possession" procedure. TxDOT will not acquire any property through the condemnation process via the "Special Deposit and Possession" procedure.

Neither DB Contractor nor its Subcontractors shall begin construction of any type on any parcel of real estate unless property rights for the parcel have been conveyed and recorded in favor of TxDOT, possession has been obtained through eminent domain or any other method as provided for in Section 7.2.1 (Standards), or a Possession and Use Agreement has been executed and delivered by all necessary parties in accordance with Section 7.4.1 (Project ROW Negotiations), and all requirements under the Uniform Act have been met (including relocation assistance in accordance with Section 7.4.2).

7.2.6 Acquisition Process Summary

DB Contractor's major activities with respect to the acquisition of the Project ROW include:

(a) Project ROW surveying and mapping

(b) Project ROW and Utility cost estimates and updates

(c) Title services

(d) Appraisal services

(e) Appraisal review

(f) Negotiations

(g) Closing services

(h) Relocation assistance

(i) Condemnation support services

(j) Clearance and demolition of Project ROW

(k) Environmental due diligence

(l) Documentation and document control

(m) Progress reports

(n) Project ROW administration and management

(o) Project ROW quality management

(p) Letter from DB Contractor's design engineer certifying that the required Project ROW acquisition is necessary and that any proposed alternatives are not feasible or are cost prohibitive

(q) Obtaining rights of entry, as necessary

7.2.7 ROW Personnel Qualifications

DB Contractor's ROW Acquisition Manager (ROW AM) shall have at least five years' experience managing the acquisition of transportation ROW projects for a condemning authority, be licensed as a real estate salesman or broker pursuant to the *Texas Real Estate License Act* or rules established by the Texas Real Estate Commission, be familiar with appraisal and appraisal report review pursuant to the Uniform Standards of Professional Appraisal Practice (USPAP), and be familiar with the Uniform Act and applicable Laws of the State of Texas.

Quality Control Specialist(s) – DB Contractor shall designate a specific person(s) responsible for internal quality control. This individual shall review all DB Contractor Submittals associated with survey, title, appraisal, acquisition, relocation, and eminent domain prior to the deliverable being delivered to TxDOT for review.

Appraiser and Appraisal Reviewer – Each appraiser and appraisal reviewers shall be licensed and certified in the State of Texas and shall have a minimum of five years' experience in appraising real property for eminent domain purposes, including partial taking appraisal, partial taking appraisal review and expert witness testimony. Each individual must have been actively and continuously engaged for at least three years immediately preceding selection for this Project in appraisal work primarily in the county(ies) where the Project is located, and as approved and precertified by TxDOT. The appraisers and the appraisal reviewers shall have separate and distinct duties, and appraisers must be employed by different firms from the appraisal reviewers. Each appraiser shall be required to submit three samples of previous appraisal work prepared for eminent domain purposes. All appraisers preparing and signing appraisals must be approved and precertified by TxDOT before performing any appraisals on the Project. If required by TxDOT, the appraiser will be required to demonstrate his or her skills at expert witness testimony.

Land Planner – Each land planner shall have a minimum of five years' experience in land planning including experience with expert witness testimony in eminent domain proceedings. Each individual must have been actively and continuously engaged for at least three years immediately preceding selection for this Project in land planning work primarily in the county(ies) where the Project is located, or as approved and precertified by TxDOT. DB Contractor shall provide a minimum of two land planners to assist appraisers and complete land plans.

Relocation Agent – Each relocation agent shall have a minimum of three years' experience in relocation assistance for ROW projects pursuant to the Uniform Act. A relocation agent's responsibilities shall include the following: determination of eligibility of all displacees, contacting all displacees and informing them of their benefits, maintaining a file of all documentation concerning the relocation of the displacees, and extending all relocation assistance advisory services.

Negotiator – Each ROW negotiator shall be licensed as either a Real Estate Sales Agent or broker pursuant to the *Texas Real Estate License Act* or rules established by the Texas Real Estate Commission, and shall be familiar with appraisal and appraisal report review pursuant to the USPAP. The negotiator shall have a minimum of three years' experience in right of way negotiations. The ROW negotiator's responsibilities shall include the following: contact with property owners on the Project to discuss the acquisition of property needed for the Project, maintaining complete and accurate files of all transactions and contacts with the property owners and their representatives, and actively working toward a joint resolution to acquire the property with the property owner.

Eminent Domain Specialist – Each eminent domain specialist shall have a minimum of three years' experience with TxDOT procedures and policies as related to acquisition of property through the use of eminent domain. The eminent domain specialist must have demonstrated experience in all activities necessary with the acquisition of parcels through the TxDOT Eminent Domain process. This includes correctly completing all TxDOT forms including the SPD ROW-E-49, filing the eminent domain forms, coordinating the hearing with all appropriate parties and ensuring that the Award of Special Commissioners is deposited into the registry of the Court and all notices sent to the appropriate parties.

Real Estate Attorney – Each real estate attorney shall be licensed by the State of Texas and shall have at least five years' experience in title review and curative matters. The real estate attorney's responsibilities shall include coordinating and clearing all title issues, and compliance

assistance with State and Federal acquisition requirements for the properties acquired for the Project.

ROW personnel shall have at least three years' experience in title review and curative matters. ROW personnel's responsibilities shall include, but not limited to the following: maintain complete and accurate files of all transactions and contacts with the property owners and/or their representatives, coordinate and clear all title issues and assist at closing for properties acquired for the Project.

7.2.8 DB Contractor Conflict of Interest

If at any time, to the best of DB Contractor's knowledge, any DB Contractor-Related Entity directly or indirectly (a) acquires or has previously acquired any interest in real property likely to be parcels of the Project ROW or the remainders of any such parcels, (b) has any financial interest in any real property likely to be a Project ROW parcel, or the remainder of any such parcel that is not a whole acquisition, or (c) purchases or has previously purchased from an existing mortgagee the mortgage instrument that secures an existing loan against real property likely to be a Project ROW parcel, or the remainder of any such parcel, DB Contractor shall promptly disclose the same to TxDOT. In the case of acquisitions, loans or mortgage purchases that occurred prior to the execution of the Agreement, such disclosure shall be made within ten days after execution of the Agreement.

In the event that DB Contractor, or any subsidiary or parent company of DB Contractor, acquires a real property interest, whether title or mortgage, in parcels of the Project ROW, the real property interest acquired or a release of mortgage as the case may be, shall be conveyed to the State of Texas without the necessity of eminent domain.

DB Contractor shall not acquire or permit the acquisition by DB Contractor or any DB Contractor-Related Entity of any real property interest in a Project ROW parcel, whether in fee title or mortgage, for the purpose of avoiding compliance with the Laws, practices, guidelines, procedures and methods described in Section 7.2.1 (Standards).

7.2.9 Meetings

DB Contractor shall attend meetings as requested by TxDOT. At such meetings DB Contractor shall provide exhibits, take minutes, and distribute the minutes to all attendees for review and comment. Minutes will not be finalized until all attendees agree on content. DB Contractor shall provide meeting minutes to TxDOT within five Business Days from the date of the meeting. TxDOT will respond within five Business Days or at the next occurrence of the meeting. DB Contractor shall provide proposed agendas three Business Days prior to each meeting.

7.2.10 Documentation and Reporting

DB Contractor shall provide TxDOT with all specific reports and supporting documentation for review and approval during the acquisition process. All correspondence with TxDOT and property owners relating to acquisition of real property shall include a heading with the following information (at a minimum):

(a) County

(b) Control Section Job (CSJ) number

(c) Right of Way Control Section Job (RCSJ) number

(d) Federal Project Number (if applicable)

(e) Highway designation

(f) Project Limits

(g) Parcel number

(h) Name of record owner(s)

(i) DB Contractor shall utilize TxDOT's approved naming convention for all electronic files and reporting fields.

In administering and managing its Project ROW activities, DB Contractor shall:

1. Maintain parcel records on file of all aspects of the acquisition process in accordance with TxDOT requirements and applicable Law. Each parcel file shall include all documents required by the Contract Documents, FHWA, and TxDOT.

2. Provide monthly summaries for the cost of Project ROW acquisition and related relocation assistance including amounts authorized and amounts paid on a parcel-by-parcel basis and cost forecasting on an overall Project basis as requested by TxDOT.

3. Maintain and electronically transmit to TxDOT, in a format acceptable to TxDOT, monthly status reports including appraisal, acquisition, eminent domain and relocation status of all parcels and activities related to Project ROW, acquisition and disposition of Additional Properties, acquisition and disposition of temporary easements and other property interests, and provide weekly (or as requested) updates to TxDOT.

4. Evaluate and report to TxDOT, Subcontractor status and performance on a monthly basis or more frequently as requested.

5. Prepare and submit electronically to TxDOT, on a monthly basis, a spreadsheet that contains Project ROW specific data required in order to complete the fields in TxDOT's ROWIS tracking software program or as directed by TxDOT.

6. Input and update parcel status in TxDOT approved web-based tracking system or as directed by TxDOT.

7.2.11 Responsibilities of DB Contractor

As set forth in Section 6 of the Agreement and as more fully described in this section, DB Contractor shall be responsible for the costs of all services and preparation of all documentation for all Project ROW acquisition, easement acquisition, permitting and related relocation assistance for the Project. The Work related to Project ROW acquisition includes mapping, surveying, environmental assessment, testing and remediation, appraisal, appraisal review, negotiation, acquisition, relocation advisory assistance and determination of relocation benefits to be provided, procurement of title insurance, clearing of title, closing of acquisitions, and condemnation support including expert witnesses required by TxDOT and/or the Office of the Attorney General for all condemnation proceedings through Special Commissioner's hearings. DB Contractor shall also be responsible for all expert witness testimony, exhibits, transcripts, and photos associated with condemnation services and proceedings required by the Office of the Attorney General or TxDOT for Special Commissioner's hearings, jury trials and appeals,

through Final Acceptance of the construction project or through any comprehensive lease, maintenance and/or operation agreement Term periods, whichever is longer.

DB Contractor shall not contact the Office of the Attorney General or an Assistant Attorney General handling a specific parcel that has been filed for eminent domain action or is in the process of settlement unless authorized by TxDOT.

DB Contractor acknowledges that it has incorporated the value of saleable improvements into DB Contractor's Project ROW costs, and DB Contractor shall concurrently, with conveyance of the real property interest to the State, and without the necessity of further documentation executed by the State, obtain the rights to said saleable improvements. TxDOT has received the benefit of the saleable value of the improvements by a reduced DB Contractor price. DB Contractor shall not be entitled to a credit for any improvements retained by a property owner. Upon conveyance of the real property interest to the State, DB Contractor shall comply with all applicable Laws with respect to relocation assistance and demolition.

DB Contractor shall be responsible for the costs of acquisition and documentation for the acquisition of any temporary right or interest in real property not necessary for the Project but that DB Contractor deems advisable to acquire for work space, contractor lay-down areas, material storage areas, borrow sites, or any other convenience of DB Contractor. Except as otherwise authorized by Law for temporary areas necessary for construction of the Project, TxDOT shall not be obligated to exercise its power of eminent domain in connection with DB Contractor's acquisition of any such temporary right or interest, and TxDOT shall have no obligations or responsibilities with respect to the acquisition, maintenance or disposition of such temporary rights or interests.

DB Contractor shall be responsible for processing payment Submittals for request of payments and distributing all payments of: agreed purchase prices or court awards and judgments; Special Commissioner's awards; relocation assistance payments; all legal, administrative, and incidental expenses of, or related to, Project ROW.

DB Contractor is responsible for the payment of and all closing costs associated with the purchase of Project ROW in accordance with the Uniform Act and TxDOT policies. TxDOT shall be responsible for the purchase price of title insurance for Preliminary ROW in accordance with Section 6.2.1 of the Agreement.

DB Contractor's cost shall include all costs not paid by TxDOT.

DB Contractor shall be responsible for submitting the completed files in accordance with the closeout procedures as defined by TxDOT within 90 days of the completed ROW parcel activity. DB Contractor shall provide the following documentation including, but not limited to:

(a) Appraisal report(s) (initial appraisal and all other issued appraisal reports, approved and/or not approved, with most recent appraisal report on top);

(b) Original conveyance document(s) (PUA(s), deed(s), easement(s), judgment(s), Award of Commissioners);

(c) Original Title Insurance Policy or Attorney's Certificate;

(d) Memorandum of Agreement; and

(e) Negotiator's Certificate.

For relocation and general correspondence, the following shall be included:

1. Relocation files (in chronological order);

2. Offer Letters;

3. Negotiator Reports and/or Contact Sheets;

4. General correspondence; and

5. All other documentation regarding the parcel.

7.2.12 Responsibilities of TxDOT

TxDOT will have the following responsibilities in connection with acquisition of Project ROW:

(a) Except as otherwise set forth in this Section 7, provide final approval for all Acquisition Packages, Condemnation Packages, and payment Submittals, relocation eligibility, relocation appeals, relocation Submittals, administrative settlement Submittals, closing Submittals, court settlement requests, and other approvals required by the Contract Documents, by the State, or by applicable Law subject to submission requirements and timelines in Section 7.2.4 (Schedule and Review Procedures).

(b) After receiving a complete Condemnation Package from DB Contractor in accordance with Section 7.2.4 (Schedule and Review Procedures) and Section 7.4.4 (Condemnation Support), TxDOT will submit a minute order request on the agenda of the next scheduled Texas Transportation Commission meeting; provided the completed Condemnation Package is submitted ten Business Days before the Commission's required deadline for eminent domain minute order requests.

(c) After receiving a complete payment Submittal from DB Contractor in accordance with Section 7.2.4 (Schedule and Review Procedures) and Section 7.4.6 (Payment Submittal), TxDOT will submit a payment request to the Comptroller's Office. Upon receipt of the State warrant, TxDOT will relay the State warrant to DB Contractor within five Business Days.

(d) TxDOT will coordinate with the Office of the Attorney General to provide legal counsel to prepare and deliver to TxDOT the condemnation petition within 20 Business Days after the Attorney General's receipt of the condemnation packet, including Commission minute order approval. TxDOT will deliver the condemnation petition to DB Contractor within ten Business Days after receipt of the condemnation petition from the Office of the Attorney General. If e-filing is not applicable, DB Contractor shall follow the standard procedures as described in the TxDOT *Right of Way Manual*.

(e) If applicable, TxDOT will provide all e-filed documents to DB Contractor as part of DB Contractor's support of the condemnation process and invoice DB Contractor for all e-filed charges. DB Contractor is responsible for reimbursing TxDOT all e-filed invoices. If e-filing is not applicable, DB Contractor shall follow the standard procedures as described in the TxDOT *Right of Way Manual*.

(f) TxDOT will provide all coordination services between DB Contractor and the Office of the Attorney General for prosecution of jury trials.

(g) TxDOT will provide a ROW Administrator to serve as the point of contact for all Project ROW issues as set forth in 23 CFR § 710.313(d). TxDOT will facilitate an office for review of all submissions as described above and will have ultimate approval authority for said submissions.

(h) TxDOT will review and approve the completed, final closeout files in accordance with the closeout procedures.

7.2.13 TxDOT Project Monitor/Reviewer

In addition to its review and approval authority as expressly set forth in other provisions of this Section 7, TxDOT may, at its discretion, audit and monitor the ROW activities and services performed by DB Contractor. TxDOT may contract with independent consultants to assist it in fulfilling the audit/monitoring function provided that the audit authority is not delegated. In addition to any components specifically required to be provided to TxDOT, DB Contractor shall provide information to TxDOT as requested to assist in its review and assessment of the progress, timeliness, adequacy and sufficiency of DB Contractor's Project ROW activities.

7.2.14 Responsibilities of the Office of the Attorney General

The Office of the Attorney General, with the assistance of DB Contractor and coordination of TxDOT, will be responsible for implementing all necessary legal actions for acquiring and obtaining possession of the Project ROW (and any necessary temporary construction easements approved by TxDOT for acquisition by condemnation) through the eminent domain process and eviction process. The responsibilities of the Office of the Attorney General will include:

(a) Represent TxDOT as the State's Attorney of Record

(b) Preparation of complete petitions for condemnation with the appropriate court for a cause number to be assigned

(c) If applicable, e-file condemnation documents and coordinate delivery of filed documents with TxDOT

(d) Coordination with TxDOT on all legal matters concerning acquisition processes, including negotiated settlements

(e) Analysis of recommended parcel values and/or appraisal issues

(f) Additional legal advice and opinions as needed by TxDOT

(g) Special Commissioners' hearings

(h) Jury trials including determination of expert witnesses and all appeals

(i) Preparation, obtaining, and filing of all necessary legal documentation for eviction of property owners or tenants

7.3 Pre-Acquisition Activities

7.3.1 Project ROW Surveying and Mapping

DB Contractor shall perform all Project ROW surveying and mapping and shall prepare Project ROW documents in accordance with applicable TxDOT Standards, including the TxDOT *Right of Way Manual*, the TxDOT *Survey Manual*, and the TxDOT *GPS User's Manual* for any Additional Properties. DB Contractor shall refer to the current *Manual of Practice* by the Texas Society of Professional Land Surveyors and the *US National Map and Accuracy Standards*. DB Contractor shall refer to Section 9 (Land Surveying) for additional survey requirements.

The Project ROW map shall be prepared by DB Contractor and submitted to TxDOT for review and approval. The Project ROW map may be prepared in separate constructible segments established by the logical termini of the Project. TxDOT shall have ten Business Days for review of each submitted ROW map, each containing up to a maximum of 25 parcels. Any Submittals that would require TxDOT to review more than 25 parcels within any given ten Business Day period shall be considered excess, and TxDOT may defer its review of any such excess parcels to a subsequent ten Business Day period (or periods as necessary).

DB Contractor may use Acquisition Survey Documents prepared by TxDOT, if available, for the purpose of performing ROW acquisition work at DB Contractor's risk.

DB Contractor shall assemble an Acquisition Survey Document to be included in the submission of the Acquisition Package. The Acquisition Survey Document shall include:

(a) Three half size right of way maps on paper, Scale 1" = 100' (11" X 17").

(b) One separate set of originals signed and sealed by a Registered Professional Land Surveyor (RPLS), legal descriptions and parcel sketch, traverse closure sheets and a copy of the parent tract deeds and subdivision plat if tract is a platted lot.

(c) A CD with DGN Master file, map sheets, Excel point list, raw data file and/or field notes, and scanned copies of the instruments of record or other pertinent documents.

(d) One full size right of way map on paper, Scale 1" = 50' (22" X 34").

(e) One set of folders for each parcel, Parts 1 & 2, etc., would be considered one folder. With one copy (signed and sealed) legal description, sketch, closure sheet, parent tract deed and subdivision plat if tract is a platted lot (and bi-section, if applicable) secured inside on the right side.

(f) Three copies (signed and sealed) of each legal and sketch.

(g) One separate set (copies) of legal and sketch of each parcel for TxDOT records.

(h) One separate set (copies) of legal and sketch of each parcel for Title Company.

(i) One separate set of originals legal and sketch signed and sealed by a RPLS to be kept in mapping files.

DB Contractor shall prepare all Project ROW surveying and mapping in accordance with the following supplemental specifications:

1. DB Contractor shall assemble an Acquisition Survey Document. The Acquisition Survey Document shall include the Project ROW map, a parcel (metes and bounds) description, and a parcel plat, with a closure report for each of these three items for each of the parcels to be acquired. The latter three items shall be on standard 8 ½" X 11" bond paper. The Project ROW map sheets shall be on 22" X 34" paper. Each final submission to TxDOT shall include two sets of each document, unless otherwise directed. Each map sheet and document page shall have an "as of" date near the lower right hand corner. The parcel plat and parcel description for a given parcel should show identical "as of" dates.

2. The ROW map sheet and plat shall show all areas of denied access for the parcel according to the current TxDOT *Access Control Management Manual* and amendments.

3. The point of beginning (POB) shall be located on the proposed Project ROW line and shown in all documents with its centerline (survey baseline) station and offset or as reviewed and approved by TxDOT.

4. The point of commencing (POC), where applicable, shall be a well-defined monument or monument of record, and shall be tied to the POB by measured bearing and distance. The POC shall not be located on any proposed Project ROW line, or existing Project ROW line within the proposed Project ROW.

5. The centerline (survey baseline) station and offset shall be shown on the Project ROW map sheets for all significant points along the Project ROW line such as point of curvature (PC), point of tangency (PT), point of intersection (PI), point of compound curvature (PCC), and point of reverse curvature (PRC), and for property line intersections (PLI) with the Project ROW line, and for any other monumentation points on the Project ROW line.

6. The centerline (survey baseline) station and offset shall be shown in the parcel description and parcel plat at the beginning and ending, being the points with the lowest station and the highest station, of each parcel along the proposed Project ROW line.

7. Project ROW map sheets shall include all curve data, with the station and coordinates of the PI, and the stations at each end (PC, PT, PRC, PCC), for every centerline (survey baseline) curve on that map sheet.

8. Any existing ROW lines being incorporated into the proposed Project ROW, including intersecting right of way, shall be surveyed and monumented (if not previously monumented).

9. All Project ROW maps (and on the title sheet) and all parcel descriptions (at the end of the description) shall include a notation that identifies the State Plane Coordinate System and UTM zones, datum (NAD83) (1993 adj), or as shown on the current ROW maps, and the Project grid-to-surface coordinate adjustment factor or refer to Primary Project Controls provided by TxDOT (refer to Section 9.3 (Design Requirements)).

10. A Project ROW map title sheet with signature blocks shall be produced for each portion of the Project. DB Contractor shall sign the Project ROW map.

11. All Project ROW maps shall include a control sheet(s), to show the primary survey control points with their location relative to the Project.

12. The parcel description and parcel plat documents shall all be referenced as parts of the exhibit recorded with the deed, so the pages shall be numbered accordingly. For example, if the parcel description is two pages, the parcel plat is one page, and then the first page of the parcel description is denoted “Page 1 of 3”, the parcel plat is denoted “Page 3 of 3”.

13. Improvements within 100 feet outside of all proposed Project ROW shall be depicted on the Project ROW map sheets. All improvements should be current as of the date of the on-the-ground property survey.

14. All visible improvements (buildings and structures) within 50 feet outside of the proposed Project ROW line shall be located by an “on-the-ground” survey and documented on the Project ROW map sheets and the parcel plats by measured offset distance from the proposed Project ROW line. Clearly indicate which distances are surveyed on-the-ground.

15. Calculated points shall be shown by a symbol on the drawing, with their relationship to the found reference points.

16. All property, city, county, abstract, section and survey lines shall be indicated appropriately. A map legend should clearly define the line styles and symbols used.

17. Upon final submittal from DB Contractor of the Project ROW documents to TxDOT, DB Contractor shall cause the surveyor to mark on the ground, using permanent and stable monuments as defined in Section 663.17 of the General Rules of Procedures and Practices of the Texas Board of Professional Land Surveying (TBPLS), all significant points along the Project ROW line, as described above, and all property line intersections with the Project ROW line. TxDOT requires these monuments to be a 5/8-inch iron rod, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument).

18. Prior to acceptance of the ROW maps and surveys by TxDOT, DB Contractor shall cause a TxDOT Type II monument to be set at all significant points on the Project ROW line and at intersections with existing Project ROW lines, replacing monuments as described above (construct according to TxDOT specifications), unless otherwise directed by TxDOT.

19. As part of the survey process, DB Contractor shall cause a TxDOT Type II monument to be set at all significant points such as PCs, PTs, angle points and at 1,500 foot intervals along tangent sections on the Project ROW line and at intersections with existing Project ROW lines, replacing monuments as described above, unless directed by TxDOT. Project ROW line intersections with property lines shall remain monumented by a 5/8-inch iron rod with a TxDOT aluminum cap (rod-and-cap monument). A TxDOT Type II monument shall be set on the Project ROW lines, perpendicularly left and right of each significant centerline point, regardless of the relative orientation of the final Project ROW line.

20. For any required revisions, DB Contractor shall resubmit to TxDOT all documents pertaining to the parcel to reflect the most recent revision date, and shall add a notation on the appropriate documents to state briefly the reason for the revision.

21. Documents shall contain deed references (survey name, abstract number, volume and page or document number, grantee, and area) for all existing public right of way encountered within the Project limits. If there is no recorded information found, a note shall state “Based upon our research, there appears to be no recorded vesting deed for the public right of way as shown hereon”.

22. The documents produced by the surveyor are the property of TxDOT, and release of any document shall be subject to TxDOT's prior written approval.

23. DB Contractor shall cause the surveyor to include the denial of access line on the Project ROW map sheets and on the parcel plats, as required for controlled access facilities. DB Contractor also shall cause the surveyor to describe the area of denied access in the parcel description and monument on the ground with a 5/8" iron rod with a TxDOT aluminum cap stamped "TxDOT ADL" the limits of the denial of access.

24. The Project ROW map and each parcel plat shall include a parcel information table containing the areas, expressed in square feet, of the following: 1) the parent ownership as stated in all adjoining record vesting deeds or converted from the stated record acreage in those vesting deeds; 2) the parcel to be acquired as shown on the closure report for that parcel; and 3) the remainder tract (item 1 *minus* item 2). If the parcel to be acquired consists of multiple parts, the Project ROW map shall show the net remainder. The parcel information table shall also contain the areas, expressed in acres, of the parent tract, the parcel to be acquired, and the remainder. This acreage (except stated record) shall be converted from the square footage as contained in the table. A note shall be included on the Project ROW map and on each parcel plat stating: "The acreage calculated and shown hereon is converted from the square footage shown hereon, and is for informational purposes only." Parcels with area less than one acre will not require acreage units to also be shown. All parcels, including parcels acquired by TxDOT or other Governmental Entity, shall be included on the Project ROW map.

25. Within the proposed Project ROW, all property owned by a city, county, or other local public agency in fee or easement that does not have a vesting deed shall be identified by a parcel number and included on the Project ROW map. DB Contractor shall cause the surveyor to prepare a parcel description and parcel plat for use as an exhibit in the Project ROW acquisition (property transfer) documents.

26. DB Contractor shall cause an independent RPLS to review the Acquisition Survey Document for consistency as to the information delineated thereon and for compliance with all applicable Technical Provisions and survey documents. The boundary location and the survey methods remain the responsibility of DB Contractor, and are not part of this review process. TxDOT will have no obligation to accept the Acquisition Survey Document as complete until the reviewing RPLS has signed and sealed the compliance certificate (compliance certificate form to be provided by TxDOT).

27. Parcel numbering shall follow the TxDOT *Right of Way Manual*. Parcels are to be numbered based upon the parent tract. DB Contractor shall revise parcel numbering due to subsequent transactions as in the following example: From a 50-acre parent tract, with a proposed Project ROW acquisition parcel identified as Parcel 14, a 5-acre parent tract is sold which will also require Project ROW acquisition. The result is, Parcel 14 is "Not Used", and the two new Project ROW acquisition parcels are identified as Parcel 14A and 14B. If the property containing Parcel 14B sells a portion, then 14B is "Not Used" and the new Project ROW acquisition parcels are identified as Parcel 14C and 14D, etc. DB Contractor shall not use the letter "E" to avoid confusion with easement designations. Parcel numbering shall be sensitive to the appraisal of the required parcels.

28. Complicated portions of a Project ROW acquisition survey can cause the Project ROW Map to be very difficult to read. TxDOT's preferred solution is to create an additional Project ROW map sheet or sheets for details, curve data, general notes, etc. The primary page

would still retain the whole property inset, record ownership data, and most of the usual information. The additional sheet(s) should be clearly referenced and be numbered as the next sequential page(s). Pages numbered with a letter added (for example: 6A, 6B) are for revisions and corrections. DB Contractor shall use the preferred solution unless TxDOT approves an alternate method.

29. An ownership sheet or sheets, containing an index to the information for all the parcels, shall be included and located near the beginning of the Project ROW map, after the title sheet and control sheet. The ownership sheet index shall include the parcel numbers, the names of the property owners, the vesting deed recording information, the record area of the parent tract, the area of parcel(s) to be acquired, the area of the remainder(s) left and right, the beginning and ending stations of the parcel along the Project ROW line, and the sheet number in the Project ROW map where the parcel is located.

30. At property corners where more than one monument is found, a detail shall be provided to show the measured relationship between the monuments found and the monument set or held.

31. DB Contractor shall purchase all materials, supplies and all other items necessary for proper survey monumentation. DB Contractor may purchase Type II monuments from TxDOT. TxDOT shall make available for pick-up by DB Contractor Type II monuments within 75 Days after TxDOT receives from DB Contractor a written order, specifying the number of monuments to be purchased. Payment for TxDOT-supplied monuments shall be due within 30 Days after TxDOT delivers to DB Contractor a written invoice. DB Contractor may use these monuments only for this Project and shall be responsible for proper storage thereof.

32. DB Contractor, at the request of the property owner or TxDOT, shall re-stake the proposed ROW with a flagged wooden stake.

Design Certification. DB Contractor shall provide sufficiency of design to determine the ROW need and produce ROW maps that delineate the proposed ROW and potential impacts to the remaining ROW. DB Contractor shall provide a design certification of ROW for each parcel which confirms that the proposed ROW acquisition is adequate and necessary to construct and perform operations and maintenance on the Project and that other ROW acquisition alternatives are not feasible and/or cost prohibitive.

7.3.2 Additional Reporting Requirements

In addition to the Project ROW map, parcel description, and parcel plats, DB Contractor shall provide the following reports and electronic files:

(a) Monthly Parcel Report: DB Contractor shall provide a report, prior to the first of the month, listing all parcel deletions, parcel additions, and parcel splits.

(b) Monthly Progress Report: DB Contractor shall provide a report of all survey activity that occurred during the previous month, including a two-week look ahead of anticipated survey activity.

(c) CAD Files: DB Contractor shall provide digital CAD files in MicroStation format which include property lines and/or existing ROW lines, as surveyed, proposed ROW lines, parcel numbers, resource files, level assignments, and plot files. DB Contractor shall submit CAD files prior to submitting the first Acquisition Package and provide updates as needed.

7.3.3 Title Services

With respect to title services, DB Contractor shall comply with the applicable standards identified in Section 7.2.1 (Standards), including the following requirements:

(a) Select and contract with one or more title companies approved by TxDOT and deliver to TxDOT a five year sales history, a preliminary title commitment or preliminary title report, and, if necessary or appropriate, copies of all underlying documents and a plot of all easements, including Existing Utility Property Interests, referenced therein for each parcel (including fee acquisitions, slope easements, other drainage and roadway ROW or easements and abandonment of utility easements) to be acquired by TxDOT for the Project. Each title report shall be dated not more than 90 Days prior to the date of submittal to TxDOT of the Acquisition Package for such parcel. DB Contractor shall, at its own cost, review each title report to ensure that it complies with the format required by the Contract Documents. DB Contractor shall, at its own cost, retain the services of a real estate attorney, licensed and located in the State of Texas, to be available for title support and acquisition assistance. All title reports must be in the following required format: clearly indicate which exclusions and exceptions shall be deleted upon acquisition of the subject parcel, and clearly indicate any required Submittals to the title company to clear identified exclusions and exceptions. Title reports shall be in accordance with Good Industry Practice. DB Contractor shall notify the title company, by letter, which exceptions should be removed, including easements that (a) are appurtenant to and/or of benefit to the parcel but are not included in the parcel to be acquired, and (b) are a burden on the parcel and not acceptable.

(b) Review the preliminary title commitment or report to ensure that all current owners of record title are contacted and that negotiations or condemnation actions are conducted with all appropriate parties.

(c) Work with the current owners of record title to each parcel or interest in a parcel or their designee and all other appropriate parties to clear any title exceptions or exclusions not acceptable to TxDOT.

(d) Secure an owner's policy of title insurance in the amount of the total acquisition cost, to include the cost of the property, improvements and damages to the remainder of the property, for each parcel from a title company acceptable to TxDOT for each parcel acquired, whether by deed or eminent domain judgment, insuring title as required by TxDOT. All Project ROW shall be acquired, and TxDOT's title in the Project ROW shall be insured, in fee simple absolute or easement interest as appropriate, free and clear of any and all liens and encumbrances. Title policies must be in a form and substance approved by TxDOT. Title to the Project ROW shall be insured in the name of the "State of Texas by and through the Texas Transportation Commission".

7.3.4 Introduction to Property Owners

DB Contractor may not contact or make offers to property owners until TxDOT has approved the ROW Acquisition Management Plan. DB Contractor shall provide TxDOT the current property owner list, with addresses, and shall pay for the distribution of initial contact letters of introduction to both property owners and displacees. The Introduction Letters shall clearly describe the Project, TxDOT's need for the owner's property, and shall include the name and telephone number of a DB Contractor's representative. TxDOT's ROW Administrator or designee will sign the letters on TxDOT letterhead. The forms for these letters will be approved by TxDOT prior to use. The Introduction Letter will not be delivered to property owners until

after TxDOT has approved the ROW Acquisition Plan and signed the Introduction Letter. DB Contractor shall provide translation for property owners or displacees unable to read or understand the notices.

Upon signing the Introduction Letter by TxDOT, DB Contractor may commence contact with the property owners in connection with the acquisition of property and all other Work and activities pertaining to the Project. DB Contractor shall furnish a copy of the State of Texas Landowner's Bill of Rights for each property owner for inclusion with the Introduction Letter. The copy of the Bill of Rights shall be the latest version as shown on the Office of Attorney General website, https://www.texasattorneygeneral.gov/agency/Landowners_billofrights.pdf.

7.3.5 Appraisals

7.3.5.1 Appraisal Services

DB Contractor shall provide TxDOT with market value appraisals prepared by appraisers meeting the minimum qualifications established herein. DB Contractor shall ensure that all appraisals are prepared in conformance with applicable Law (including the Uniform Act), and in accordance with professional appraisal methods and applicable TxDOT standards for all parcels to be acquired by TxDOT. DB Contractor shall:

(a) Select appraisers from TxDOT's list of pre-certified fee appraisers meeting the requirements specified in Section 7.2.7 (ROW Personnel Qualifications). TxDOT shall have final approval of the selection of each appraiser and appraisal reviewers submitted by DB Contractor. DB Contractor must identify and receive written approval of the appraiser who will be responsible for the appraisal work product and who will be signing the reports.

(b) Establish personal pre-appraisal contact with each owner of record title and each occupant, and document all contacts utilizing forms provided by TxDOT.

(c) If necessary, make a diligent effort to secure a written agreement between the record title owner and DB Contractor granting TxDOT, DB Contractor or assignees permission to enter the applicable parcel to be acquired (a "Right of Entry Agreement"). DB Contractor may, at its discretion and expense, offer to pay reasonable compensation for any required Right of Entry Agreements. If DB Contractor, after best efforts, is unable to secure a Right of Entry Agreement from the property owner, DB Contractor shall provide documentation acceptable to TxDOT indicating conversations, correspondence, and efforts used to attempt to secure the Right of Entry Agreement.

(d) Contact the record title owners or their designated representatives, in writing, to offer them the opportunity to accompany the appraiser on the appraiser's inspection of the parcel, and maintain a record of all such contacts and attempts to contact in the parcel file.

(e) Cause the appraiser to prepare a complete appraisal report for each parcel to be acquired to include the whole property, the portion to be acquired, and any damage to the remainder. It shall also include all improvements on the whole property, unless otherwise directed by TxDOT. The appraisal reports shall comply with and include all matters required by this section and TxDOT ROW related manuals, and shall satisfy the requirements of the USPAP in effect at the time the appraisal is submitted. Special analyses, studies or reports, as necessary, shall be made a part of each appraisal. The appraiser must use the most current edition of the USPAP standards referenced above and continually monitor these standards to ensure the appraisals conform to the most current requirements of professional appraisal practice. All appraisals shall utilize TxDOT form SPD ROW-A-5 – Real Estate Appraisal Report.

In very limited situations and with written permission from TxDOT on a per parcel basis, the appraiser may utilize TxDOT form SPD ROW-A-6 for less complicated parcels. All appraisals must be performed utilizing guidance from the TxDOT *Right of Way Manual* and the TxDOT *Appraisal and Review Manual*. All appraisals for condemnation proceedings shall utilize TxDOT form SPD ROW-A-5 – Real Estate Appraisal Report.

(f) Obtain and provide TxDOT with copies of all written leases, licenses and other occupancy agreements, including outdoor advertising/sign agreements that are not already included in the Title Commitment.

(g) Perform an evaluation of all outdoor advertising signs, as required, utilizing the appropriate forms as instructed by TxDOT.

(h) DB Contractor shall utilize the appropriate TxDOT forms in considering all outdoor advertising signs. The forms shall be completed and executed by the outdoor advertising sign owner.

For all parcels to be acquired that have off-premise outdoor advertising signs (sign structure), the preliminary appraisal package or the appraisal in the Acquisition Package, submitted for TxDOT approval, must include:

(i) Completed and executed appropriate TxDOT forms; and

(ii) If applicable, the value of the sign structure as a real property fixture.

Unless the appraiser is advised that the owner of an impacted (displaced) sign structure has elected to relocate the sign structure as personal property, DB Contractor shall prepare a valuation of the sign structure.

(i) Cause the appraiser(s) to testify as an expert witness(es) or provide expert witness(es) approved by TxDOT in Special Commissioners' hearings or eminent domain proceedings through jury trial and be available for depositions, other discovery, pre-hearing or pre-trial meetings and appeals, as directed by TxDOT in accordance with the TxDOT *Right of Way Manual* and USPAP. DB Contractor shall also provide administrative and/or technical support for such proceedings as requested by TxDOT.

(j) Coordinate with the review appraiser regarding corrections and additional information that may be required for a particular appraisal.

(k) Cause a report to be prepared by an environmental professional that meets the qualifications set forth in ASTM E-1527-13, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, documenting the environmental condition of each parcel, which may be used on field investigations and/or historical review, as appropriate for the particular parcel. As directed by TxDOT, DB Contractor shall submit a summary report of the Phase I site assessment. A template or sample of this summary report shall be provided by TxDOT in the Reference Information Documents (RIDs). Upon completion, the report shall be made available to the appraiser(s). A Phase I environmental site assessment or a report provided in a manner approved by TxDOT shall be performed for all properties and submitted with the Acquisition Package. If it is determined that there is a potential environmental risk based on the Phase I report or other reports, then a Phase II investigation shall be performed and submitted to TxDOT before a payment request is submitted for the purchase of the parcel or a Condemnation Package is submitted for approval.

A Phase III investigation shall be performed if the Phase II report justifies it. The Phase III report must indicate the approximate cost to remediate the parcel to achieve its current use and its highest and best use. DB Contractor shall prepare timely written notification to TxDOT of any environmental or other concerns associated with the Project ROW or Additional Properties to be acquired that could require environmental remediation or other special attention or which would cause a report to be prepared. In the event that DB Contractor has exhausted all means possible and is unable to access the properties to perform an Environmental Site Assessment (ESA) Phase II and/or III, DB Contractor may submit the Acquisition Package and Condemnation Package without the ESA reports. However, DB Contractor shall be responsible for performing and receiving approval from TxDOT for all required ESAs after possession of the property has been obtained through condemnation before commencement of construction.

(l) Engage the services of, and cause, a land planner to perform or otherwise assist in the preparation of, any and all appraisals. The land planner shall be involved with all parcels with a valuation analysis indicating a highest and best use that is other than the current use of such parcels, or as directed by TxDOT, for certain other appraisals. DB Contractor shall notify TxDOT in writing of each and every instance when the highest and best use of a parcel is different and TxDOT will determine to what degree land planner services will be utilized by DB Contractor.

(m) Cause the appraiser(s) to prepare updated appraisals, as well as updated appraisal reviews, when required by TxDOT or as needed during eminent domain proceedings. An updated appraisal package shall comply with USPAP and Advisory Opinion, AO-3. At a minimum, the updated appraisal report or new assignment must include:

(i) A letter of transmittal with a specific reference to the original appraisal report, any changes in market conditions since the original appraisal, any changes in the subject property since the original appraisal, a statement of the current value or extension of the original value opinion, and the listing of the current date of value.

(ii) An updated Page 1 from TxDOT form SPD ROW-A-5 – Real Estate Appraisal Report with the current date of a recent inspection of the subject property and a current date of value. This form needs to have a current signature and date by both the appraiser and the reviewing appraiser in the appropriate spaces on the form.

(iii) Any qualifying and limiting conditions or general assumptions by the appraiser shall be clearly stated and attached.

(iv) A copy of the survey and legal description of the property being acquired, current photographs of the subject property clearly showing the area being acquired, even though the original appraisal report contained photographs of the subject and the area of the acquisition. If there are significant changes to the subject property, the area being acquired, access to the remainder property, damages to the remainder(s), market conditions, the subject property's highest and best use from the previous appraisal, or significant changes in the approaches to value, the property shall be reappraised using the TxDOT form SPD ROW-A-5 – Real Estate Appraisal Report. Appraisers shall refer to the TxDOT *ROW Appraisal and Review Manual* for additional guidance. DB Contractor shall follow these guidelines in producing updated appraisal reports or new assignments and shall discuss specific updating requirements for any complex appraisals with TxDOT before beginning the assignment.

(n) Prepare and deliver to TxDOT, upon request, a copy of all file documents, as formally requested in discovery motions or request for production.

(o) Complete with the property owner and furnish, to the appraiser and Relocation Agent, TxDOT form SPD ROW-A-9 – Property Classification Agreement, before appraisal is completed.

7.3.5.2 Appraisal Review

In connection with appraisal review, DB Contractor shall:

(a) Select review appraisers from TxDOT's list of pre-certified fee appraisers meeting the requirements of Section 7.2.7 (ROW Personnel Qualifications). The review appraiser selected must follow the appraisal guidelines and procedures found in the TxDOT *ROW Appraisal and Review Manual*.

(b) Determine, in consultation with TxDOT, if additional appraisal reports or technical expert reports are required. Initiate, review, and reconcile each report required.

(c) Review all appraisal reports for each parcel to determine consistency of methodology, supporting documentation related to the conclusion reached, and compliance with TxDOT standards, as defined in Section 7.3.5.1 (Appraisal Services) and this Section 7.3.5.2 (Appraisal Review), the TxDOT *ROW Appraisal and Review Manual*, the *Uniform Appraisal Standards of Federal Land Acquisitions*, and the requirements of the Appraisal Foundation's USPAP in effect at the time the appraisal is reviewed. The review appraiser must use the most current edition of the standards referenced above and continually monitor these standards to ensure the appraisals conform to the most current requirement of professional appraisal practice.

(d) Inspect the subject properties and the sale properties used in direct comparison for each appraisal being reviewed.

(e) Upon completion of the review outlined above, the review appraiser shall certify in writing to TxDOT that all required standards have been met. This certification will occur by signing on Page 1 of the TxDOT form SPD ROW-A-5 – Real Estate Appraisal Report, in the block provided. The review appraiser will also complete TxDOT form SPD ROW-A-10 – Tabulation of Values, to accompany each appraisal.

(f) For appraisal updates or new assignments, the review appraiser shall perform a complete review of the updated or new appraisal, re-inspecting the subject property and the comparable sales used, as of the current date of value. The review appraiser shall follow the procedures outlined in the TxDOT *ROW Appraisal and Review Manual*. A new TxDOT form SPD ROW-A-10 – Tabulation of Values, will be required for each updated appraisal or new assignment.

(g) DB Contractor's Quality Control Specialist(s) as referred to in Section 7.2.7 (ROW Personnel Qualifications), shall ensure that appraisal consistency and quality for the entire Project is monitored for Project-wide controls and consistency.

7.3.6 Project ROW Acquisition Package Approval

Acquisition Packages submitted by DB Contractor for TxDOT's approval shall include the following items, prepared for each parcel in accordance with the requirements of this section:

(a) A cover sheet setting forth the following information for each parcel:

(i) Parcel number and number of parts

(ii) Station number

(iii) CSJ number

(iv) Federal Identification Number (if applicable)

(v) Location of parcel

(vi) Name of owner

(vii) County and/or other jurisdiction

(viii) Extent of acquisition (partial or whole acquisition)

(ix) Type of conveyance (fee, easement, etc.)

(b) A complete legal description of the parcel adequate to effect the desired acquisition of the parcel, signed and sealed by a RPLS. A legal description and parcel plat is required for each parcel. Control of access shall be addressed in all legal descriptions. All descriptions shall be in recordable form and shall be prepared in a form and manner acceptable to TxDOT in all respects.

(c) The parcel plat, as prepared by the RPLS, and a half-size (11" X 17") copy of the ROW map sheet(s) pertaining to the parcel, such plat to include control of access designations.

(d) A title report, current within 90 Days, including copies of all documents identified in the exceptions listed therein and a plot of all easements identified therein. The Acquisition Package shall include DB Contractor's analysis of each preliminary title report or title commitment to determine potential problems and proposed methods to cure title deficiencies. DB Contractor shall perform title curative work. DB Contractor shall provide TxDOT with copies of all curative documents.

(e) A copy of the appraisal report with an effective date less than 180 Days.

(f) A copy of the Environmental Site Assessment and all amendments as described in Section 7.3.5.1 (Appraisal Services).

(g) A real/personal property report (TxDOT form SPD ROW-A-9 – Property Classification Agreement) detailing the items making up each parcel are classified as real estate, tenant-owned improvements or personal property. Particular attention shall be paid to items that have questionable classifications.

(h) Replacement Housing Calculations, notification of business eligibility, completed displacee interviews, all comparables used in estimating the Replacement Housing Calculations, and letter to displacee(s) explaining Replacement Housing Calculations. Calculations and replacement housing benefit package shall be prepared and reviewed by a qualified consultant, in conformance with TxDOT's standard relocation procedures and applicable to State and Federal Laws.

(i) The proposed initial offer letter, memorandum of agreement, deed, and any other documents, which shall be prepared by DB Contractor as required or requested by TxDOT, on DB Contractor's letterhead or as otherwise directed. TxDOT will provide the format for preparing these documents. Documents referred to in this section are standardized by TxDOT and modification of standardized documents shall be kept to a minimum. All changes are subject to approval by TxDOT in writing, in TxDOT's discretion.

(j) Any other required TxDOT forms, such as record of all contacts with the property owner or any party with a compensable interest.

No Acquisition Packages will be approved if performed or submitted by appraisers or agents not previously approved by TxDOT for this Project.

Upon TxDOT's prior written approval of the Acquisition Package, DB Contractor may proceed with the offer to the property owner.

7.4 Acquisition Activities

7.4.1 ROW Negotiations

DB Contractor shall conduct all negotiations in accordance with the requirements of applicable Law. In conjunction with negotiations, DB Contractor shall:

(a) Within ten Business Days of TxDOT's approval of the Acquisition Package, contact each property owner or owner's designated representative, in person where practical, to present the offer and deliver an appraisal report (not more than six months old) and appropriate brochures. The approved appraisal shall be sent by certified mail, return receipt requested. A copy of the appraisal report for the subject property shall be provided to the property owner or authorized representative at the time of initial offer. All appraisal reports produced or acquired by TxDOT relating specifically to the property owner's property and prepared in the ten years preceding the date of the offer must also be delivered to the property owner. DB Contractor shall also maintain a file record of receipt of appraisal signed by the property owner. DB Contractor shall also maintain follow-up contacts and secure the necessary documentation and title curative Work upon acceptance of the purchase offer.

(b) At the time of offer, produce and distribute to all property owners and displacees, TxDOT approved informational brochures and the State of Texas Landowner's Bill of Rights as updated on the Office of the Attorney General's website:

https://www.texasattorneygeneral.gov/agency/Landowners_billofrights.pdf.

(c) Identify lessees, licensees, occupants, or other parties with potential compensable interests including outdoor advertising sign owners, and, if appropriate, after consultation with TxDOT, negotiate with such parties for the acquisition of their compensable interests.

(d) Advise the property owners, lessees, licensees, occupants, and other holders of compensable interests, as applicable, of the administrative settlement process. Confer with and transmit to TxDOT's ROW Administrator any settlement request from property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, including a detailed recommendation from DB Contractor in accordance with standards, manuals and procedures as defined in Section 7.2 (Administrative Requirements). TxDOT shall determine whether to accept a settlement request. Delivery of the administrative settlement request and

DB Contractor's recommendation to TxDOT must occur within 15 Business Days following DB Contractor's receipt of the administrative settlement request.

(e) DB Contractor, at its request or the request by TxDOT or the TxDOT Administrative Settlement Committee, may participate in the evaluation of the administrative settlement request and attend the committee meeting.

(f) DB Contractor shall provide a letter stating the TxDOT Administrative Settlement Committee's response to the property owner, lessee, licensee, occupant, or other holder of a compensable interest, as applicable. DB Contractor shall deliver all settlement responses (if within reasonable proximity of the Project) by hand within three Business Days after receipt. If this delivery method is not feasible, DB Contractor shall mail (return receipt requested) response letters not more than three Business Days following any decision by the TxDOT Administrative Settlement Committee. If DB Contractor selects the mailing option, DB Contractor shall contact the property owner to discuss the settlement offer prior to mailing the response letter. The TxDOT ROW Administrator, on an as-needed basis, will convene the TxDOT Administrative Settlement Committee.

(g) Notwithstanding an unsuccessful completion of the formal administrative settlement process, DB Contractor may engage in ongoing negotiations with the owners of compensable interests. DB Contractor shall develop and incorporate in its ROW Acquisition Management Plan a procedure for these negotiated settlements. Said negotiations may continue until such time as the Texas Transportation Commission adopts a minute order authorizing the filing of a condemnation petition. DB Contractor shall submit its recommendation to TxDOT of a negotiated settlement and obtain TxDOT's consent prior to acceptance of any settlement.

(h) Provide timely (i.e., not more than ten Business Days after inquiry) response to the verbal or written inquiries of any property owner, lessee, licensee, occupant or other holder of a compensable interest, as applicable.

(i) Prepare a separate negotiator contact report for each meeting or conversation with any person (or other appointed representative(s) supported by a written confirmation of appointment) who has a compensable interest in each parcel on TxDOT form SPD ROW-N-94 – Negotiator's Report. Contact reports shall also be prepared for unsuccessful attempts to contact such persons.

(j) Maintain a complete parcel file for each parcel. All original documentation related to the purchase of the real property interests will be maintained (housed separately from the relocation files) in conformance with TxDOT standards, manuals, and procedures, as defined in Section 7.2 (Administrative Requirements). All original Project ROW documents must be retained and properly secured in DB Contractor's Project office or as otherwise approved by TxDOT. Signed original documents shall be forwarded to TxDOT periodically or as requested by TxDOT with a transmittal form during the acquisition process; *provided, however*, that all remaining original documents shall be forwarded upon completion of the acquisition of Project ROW for the Project.

(k) Prepare and deliver documents of conveyance (including bisection clause and access clause, if applicable) to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable, and obtain their execution of the same. All signatures on documents to be recorded shall be notarized in accordance with Texas Law.

(l) Pursue and obtain Possession and Use Agreements (PUA) concurrently with the parcel negotiations. The form of PUA will be provided by TxDOT and will contain provisions allowing for construction to commence while negotiations are finalized. Such agreements shall be sought and negotiated by DB Contractor strictly in accordance with the Law and only with the prior written consent of TxDOT. If DB Contractor exercises the use of a TxDOT PUA, DB Contractor must obtain a deed or commence action on condemnation proceedings by forwarding a condemnation packet to TxDOT for approval within six months from the date of the PUA. No other conveyance documents shall be used for the purpose of Construction Work unless otherwise approved by TxDOT.

(m) Consider all reasonable settlement requests (that comply with the regulations as outlined in this section) from the property owners, which are feasible and help expedite the Project ROW acquisition process. DB Contractor acknowledges and understands that TxDOT encourages all positive and creative solutions which satisfy the property owner and promote the success of the Project.

(n) DB Contractor shall prepare and deliver a final offer letter to the property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable. The letter shall be on DB Contractor's letterhead and shall be signed by the ROW Acquisition Manager. The final offer letter shall allow a property owner lessee, licensee, occupant or other holder of compensable interest at least 14 Days as the consideration time period to review the final offer. DB Contractor shall submit to TxDOT, a copy of the final offer letter within two days of delivery to the property owner.

If the final offer letter is not accepted, DB Contractor shall follow the procedures established for condemnation.

7.4.2 Relocation Assistance

DB Contractor shall coordinate and perform the administrative requirements necessary to relocate any occupants and personal property from Project ROW and certain remainders, as authorized by TxDOT. All Work prepared by DB Contractor with respect to relocation assistance shall be performed in accordance with applicable Law, including the Uniform Act and TxDOT standards, and in accordance with all provisions of this Agreement.

DB Contractor shall maintain a relocation office (meeting ADA requirements) within reasonable proximity of the Project area as approved by TxDOT. At a minimum, the office hours of the relocation office shall be posted to meet the following timetables:

(a) Monday through Friday: 8:00 a.m. to 5:00 p.m.

(b) Saturday: 9:00 a.m. to 12:00 p.m.

(c) Sunday: office may be closed

In addition to the office hours listed above, DB Contractor shall be available to all displacees for relocation services at the convenience of the displacees.

DB Contractor's major activities with respect to the relocation assistance of occupants from Project ROW include:

1. Prepare a Relocation Plan in accordance with the TxDOT *Right of Way Manual*, Volume 3, Chapter 8 (Relocation Program Planning and Construction) within 90 Days after receipt of NTP1, as part of an updated ROW Acquisition Management Plan.

2. Monitor relocation assistance activities and provide advisory services.

3. Prevent fraud, waste and mismanagement.

4. Assist with all requests and be responsible for carrying out decisions made by TxDOT, the review/appeal process and judicial reviews.

DB Contractor shall provide relocation assistance strictly in accordance with the Law, and, in particular, the Uniform Act and TxDOT standards. With respect to relocation assistance, DB Contractor shall:

A. Provide written notice to all property owners, lessees, licensees, occupants, other holders of compensable interests, and other potential displacees regarding relocation assistance and produce and provide them with a relocation assistance brochure that has been approved by TxDOT. DB Contractor shall perform relocation interviews, complete and maintain interview forms and discuss general eligibility requirements, programs, and services with potential displacees. DB Contractor shall maintain a written record of all verbal contacts.

B. Give written notice of the pending acquisition to any non-eligible occupants. Any questions as to the eligibility of a potential displacee shall be directed in writing to TxDOT's ROW Administrator.

C. Contact and provide relocation assistance to those parties affected by the Project ROW acquisition and complete forms for all displacees, as required.

D. Locate, evaluate and maintain files on comparable available housing, commercial, retail and industrial sites.

E. Calculate replacement supplement benefits.

F. Compute and submit requests for relocation rental/housing supplement to TxDOT prior to submission to relocatees. All relocation supplements shall be subject to TxDOT's written approval.

G. Perform a Decent, Safe and Sanitary (DSS) inspection for each replacement housing comparable, photograph the comparable and complete the DSS inspection form, TxDOT form SPD ROW-R116 – Replacement Housing Inspection.

H. Obtain at least two moving estimates from moving companies to effect relocation of personal property or consistent with the Uniform Act.

I. Prepare moving plan with appropriate photos, sketches and inventory of personal property to be moved.

J. Coordinate moves with displacees and moving companies in accordance with TxDOT standards and the Uniform Act.

K. Maintain relocation contact logs on a TxDOT form SPD ROW-R96-R – Relocation Advisory Assistance – Parcel Record.

L. Attend all closings on replacement properties, if requested by any party involved, and assure supplemental payments, if any, are properly distributed.

M. Process and compute increased interest payments on the mortgage of owner-occupied dwellings, as required.

N. Deliver to displacees a 90 Day notice of eligibility letter simultaneously with the delivery of the relocation benefits package. Deliver a 90 Day letter to displacees with the location of the comparable property used to compute the supplement.

O. Deliver a 30 Day notice to displacees and property owners upon Possession of Project ROW.

P. Notify TxDOT, in writing, when displacee has vacated or abandoned the affected dwelling or structure. In addition, insure displacee has removed all personal property from the Project ROW.

Q. Notify TxDOT's ROW Administrator office immediately if a displacee has not moved after 30 Day notice expires. Special effort and consideration should be extended to the displacees in the move out process. If the displacees have not moved from the State owned ROW and eviction is necessary, DB Contractor must provide written request to TxDOT to begin eviction proceedings. The request must include written evidence of the due diligence efforts to vacate the displacees. Prepare a written recommendation to facilitate the displacee's move.

R. Be available for any appeals or hearings.

S. Prepare relocation payment claim submissions for all displacees and all relocation assistance benefits.

T. Verify DSS dwelling criteria on all replacement housing as selected by the displacees.

U. Secure dwellings and structures no later than ten Days after vacancy and protect the Project ROW following acquisition and relocation. It is DB Contractor's responsibility to insure that all occupied and vacated improvements maintain insurance coverage or assume liability through completion of demolition.

V. Maintain a complete file, separate from acquisition files, on each displacee and make available for inspection.

W. Be responsible for all relocation activities that may occur after deposit of the Special Commissioner's award in the courts, including instances when a parcel referred to the Office of the Attorney General for eminent domain also has a relocation issue. Relocation computations shall be adjusted based on the approved administrative settlement and court award.

X. Prepare all correspondence to the displacees or their representative(s) on DB Contractor's designated relocation letterhead and have DB Contractor's correspondence signed by the Project ROW relocation agent.

Y. Deliver to each displacee the relocation assistance payments according to the TxDOT *Right of Way Manual*, Volume 3 – Relocation Assistance – Chapter 4 Program Administration – Section 1 Procedures – Delivery of Payment.

Z. Assist TxDOT and the Office of the Attorney General with eviction proceedings. Serve notice of eviction proceedings to the occupant(s) of the property who have not complied with move dates. Coordinate the eviction process with the local authorities and accompany the Sheriff's Department when the local authorities are carrying out eviction.

7.4.3 Closing Services

For purposes of closing services, DB Contractor shall:

(a) Submit a closing Submittal to TxDOT for review a minimum of 24 hours prior to closing. Closing Submittals shall include the following:

(i) A reference to the disposition of any environmental matters;

(ii) Updated title commitment, no more than 15 Days prior, with notations indicating the disposition of all schedule "B" and "C" items;

(iii) A copy of the executed warranty deed to be delivered;

(iv) A proposed closing statement indicating disposition of all proceeds;

(v) A copy of any and all release(s) of liens;

(vi) A copy of any miscellaneous documents and other curative matters required to be delivered at closing; and

(vii) A copy of the closing memorandum outlined in item (b) below.

(b) Prepare the escrow agreement and closing documents, including a closing memorandum identifying all parties involved in the closing, and listing all documents to be executed and/or delivered in connection with the closing.

(c) Attend closings; provide curative documents and exhibits, as required, and in conjunction with the applicable title company. Confirm that all conditions to closing are satisfied and notify TxDOT of all closing appointments.

(d) Obtain and transmit to TxDOT a copy of the issued title insurance policy and recorded conveyance document based on the approved updated title commitment within 45 Days following closing.

7.4.4 Condemnation Support

DB Contractor shall provide an individual or individuals having sufficient knowledge of the design of the Project to appear as an expert witness for testimony at the Special Commissioners' hearing or other proceedings. This individual is also responsible for preparing exhibits as requested by TxDOT or the Office of the Attorney General in support of said testimony.

DB Contractor shall support condemnation efforts as directed by TxDOT and further delineated as follows:

(a) Notify TxDOT of any potential condemnation and document the reason(s) for condemnation including recommendations for property closure.

(b) Conduct all applicable eminent domain-condemnation activities in accordance with the policies and procedures as described in the TxDOT *Right of Way Manual*, Volume 4: "Eminent Domain"; in the TxDOT *ROW Appraisal and Review Manual*, Chapter 7: "Eminent Domain-State Acquisition" or as revised; in Chapter 21 of the Texas Property Code; and Senate Bill 18.

(c) After non-response or upon receipt of a copy of the rejected final offer from a property owner or other property right holder entitled to compensation, request an updated title report from the title company issuing the original title commitment.

(d) Provide to TxDOT, within ten Days following non-response or rejected certified mailing, notification thereof together with a signed and sealed parcel description and parcel plat, and a bisection clause and access clause, if necessary, with the clauses attached to a property exhibit containing the parcel description and parcel plat.

(e) Use the information from the title report to join all parties having a property interest on the applicable TxDOT form. Spouses of property holders with compensable rights must also be joined.

(f) Upon completion of TxDOT form SPD ROW-E-49 – Request for Eminent Domain Proceedings, prepare a condemnation packet containing two copies each of the following documents: the completed TxDOT form, negotiation logs, the updated title report not more than 30 Days old, appraisal receipt acknowledgment, pre-appraisal contact sheet, signed and sealed field notes, parcel sketch, bisection clause and access clause exhibits (if necessary), initial offer letter and final offer letter reflecting the latest appraisal, complete minute order request form (form to be provided by TxDOT), any correspondence sent by DB Contractor or from the owner of the compensable interest or representatives, one copy of all the appraisal reports and evidence of a bona fide offer to the property owner. Submit two complete Condemnation Packages to TxDOT's ROW Administrator for review and approval.

(g) Send a copy of the complete petition to the title company and confirm with the title company that the appropriate parties were joined in the case and that no changes in title have occurred since the original litigation guaranty was issued.

(h) File the petition for condemnation with the appropriate court clerk after a determination that a timely settlement is not feasible. In counties that require e-filing, the Office of the Attorney General will e-file as appropriate and provide a copy of the petition to TxDOT. DB Contractor shall record the lis pendens in deed records with the appropriate county. No later than three Business Days from the date of filing, DB Contractor shall send a copy of the petition and lis pendens, by certified mail, return receipt requested, to the owner, lessee, licensee, occupant or other holder of compensable interest. DB Contractor shall provide a copy to TxDOT.

(i) Coordinate and provide technical support to TxDOT, as required to facilitate filing the petition. The Office of the Attorney General will file petitions as required by law. DB Contractor shall provide the location and setting of a hearing date.

(j) Make available to TxDOT on behalf of the Office of the Attorney General an agent who will be expected to assist in making arrangements for conferences with witnesses

prior to trial, filing the condemnation petition, informing all parties as to the filing date of the petition and the case number assigned to the suit, and perform any other duties which will assist in the successful prosecution of the suit, including his or her attendance in court and filing necessary documents to complete all eminent domain proceedings.

(k) Depending on the market conditions or if over six months have elapsed since the date of the initial offer, contact TxDOT and TxDOT will contact the Assistant Attorney General handling the case for TxDOT and confer about the advisability of preparing an updated appraisal. If it is determined that an updated or new appraisal is necessary or desirable, obtain such appraisal using the same procedures as described in Section 7.3.5.1 (Appraisal Services). DB Contractor must also undertake appraisal review as described in Section 7.3.5.2 (Appraisal Review).

(l) Coordinate with TxDOT on behalf of the Office of the Attorney General as to land planners and/or other expert witnesses as required by the Office of the Attorney General. DB Contractor, at its cost, shall provide the land planner or other expert at the request of TxDOT or the Office of the Attorney General. The land planner or other expert report, if required, shall be completed and forwarded to the appraiser before the updated appraisal is completed.

(m) Appear or provide for the appearance of expert witness(es) or fact witness(es) when requested by TxDOT or the Office of the Attorney General. The appearances may include pre-commissioner's hearing preparations, Special Commissioner's hearings, subsequent proceedings including jury trials and related proceedings and as other needs arise.

(n) Submit the updated appraisal or new assignment to TxDOT for review and approval. Once approved, TxDOT shall transmit the approved appraisal to the Office of the Attorney General. TxDOT must approve any updated appraisals or new assignments. If an updated appraisal or new assignment is approved, notify the property owner or other holder of a compensable interest, as applicable, and submit a copy to TxDOT.

(o) Communicate with TxDOT as to the parcel status on a monthly basis and in the Project Progress Report or as requested by TxDOT.

(p) Serve in person, a "Notice of Hearing" not later than 20 Days before the date of the Special Commissioners' hearing or other hearings and notice requirements as directed or authorized by the court.

(q) Call and send reminder letters two to three weeks in advance of any hearing to the assigned attorney, engineer, technical experts, appraiser, the commissioners, court reporter, and TxDOT's ROW Administrator concerning hearing dates.

(r) Upon completion of the hearing, prepare TxDOT form SPD ROW-E-73 – Data Sheet – Special Commissioner's Hearing, and commissioners' time sheets. DB Contractor shall make payment to all commissioners involved in the hearing and include payment for commissioners as part of general Project ROW services.

(s) Coordinate and provide support to TxDOT's counsel, and facilitate distribution of copies of award, prepare request for payment, and file notice of deposit. DB Contractor shall coordinate with TxDOT on behalf of the Office of the Attorney General regarding expert witnesses needed to testify on behalf of the State at the Special Commissioners' hearing and subsequent proceedings including jury trials. At the request of the Office of the Attorney General or TxDOT, DB Contractor shall provide and pay for all necessary expert witnesses including:

engineering, land planners, real estate consultants, cost estimators, outdoor advertising sign experts, and environmental consultants, and DB Contractor shall appear as expert witness or fact witness, as requested. DB Contractor shall also make any Subcontractors available to appear as an expert witness or fact witness, as requested at the Special Commissioners' hearing or subsequent proceedings up to Final Acceptance of the construction project and through any maintenance agreement periods. The selection of all expert witnesses to be used for jury trials shall be determined by the Office of the Attorney General.

(t) Schedule and pay for all court reporter services, transcription costs, expert witness fees, exhibits, and exhibit workbooks as directed by TxDOT.

(u) Be responsible for coordinating the pre-hearing meeting with TxDOT on behalf of the Office of the Attorney General and all others required for testimony or exhibit preparation. DB Contractor shall require expert witnesses with all exhibits and documents to be present at a pre-hearing meeting.

(v) Timely file and provide proper service of citations if objections are filed after completion of the Special Commissioner's hearing and promptly provide evidence of filing and copies of all filed documents to TxDOT. As directed by TxDOT or the Office of the Attorney General, DB Contractor, at its cost, shall order transcripts of such hearing.

(w) DB Contractor shall provide an individual or individuals having sufficient knowledge of the design of the Project to appear as an expert witness for testimony at the Special Commissioner's hearing or other proceedings. This individual is also responsible for preparing exhibits as requested by TxDOT or the Office of the Attorney General in support of said testimony. Exhibits shall be left in the custody of TxDOT at the close of the hearing.

7.4.5 Clearance/Demolition of Project ROW

Prior to demolition of any improvements, DB Contractor shall provide to TxDOT photographs of the property and all improvements. If legal proceedings are initiated, all photos of personal property and any other items of dispute shall be in and of a quality suitable for presentation as evidence in court. Following acquisition or possession of any parcel of Project ROW, DB Contractor shall:

(a) Within ten Days from vacancy of the property, secure and protect the buildings, improvements and fixtures on the Project ROW until they are disposed of or demolished. DB Contractor shall board-up, mow, fumigate and winterize as required by TxDOT or applicable Law.

(b) Coordinate with the owner and occupants to assure the clearance of personal property from the Project ROW, as applicable.

(c) Provide for any insect and rodent control and initiate extermination as required to protect the adjacent properties and rid the Project ROW from infestations.

(d) Secure Governmental Approvals required for demolition and environmental surveys or tests, notify TxDOT in writing of all such activities, and provide copies of such Governmental Approvals to TxDOT.

(e) To the extent required by Section 7.2.11 (Responsibilities of DB Contractor), prepare necessary documentation for disposal of improvements, fixtures and buildings in accordance with applicable Laws and submit the same to TxDOT.

(f) Provide written notification to TxDOT of any abandoned personal property remaining on the Project ROW.

(g) Terminate all utility service(s) when appropriate.

(h) Process all required forms, documents and permit applications in order to proceed with the timely demolition or removal of any and all improvements, buildings and fixtures located within the Project ROW, as applicable.

(i) Demolish and/or remove all improvements.

(j) Notify TxDOT upon completion of the demolition and clearance of the Project ROW, as applicable.

7.4.6 Payment Submittal

DB Contractor must submit a payment Submittal for any item that is a TxDOT payment responsibility as outlined in this Section 7. A payment Submittal shall consist of:

(a) Completed payment request forms for each type of payment.

(b) All required appropriate documents as shown on each payment request form.

(c) Form AP-152 (Tax Payer Identification Number).

The State's warrant will be returned to DB Contractor's ROW Acquisition Manager (ROW AM).

7.4.7 Property Fence

In connection with fences, DB Contractor shall comply with the policies and procedures of the TxDOT *Right of Way Manual*, as well as the specifications found in the TxDOT Standard Specifications. Fencing standards for DB Contractor-provided fencing shall conform to the overall aesthetics requirements found elsewhere in these Contract Documents and referenced standards.

7.4.8 Property Fencing for Public Properties

Where public facilities now exist that are in high risk areas for public use (particularly those containing parks, sport areas, schools or any highly traveled pedestrian areas), DB Contractor shall construct similar like fence as in the preexisting condition or, at a minimum, construct a 6-foot-high chain-link fence with metal posts if no fence was in the preexisting condition. DB Contractor shall use Good Industry Practice in fencing public properties to control public access to the Project.

7.4.9 Property Fencing for Private Properties

DB Contractor shall instruct the appraiser to use the "Cost to Cure" format to compensate an owner of private property for a replacement fence when the Project ROW line leaves one or more unfenced remainder property(ies) that were fenced before the taking. Compensation for

the new fencing will be based upon the same type of fence as the property owner's existing fence.

When the property owner is paid through the appraisal process for the cost to rebuild the fence on the remainder property, DB Contractor shall include the following clause in the memorandum of agreement or the purchase agreement for such property:

> "It is further understood and agreed that the Grantor has been compensated for the construction of a new fence and shall be responsible for constructing the necessary fencing within 30 Days from the date of closing. Grantor specifically understands and agrees that the fences are the property of the Grantor and they shall be liable and responsible for any reconstruction, maintenance, or adjustment with regard to such fencing."

DB Contractor shall make reasonable and good faith efforts to ensure that the property owners, who have been compensated for fencing of the remainder properties, erect the fence in accordance with the construction schedule.

If necessary to maintain the Project construction schedule and to control unauthorized access to the Project ROW by the public or livestock, DB Contractor shall be responsible for providing temporary fencing in cases where the property owner refuses to fence the property within the allotted timeframe.

After the property owner's retention period has expired and if any existing fencing remains, DB Contractor shall remove the existing fences from the newly acquired Project ROW and will be responsible for all costs associated therewith.

7.5 Early ROW Acquisition

TxDOT will notify DB Contractor if certain Project ROW parcels are scheduled to be acquired by TxDOT or Governmental Entities prior to issuance of NTP2. TxDOT will update DB Contractor regularly on the status of the acquisition process for each parcel.

After issuance of NTP2, DB Contractor shall complete the acquisition process and coordinate the scheduling of any remaining early Project ROW acquisitions.

7.6 Submittals

Submittals described in Section 7 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 7-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 7-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 7			
PMP – ROW Acquisition Management Plan	Within 30 Days after NTP1	Approval prior to issuance of NTP2	7.2.3
Updates for the projected acquisition of each parcel	Monthly	Approval	7.2.4

Table 7-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Meeting Agendas	Three Business Days prior to each meeting	Information	7.2.9
Meeting Minutes	Within five Business Days from the date of the meeting	Review and Comment	7.2.9
All specific reports and supporting documentation during acquisition process	1. Prior to Acquisition Package submission, Condemnation Package submission, and as often as requested by TxDOT 2. Final reports and supporting documentation to be provided with retirement of all acquisition, relocation, condemnation, and property management files	Approval	7.2.10
Cost Summaries	Monthly	Information	7.2.10(2)
Status Reports	Monthly	Information	7.2.10(3)
Status Updates	Weekly or as requested	Information	7.2.10(3)
Subcontractor Status Report	Monthly or as requested	Information	7.2.10(4)
ROWIS compatible spreadsheet of ROW data	Monthly	Information	7.2.10-5
Completed closeout files	Within 90 days of the completed ROW parcel activity	Review, Comment, and Approval	7.2.11
Project ROW map	Part of the Acquisition Survey Document	Approval	7.3.1
Acquisition Survey Document	As part of any Acquisition Package	Approval	7.3.1
Monthly Parcel Report	Monthly	Information	7.3.2(a)
Monthly Progress Report	Monthly	Information	7.3.2(b)
ROW CAD Files	Prior to submission of the first Acquisition Package	Information	7.3.2(c)
TxDOT Introduction letter and Landowner Bill of Rights to Property Owners and Displacees	After ROW Acquisition Management Plan approval	Approval and signature	7.3.4
Appraisal Reports	Prior to submission of the first Acquisition Package, and as requested	Approval	7.3.5

Table 7-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
TxDOT Form SPD-ROW-A-11-LOAS (Relocation Assistance Notification of Outdoor Advertising Signs) to Property Owners and Displacees, including supporting documentation	After ROW Acquisition Management Plan approval	Approval and signature	7.3.5.1(h)
Acquisition Packages	Prior to delivering the offer to each property owner	Approval	7.3.6
Administrative Settlement Submittals	As necessary	Approval	7.4.1
Relocation Assistance Submittals	As part of the respective parcel's Acquisition Package or separately	Approval	7.4.2
Relocation Plan	Within 90 Days after NTP1, as part of a ROW Acquisition Management Plan update	Approval prior to commencement of Construction Work	7.4.2(1)
Closing Submittals	Minimum of 24 hours prior to closing	Approval	7.4.3
Condemnation Packages	Prior to TxDOT submission to TTC for a minute order	Approval	7.4.4
Payment Submittals	As necessary	Approval	7.4.6

SECTION 8.0 GEOTECHNICAL

8.1 General Requirements

DB Contractor shall perform all investigations, testing, research, and analysis necessary to effectively determine and understand the existing surface and subsurface conditions within the Project ROW needed to carry out the Work.

DB Contractor shall ensure the geotechnical investigations and analyses are both thorough and complete, to provide accurate information for the design of roadways, pavements, foundations, structures, embankments, excavations, slopes, temporary special shoring, and other facilities that result in a Project that meet the requirements of the Contract Documents.

All geotechnical Work shall be performed in accordance with the TxDOT *Geotechnical Manual* and the TxDOT *Pavement Manual* provided in the RID.

DB Contractor shall comply with the TxDOT *Pavement Manual* and Section 8 of these Technical Provisions for the pavement design and quality acceptance process. Where there is a conflict between the requirements of these documents, the requirements in the Technical Provisions shall take precedence.

8.2 Geotechnical Investigation

8.2.1 Geotechnical Investigation for Pavement Design

DB Contractor shall determine the specific locations, frequency, and scope of all subsurface investigations, testing, research, and analysis necessary to design a safe and reliable pavement foundation for the Project in accordance with TxDOT's geotechnical requirements in the TxDOT *Pavement Manual* and this Section 8. DB Contractor shall take all soil borings within and along the proposed roadbed alignment.

DB Contractor shall also submit traffic control plans associated with subsurface pavement investigations to TxDOT in accordance with Section 18 prior to performing any investigations.

DB Contractor shall utilize drilling and field investigation measures that safeguard groundwater from contamination, and shall be responsible for any mitigation or restoration associated with the geotechnical investigation work.

DB Contractor shall prepare and amend as needed its Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analyses in accordance with the TxDOT *Pavement Manual*.

Each Geotechnical Engineering Report, upon completion and including any later supplements or amendments, shall be submitted to TxDOT for review and comment.

DB Contractor shall submit the final Geotechnical Engineering Report, signed and sealed by a Registered Professional Engineer, to TxDOT for approval with the Released for Construction Documents.

8.2.1.1 PVR Requirements for Rigid and Flexible Pavements

DB Contractor shall design the new pavement to have a PVR no greater than 1.5 inches for main lanes and 2.0 inches for non-main lane pavements, as calculated in accordance with Tex-124-E.

DB Contractor shall calculate PVR using the default empirical volumetric swell curves in Tex-124-E or alternatively, by directly determining the percent volumetric swell for the in-situ soil column by measuring the volumetric swell properties at the associated depth and load (effective stress) of each soil strata in the soil column, in accordance to ASTM D4546. DB Contractor shall calculate PVR for a soil column 15 feet deep as measured from the top of the untreated natural subgrade which is bottom of the cut and in a cut section and bottom of fill in a fill section. If the PVR is greater than the maximum allowable for a fill section, then DB Contractor shall account for the fill to determine if the fill effectively negates the non-compliant PVR requirement. PVR can be calculated using a 10 foot soil column from the top of the untreated natural subgrade if high plasticity clays (CH) are present within the top 5 feet of the soil column.

If the PVR of the in-situ conditions exceed the maximum allowable levels, DB Contractor shall determine the depth of mitigation required to comply with PVR limits and implement mitigation measures to comply with PVR requirements. Any mitigation measures shall take into account fluctuations of the water table. At a minimum, DB Contractor shall utilize the following mitigation measures which may be used independently or in combination:

(a) Where chemical soil stabilization is used, it shall be in accordance with TxDOT's *Guidelines for Modification and Stabilization of Soils and Base for Use in Pavement Structures*. Only material meeting the definition of treated subgrade or treated subbase in Section 8.3.3 shall be used to provide a permanently treated subgrade.

(b) Undercut, remove and replace expansive soils with select fill subbase. Only material meeting the definition of select fill subbase in Section 8.3.2 shall be used; all other unbound materials used as a pavement layer that do not meet this definition shall be considered untreated subgrade/embankment.

Adopting mitigation measures does not excuse DB Contractor from meeting Performance Requirements set forth in Section 19 and the Capital Maintenance Agreement (CMA).

8.2.1.2 Soil Testing Requirements

DB Contractor shall use the TxDOT *Pavement Manual* to determine the frequency of subgrade soil survey exploration for use in determining plasticity index, liquid limit, moisture content, organic content, sulfate concentration, soil classification and calculating PVR (Tex-124-E) as it relates to pavement design. Borings shall terminate at the depth recommended in the PVR evaluation below the top of untreated natural subgrade and sampling will be performed with Shelby tubes or a continuous sampler system.

DB Contractor shall develop the scope of testing and the evaluation for analyzing the subgrade and existing pavement structure to supplement the pavement design report. DB Contractor shall use the TxDOT test procedures in Table 8-1 to characterize the subgrade soils or borrow material for pavement design:

Table 8-1: Soil Exploration & Testing

Testing	Properties
Dynamic Cone Penetrometer (DCP) (ASTM D6951)	Subgrade Soil Shear Strength
Soil Classification (Tex-104-106-E, Tex-110-E, Tex-142-E)	Plasticity, Particle Distribution, Percent Binder and Soil Classification
Soil Mineralogy (Tex-145-E, Tex-148-E)	Sulfate Content (ppm) and Percent Organic Content
Soil Treatment Design (Tex-120-E, Tex-121-E, Tex-127-E)	Target Stabilizer Content, Compressive Strength, Max. Dry Density, and Optimum Moisture Content

8.2.2 Geotechnical Investigation for Other Elements

The subsurface investigation shall include, but not be limited to, soil borings, test pits, rock coring and pavement coring. DB Contractor shall determine the specific locations, frequency and depth of test holes in accordance with the guidelines in TxDOT *Geotechnical Manual*. The scope of the subsurface geotechnical investigations shall include field and laboratory testing, research, and analysis that DB Contractor considers necessary to provide a safe and reliable roadway embankment and cut slopes, bridge foundations, noise and sign structures, drainage structures, temporary and permanent retaining walls, excavation support systems, and any other facilities for the Project.

The depth of test hole should be adequate for the anticipated structure foundation type and loading, excavation depths, and scour.

Groundwater monitoring methods and durations should be adequate to determine groundwater levels and their impacts on the design and construction. DB Contractor shall employ field investigation measures that avoid groundwater contamination and shall be responsible for all mitigation and/or restoration associated with the geotechnical investigations.

DB Contractor shall prepare and amend, as needed, its Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analyses, including the following:

(a) The geology of the Project area, including soil and/or rock types, and drainage characteristics.

(b) Descriptions of field investigations and laboratory test results used to characterize subsurface conditions. Boring logs shall be provided including descriptions of the soil/rock, Texas Cone Penetration test results, in-situ test results, and percent recovery and Rock Quality Designation (RQD) for rock cores. TxDOT Log form 513 shall be used as required by TxDOT *Geotechnical Manual*.

(c) Laboratory testing shall include moisture content, plasticity index, gradations for each major soil strata change, levels of shrink/swell potential, soil corrosivity, soil compressibility, compaction characteristics (Proctor tests), resilient modulus tests, short-term and long-term strength tests and properties in accordance with TxDOT and ASTM geotechnical

testing standards. Other field exploration and laboratory testing shall be performed as appropriate.

(d) A discussion of surface and subsurface site conditions and testing results with reference to specific locations on the Project.

(e) Design and construction parameters resulting from the geotechnical investigation and analysis.

(f) Discussions of structure foundation type selection considerations including suitability of subsurface conditions anticipated loads, scour, and construction staging. As required by TxDOT *Geotechnical Manual*, bridge foundations shall consist of either drilled shafts or piling.

(g) Geotechnical analyses for foundations of drainage structures, bridge structures, noise and sign structures, retaining walls, sound walls and embankments. The analyses shall include recommended bearing strata, deep foundation length and evaluations of bearing capacities and predicted settlements.

(h) Slope stability analyses for embankment and excavation, including roadway section, and retaining wall slopes including both short-term (undrained) and long-term (drained) conditions, and discussion of design measures undertaken to ensure stability and safety of all slopes. The design minimum factor of safety required for global stability of all slopes and retaining walls shall be in accordance with the TxDOT *Geotechnical Manual*. The analysis shall consider the potential for long-term surficial slide failures common to high plasticity clays in Texas, and specific recommendations shall be provided to minimize their occurrence.

(i) Evaluation of applicable retaining wall types including design and constructability considerations. Both temporary and permanent retaining walls shall be evaluated. Analyses should be performed to evaluate the stability of the walls, and to ensure that the minimum factors of safety required by TxDOT *Geotechnical Manual* have been achieved.

(j) Quantitative settlement analyses are intended to predict the post-construction settlements at the finished ground surface. These analyses shall consider both total and differential settlements. Quantitative settlement analyses shall consider the compressibility of the proposed fill and the underlying soil and rock and their potential for settlement due to the weight of the fill and the weight of proposed structures. These evaluations shall consider but not be limited to primary consolidation, secondary compression, hydro-compression, and expansion. Settlement analyses shall be performed for all approach embankments to grade separation and other bridge structures. Where necessary, embankment foundations shall be treated to provide a maximum differential settlement of 1” between the approach embankment and the bridge.

(k) Recommendations for instrumentation and monitoring of settlement, stability, vibrations, etc. during construction as required to achieve safe and reliable construction staging and to ensure safety of existing facilities and travelling public.

(l) Plan view of field sampling locations (field test locations plan), boring logs and other field data, laboratory test results, calculations, and analyses that support design decisions.

The report shall:

1) Document that adequate investigation, testing, analysis, design, mitigating measures and construction planning are applied to assess and provide for the effects of swell pressures from expansive soil and rock materials on foundations, pipes, and earth retaining structures.

2) Provide design and construction parameters derived from geotechnical investigations for the design of structure foundations, pipes, slopes, embankments, detention ponds and earth retaining structures.

3) Assess the corrosion potential of the soil and rock materials and conditions that will be encountered, and the impacts to planned surface and subsurface facilities.

Each Geotechnical Engineering Report, upon completion and including any later supplements or amendments shall be submitted to TxDOT for review and comment.

DB Contractor shall submit the final Geotechnical Engineering Report, signed and sealed by a Registered Professional Engineer, to TxDOT for approval with the Released for Construction Documents.

8.3 Pavement Materials Requirements

DB Contractor shall incorporate the following requirements into the pavement designs, plans, quality control and quality assurance programs, and the field construction procedures.

8.3.1 Subgrade Material Composition

DB Contractor shall analyze subgrade material composition, and perform necessary construction procedures to address the following subgrade soil limitations.

(a) ***Sulfate Content.*** DB Contractor shall mitigate soluble sulfate induced heave by reducing soluble sulfate concentration to a level under 3000 ppm. DB Contractor shall follow Tex-145-E for measuring sulfate contents. When quantities of soluble sulfates detected are greater than 3000 ppm, DB Contractor shall determine the source of the sulfates and whether there are even greater concentrations in the general proximity or that would be created when materials are pulverized in and surrounding the sampled location. DB Contractor shall use the TxDOT *Guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures* and TxDOT Standard Specification Items 260, 265 and 275 for testing and detection and integrate these procedures with construction practices.

(b) ***Organic Content.*** DB Contractor shall evaluate subgrade soils for organic content using Tex-148-E provided in the RID and in accordance with general guidelines given in Chapter 3, Section 2 (Geotechnical Investigation for Pavement Structures) of the TxDOT *Pavement Manual*, considering soil variability within the Project limits. If the organic content of the soils are greater than 1%, DB Contractor will determine the appropriate type and quantity of additives to compensate for these organic levels to obtain minimum subgrade stabilization requirements. As a minimum, stabilizer contents shall meet the requirements of Tex-121-E, Part III.

8.3.2 Select Fill Material

If select fill is used by DB Contractor to mitigate non-compliant PVR, then DB Contractor shall furnish select fill material meeting the requirements shown below in Table 8-2.

Table 8-2: Select Fill Material Requirements

		(Percent Retained-Sieve)					LL Max	PI	PI
TxDOT Standard Specification	Description	1 3/4"	7/8"	3/8"	#4	#40		Max	Min
Item 132	Embankment (Density Control)(TY C – Select Fill)	0-10	-	-	45-75	60-85	45	20	6

8.3.3 Treated Subgrade

For lime stabilization, DB Contractor shall meet the requirements of Part I of Tex-121-E. For cement stabilization, DB Contractor shall meet the requirements of Part I of Tex-120-E. For lime-fly ash stabilization, DB Contractor shall meet the requirements of Tex-127-E. If subgrade stabilization does not conform to these requirements, then the treated subgrade shall not be included in the pavement design calculations for the structural layer of flexible pavement design. DB Contractor shall use the TxDOT *Guidelines for Modification and Stabilization of Soils and Base for Use in Pavement Structure*.

When swelling soils are present, DB Contractor shall provide means of stabilizing the moisture conditions in the pavement structure by extending the treated subgrade to the face of embankment.

8.3.4 Treated Base

Treated base may either be modified with cement, lime, lime-fly ash, or asphaltic binders. Base materials to be treated shall meet the specifications for the type and grade specified in accordance with TxDOT Standard Specification Item 247. TxDOT Standard Specification Item 247 requirements may be waived for cement if the wet/dry strengths meet the strength requirements in Table 8-3. For other stabilizers, DB Contractor shall meet the requirements set forth in the applicable TxDOT Standard Specification.

When cement is used to treat the base materials, DB Contractor shall determine the target cement content meeting the minimum and maximum unconfined compressive strength (UCS) and 24-hour submerged strength requirements shown in Table 8-3 and in accordance with Tex-120-E.

Table 8-3: Minimum and Maximum Strength Values to be Achieved when using Cement for Stabilization, by Pavement Type

Pavement Type	Minimum 24-hour submerged strength (psi)	Minimum 7-day UCS (psi)	Maximum 7-day UCS (psi)
Flexible Pavement	240	300	500
Rigid Pavement	400	500	750

When lime is used to treat the base materials, DB Contractor shall determine the required lime content using Tex-121-E.

When lime-fly ash is used to treat the base materials, DB Contractor shall determine the required lime-fly ash content using Tex-127-E.

When asphalt is used to treat the base materials, DB Contractor shall determine the required asphalt content using an approved TxDOT Standard Specification.

When swelling soils are present, DB Contractor shall provide means of stabilizing the moisture conditions in the pavement structure by extending the treated base and subbase for at least three feet outside the edge of pavement.

For rigid pavements, the treated base shall extend a minimum two feet outside the edge of pavement to provide a stable area for the paving equipment.

8.3.5 Tack Coat

For flexible pavements, DB Contractor shall place a non-tracking tack coat using an approved TxDOT Standard Specification directly beneath the final surface course in accordance to the applicable specification for the final surface. No tack will be required if HMACP is on a freshly laid seal coat free of objectionable material such as moisture, dirt, sand, organic material, and other loose impediments as determined by the IQF.

8.3.6 Surface Mix Type

Where flexible pavement structures are used, the surface mix shall be an asphalt mixture which shall meet the performance, aggregate, and binder requirements for a Stone Matrix Asphalt (SMA), Permeable Friction Course (PFC), or Thin Overlay Mixture (TOM) mixture (TxDOT Standard Specification Items 342, 346, or 347) in terms of rutting as measured in the Hamburg Wheel Test (Tex-242-F after 20,000 passes), stripping as measured in the boil test (Tex-530-C), and cracking as measured in the Overlay Test (Tex-248-F after 200 cycles). DB Contractor shall obtain surface mix material from a vendor listed at http://www.txdot.gov/business/resources/producer-list.html.

The binder selection for the surface course shall be used in all asphalt mixtures in the top four inches (minimum) of the pavement structure.

8.3.1 Final Surface

Level up shall not be considered part of the final surface course thickness.

If TOM (Item 347) is used, DB Contractor shall construct the final surface course while the surface temperature is at or above 70°F (regardless of the use of a thermal imaging system).

8.4 Design

8.4.1 New Pavement

8.4.1.1 Design Traffic Considerations

Corridor traffic data is provided in the RIDs. The corridor traffic data shall be deemed a minimum acceptable traffic volume and composition to be used by DB Contractor for the purpose of pavement design for the main lanes. DB Contractor is responsible for determining appropriate traffic to be used as a minimum for the design of cross street and access roadway

and driveway pavements. DB Contractor shall not be entitled to rely on the corridor traffic data in the RIDs for the purpose of meeting the Performance Requirements of these Technical Provisions or the CMA. The final pavement design shall be a DB Contractor risk regardless of whether the actual traffic volume and composition exceeds that identified in the RID.

8.4.1.2 Subgrade Considerations

DB Contractor shall be responsible for determining the design value for subgrade using testing as desired, only after they inform TxDOT of the method prior to commencement of construction.

The IQF shall ensure the final design subgrade modulus during construction using acceptance methods in Section 8.5.

8.4.1.3 Pavement Type Requirement

The following requirements shall be incorporated into the final pavement design:

8.4.1.3.1 Main Lanes

Continuously Reinforced Concrete Pavement (CRCP) shall be used for the main lane pavement in Segments 1 and 2. The main lanes for Segments 1 and 2 shall be a minimum thickness of ten inches.

Pavement for SH 105 shall be constructed at a minimum to match the existing pavement structure.

8.4.1.3.2 Access Roads

Access road pavements shall meet the Performance Requirements in these Technical Provisions or CMA.

Access road pavements shall be constructed with a minimum of two surface course treatment over six inches of flexible base and eight inches of treated subgrade. For flexible pavement designs, TxDOT form 2088 will be required when determining the minimum Surface Aggregate Classification of the final surface.

8.4.1.3.3 Ramps

Ramp pavements shall be constructed with the same section (materials and depths) as the adjacent main lane pavement.

8.4.1.3.4 Cross Streets

Cross street pavements shall meet the Performance Requirements in these Technical Provisions or CMA.

Pavements for FM 149, FM 1488, FM 1486, and FM 1774 shall be constructed at a minimum to match the existing pavement structures.

Other cross street pavements shall be constructed with a minimum of two surface course treatment over six inches of flexible base and eight inches of treated subgrade.

Cross street pavement transitions shall be constructed from the proposed section to the existing section within the Maintenance Limits.

For flexible pavement designs, TxDOT form 2088 will be required when determining the minimum Surface Aggregate Classification of the final surface.

8.4.1.3.5 Toll Zones

Toll Zone(s) lanes shall be epoxy-coated CRCP as shown in Attachment 21-3.

8.4.1.3.6 Shoulders

Pavement for the shoulders of all roadways shall be the same section (materials and depths) as the adjacent roadway pavement.

8.4.1.3.7 Access Driveways

Access driveway pavements shall be constructed with a minimum of two surface course treatment over six inches of flexible base and eight inches of treated subgrade. For flexible pavement designs, TxDOT form 2088 will be required when determining the minimum Surface Aggregate Classification of the final surface.

8.4.1.4 Required Pavement Design Reports

The pavement designs developed by DB Contractor shall be signed and sealed by a Registered Professional Engineer.

Each preliminary Pavement Design Report, upon completion and including any later supplements or amendments, shall be submitted to TxDOT for review and comment.

DB Contractor shall submit the final Pavement Design Report to TxDOT for approval with the Released for Construction Documents.

In addition to those requirements in the TxDOT *Pavement Manual*, pavement design report(s) shall document the assumptions, considerations, and decisions contributing to DB Contractor's pavement designs, including the following:

(a) Basic life-cycle cost considerations as described in Chapter 2, Section 5 of the TxDOT *Pavement Manual*. Use a LCCA tool that allows for input of essential cost items; as a minimum consider future maintenance, resurfacing, reconstruction and other rehabilitation measures, describing what these activities are likely to entail. Do not include user costs.

DB Contractor shall include the proposed permanent, detour (temporary), transition pavement (from concrete to flexible) and rehabilitated pavement designs for the Project in its Final Plans and shall indicate the applicable roadway and station limits for each pavement design. DB Contractor shall provide a tabulation of the design subgrade and other layer moduli, FWD data, or other basis for the pavement thickness designs, and include station limits.

8.4.1.5 Flexible Pavement Design Requirements

DB Contractor shall use FPS 21 software as the sole design methodology for flexible pavements. DB Contractor shall check all pavement thickness designs using the Modified Texas Triaxial design method, and other analyses methods necessary to prevent premature failure from subgrade rutting and fatigue. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 5, except as noted below.

8.4.1.5.1 Minimum Layer Thickness

Minimum layer thickness for all unbound materials used in flexible pavement designs shall be 6.0 inches.

8.4.1.5.2 Pavement Analysis Period (Design Life)

DB Contractor shall use 30 years for all pavement types.

8.4.1.5.3 Minimum Time to 1st Overlay

DB Contractor shall use 15 years for main lane design, 12 years for all others.

8.4.1.5.4 Reliability Level

DB Contractor shall use Level 'C' (95%) for all pavement designs.

8.4.1.5.5 Design Moduli

Design moduli shall not exceed the maximum values in Table 8-4, as established from methods and criteria stated below, and in accordance with layer thickness specified in Table 8-4.

Table 8-4: Design Structural Values for HMA Asphalt Pavements

Material Type	TxDOT Standard Specification(s)	Modulus for TxDOT FPS 21
Dense-Graded Hot Mix Asphalt	Item 341 (for permanent pavement)	Combined HMA thickness: ≤ 4.0" use 500 ksi > 4.0" use 650 ksi
Permeable Friction Course (PFC)	Item 342	300 ksi
Superpave Mixtures	Item 344	Combined HMA thickness: ≤ 4.0" use 650 ksi 4.0"< T ≤ 6.0" use 750 ksi > 6.0" use 850 ksi
Stone-Matrix Asphalt	Item 346	Same as Item 344
Thin Overlay Mixtures (TOM)	Item 347	Same as Item 344 (maximum thickness of 1.0")
Thin Bonded Wearing Course	Item 348	Same as Item 344
Flexible Base (Unbound Base)	Item 247, Grades 1-2 or 5	*75 ksi (no more than 4X the untreated subgrade modulus)
Treated Base	Item 275	*150 ksi.
	Item 276	*200 ksi.
	Foam or Emulsion	*150 ksi
	Item 292	*300 ksi.
Treated Subgrade or Subbase	Item 260	*35 ksi**
	Item 275	*35 ksi**

* Maximum design values.

**Minimum modulus value for perpetual pavement design must be 35 ksi

8.4.1.6 Rigid Pavement Design Requirements

DB Contractor shall use the design procedures outlined in the TxDOT *Pavement Manual* as the design methodology for all rigid pavement design. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 8, and the applicable current TxDOT Standard Specifications for joint and reinforcement design. DB Contractor shall select one of the two base layer combinations in the TxDOT *Pavement Manual*, Chapter 8.

A treated subgrade layer shall be used under all rigid pavement sections. This treated subgrade layer shall have a minimum thickness of six inches. While this treated subgrade layer does not contribute to the structural calculations for rigid pavement, the requirements for the applicable test procedure shall be met depending on the type of chemical additive treatment used, i.e. lime, cement or lime-fly ash.

8.4.1.6.1 TxCRCP-ME Design Input Values

DB Contractor shall use 30 years for the pavement analysis period (Design Life) for all rigid pavement types and locations.

DB Contractor shall use 570 psi for the 28-day modulus of rupture for concrete.

The maximum modulus of base layer shall be 500 psi/inch for cement treated base and 400 psi/inch for asphalt treated base or hot mix asphalt.

8.4.2 Rehabilitation and Widening

In many instances, DB Contractor may consider that sections of the existing roadway are structurally adequate and propose that they, in existing or modified form, become part of the new pavement cross-section. Structural improvements may or may not be required and/or the roadway is widened. This section provides guidelines on determining the structural capacity of existing facilities and the requirements for generating pavement designs which incorporate existing structures.

8.4.2.1 Pavement Rehabilitation Requirements

DB Contractor shall follow these sections of the TxDOT *Pavement Manual*:

Ch. 3 Sec 2	Geotechnical Investigations for Pavement structures
Ch. 4 Sec 4	Non-Destructive Evaluation of Pavement Structural Properties
Ch. 7	Flexible Pavement Rehabilitation
Ch. 10	Rigid Pavement Rehabilitation

For segments which will remain in place, DB Contractor shall submit a pavement design report describing all analyses, data, policies, and other considerations used to design the structural aspects of the proposed pavement. The pavement rehabilitation designs developed by DB Contractor shall be part of the pavement design report and include the following:

(a) Narrative discussing the overall objective, site particulars (location, facility type, soil conditions and drainage considerations), current pavement condition surveys conclusions, and recommended pavement structure.

(b) Soils map of the project area with a brief description of each type of soil located within the project area. Provide information pertaining to shrink/swell potential, soil soluble sulfate content and plasticity.

(c) Results of non-destructive testing to characterize the existing structural condition. As a minimum, both an FWD and GPR survey shall be undertaken. The TxDOT MODULUS software summary or back calculation results are required. For existing rigid pavements, a report on the load transfer efficiency of representative joints and cracks. GPR survey results shall be used to show section uniformity and to identify possible subsurface defects, which will be validated by field coring.

(d) Results from field sampling to ensure materials quality and thickness, and adequate samples for any lab testing required to modify existing layers.

(e) Results from lab testing if any in-place stabilization is to be recommended. DB Contractor shall follow the design recommendations and criteria in TxDOT stabilization guidelines and TxDOT specifications (including special specs).

(f) Design input values and output reports.

(i) For flexible pavement rehabilitation, DB Contractor shall use TxDOT FPS-21, Modified Texas Triaxial design check and mechanistic checks for fatigue cracking and rutting.

(ii) For rigid pavement rehabilitation, DB Contractor shall use design procedures outlined in the *TxDOT Pavement Manual*.

(g) Existing and proposed typical sections. For the proposed structure, clearly define the various pavement layers, thickness, and materials with TxDOT Standard Specification Item. Also identify localized weaker areas that will need special treatment and/or replacement. For the existing structure, sections should be as detailed as possible. Proposed or existing positive drainage systems should be indicated on the typical sections.

(h) Structural strength validation plan. For roadway which incorporates existing roadway materials, the design report shall include a construction validation plan to demonstrate that the completed roadway has adequate capacity to carry the proposed design traffic.

(i) A concise summary of recommended pavement rehabilitation designs based on the data, analyses, and procedures.

(j) Appendices. Additional appendices (results of borings, material lab tests, raw PMIS data, life-cycle cost analysis, drainage analysis, DCP data, design exceptional approvals, etc.), as needed.

8.4.2.2 Use of Shoulders to Carry Construction Traffic

DB Contractor shall perform a structural evaluation of all shoulders proposed to carry main lane traffic during construction. DB Contractor shall use the non-destructive testing and field sampling described above for this structural evaluation. The pavement design report shall include the results of a shoulder evaluation.

8.4.2.3 Pavement Widenings

For widening of existing pavement sections, DB Contractor shall provide documentation of criteria and rationale for the construction approaches selected to widen sections. DB Contractor shall comply with the TxDOT *Pavement Manual*, historical performance, and TxDOT District guidelines when designing the widened sections and selecting construction approaches. If DB Contractor's pavement design of the widened section does not match the existing section, DB Contractor shall submit an analysis to address concerns about blocking subsurface moisture flow and to minimize the risk of failure of the construction joint between the different pavement structures.

For widened section areas that will be used as a travel lane, DB Contractor shall develop a full pavement design report for that lane following the guidelines given in the pavement design section. In that report, DB Contractor shall also provide a structural evaluation of the existing travel lanes and existing shoulders to ensure they are adequate to carry the design traffic loads.

Longitudinal construction joints along the existing and new pavement sections shall be placed within six inches from the final in-service lane stripe or the center of the lane. Geotextiles or stress absorbing membrane interlayer (SAMI) may be placed over the widening joint to delay reflective cracking prior to performing asphalt overlays only.

For all widened sections, the interface between the new widened pavement and the existing pavement shall provide a uniform surface of the same material type across all adjacent lanes. In areas where an existing asphalt surface is in place and widening is required, a new surface course overlay will be required over the existing and widened pavements, with the surface HMA longitudinal joint offset from the underlying layers' longitudinal joint by at least 6".

8.5 Construction Quality Acceptance

The construction acceptance tasks described below shall be part of the IQF quality acceptance efforts.

When performing construction activities under or adjacent to existing structures or utilities, DB Contractor shall limit vertical settlements and ground deformations so as to not damage structures, including foundation elements, and/or utilities.

For those occurrences involving third party structures and Utilities, DB Contractor shall coordinate excavation activities with Sections 5 and 6. For those occurrences involving TxDOT's structures and Utilities, DB Contractor shall coordinate excavation activities with TxDOT.

All testing required in TxDOT Specifications and Guide Schedule shall be conducted for each pavement layer except where superseded by these Technical Provisions. DB Contractor shall also ensure that the design assumptions are met as a minimum by the testing requirements described in this section.

8.5.1 Field Design Subgrade Modulus

The IQF shall ensure that the design subgrade modulus is being achieved in the field, by performing the following field testing, which will establish criteria for acceptance of subgrade construction. The IQF shall perform all field tests no later than 48 hours after compaction is complete except on treated soil layers as described below.

8.5.1.1 100% Coverage Testing

The following two options are permitted for coverage testing either the compacted subgrade or the treated subgrade layer. For untreated subgrade, the testing shall be completed within 24 hours of the completion of compaction. On treated soil layers, the IQF shall complete testing after a minimum of three days following completion of compaction.

Option 1 Proof Rolling: IQF shall follow the requirements of TxDOT Standard Specification Item 216. All areas which are judged to be unstable or that rut more than 0.5 inch shall be considered as failures and require corrective action.

Option 2 Intelligent Compaction (IC): The IQF shall develop a color-coded "proof-mapping" chart in accordance with criteria listed in Table 1 from TxDOT Special Specification 2304 provided in the RID. Red-mapped areas constituting locations not achieving at least 25% of the Intelligent Compaction Measured Value (ICMV) shall be further evaluated by the IQF with the DCP to determine depth of weak material for corrective action.

8.5.1.2 Point Specific Testing

When using proof rolling, one DCP test will be conducted for every 250-foot section of roadbed to estimate M_R. The IQF will use ASTM D 3665 to select one random location for each 250-ft section.

When using proof-mapping IC data of the compacted layer, only those locations classified as "red-mapped" shall be subject to DCP testing at a maximum of 250-foot intervals in the center of the "red-mapped" location or as directed by TxDOT. Non-"red-mapped" locations shall be tested every 1000 feet in the center of the travel lane.

The IQF shall perform a DCP test for acceptance using ASTM D 6951. All locations must be within the future drive lane and greater than 1 foot from the future edge stripe.

The process for the IQF shall be as follows:

(a) Perform a DCP test to a depth of 3 feet. If a test location meets with refusal, then select an alternate location within 2 to 5 feet to begin a new test. Refusal is defined as slow or no penetration progress where the penetration rate is below 1 inch in a 10-blow set anywhere within the top 1 foot of subgrade material. If refusal is met after penetrating at least 1 foot, then the results to the depth of refusal shall be used.

(b) Convert the DCP data for each test to an estimated M_R for each 6 inch interval of penetration using the equations given in the TxDOT *Pavement Manual*.

(c) Compare M_R for each 6 inch interval of penetration in the section to the design value.

(d) If M_R for each 6 inch interval of penetration in the section meets or exceeds design value, then review proof rolling. If proof rolling passes, then accept section.

(e) If no estimated M_R result for any 6 inch interval of penetration is below 50% of the design value, take the average of results for all 6 inch intervals and compare to design value. If the average M_R for all intervals is computed to be higher than the design value, then accept the section provided proof rolling passes. If the computed average is less than the design value, perform two additional DCP tests (one on either side) 10 feet longitudinally from the original test

to determine the extent of the weak area. Continue testing at additional 10 foot increments until results no longer show weakness. DB Contractor shall determine a course of action to correct the weak areas. The IQF shall reevaluate following DB Contractor's corrective action.

(f) If M_R for any 6 inch interval of penetration in the section is below 50% of design value, take two additional DCP tests (one on either side) 10 feet longitudinally from the original test to determine the extent of the weak area. Continue testing at additional 10 foot increments until results no longer show weakness. DB Contractor shall propose options to address these failed areas. The IQF shall reevaluate following DB Contractor's corrective action.

If corrective action is required, DB Contractor shall develop options for consideration. These could include:

1) Calcium-based treatment;

2) Reworking failing areas;

3) Excavating existing subgrade and replacing with material meeting requirements in Section 8.3, to a depth that meets requirements; or

4) Other options as recommended by DB Contractor with TxDOT approval.

Additional pavement thickness shall not be considered corrective action.

8.5.2 Smoothness Specification

Smoothness of the pavement constructed shall conform to the requirements of TxDOT Standard Specification Item 585, Ride Quality for Pavement Surfaces, amended as cited below:

Article 585.3.4. Acceptance Plan and Pay Adjustments. The entire section is voided and replaced by the following:

Only Surface Test Type B permitted; corrective action acceptable to TxDOT is required, at DB Contractor's sole expense, for any 0.1-mile section that measures an average IRI in excess of 75 inches per mile for rigid pavements, in excess of 65 inches per mile for flexible pavements, or for correction of local roughness. After making corrections, re-profile the pavement section to ensure that corrections have achieved the required level of smoothness.

For asphalt concrete pavements, DB Contractor shall fog seal the aggregate exposed from diamond grinding.

Article 585.4 Measurement and Payment. The entire section is voided.

8.6 Uniformity of Support for all Pavement Designs

For both rigid and flexible pavements, DB Contractor shall collect Falling Weight Deflectometer (FWD) data for information about both the adequacy and uniformity of support and shall provide this data to TxDOT.

For rigid pavements, FWD testing shall be conducted on top of the asphalt base, asphalt bond breaker, or cement stabilized base layer prior to placement of any concrete. For flexible pavements, FWD testing shall be conducted on top of the base layer prior to placement of any hot mix asphalt. For stabilized bases, DB Contractor shall allow a minimum of three days following final compaction before testing. Testing shall be conducted at 100-foot intervals in

each travel lane. The FWD should conform to TxDOT standards as described in the Pavement Design Manual (seven sensors at 1-foot spacing). The test load should be as close as possible to 9000 pounds and the surface temperatrure and the age of the base at the time of testing should be recorded.

The methodology for performing FWD testing and gathering data are provided in the TxDOT document "FWD testing requirements for Design Build Projects" provided in the RID.

8.7 Submittals

Submittals described in Section 8 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 8-5. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 8-5: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 8			
Traffic control plans associated with subsurface pavement investigations	Prior to performing any investigations	In accordance with Section 18	8.2.1
Preliminary Geotechnical Engineering Reports	10 Business Days prior to commencement of applicable Design Work	Review and comment	8.2.1 and 8.2.2
Final Geotechnical Engineering Report	10 Business Days prior to commencement of applicable Construction Work	Approval	8.2.1 and 8.2.2
Preliminary Pavement Design Reports	10 Business Days prior to commencement of applicable Design Work	Review and Comment	8.4.1.4
Final Pavement Design Report	10 Business Days prior to commencement of applicable Construction Work	Approval	8.4.1.4
FWD data	As part of the daily QC inspection and test reports described Section 2.2.7.1 and upon request	For Information	8.6

SECTION 9.0 LAND SURVEYING

9.1 General Requirements

DB Contractor shall provide accurate and consistent land surveying and mapping necessary to support ROW acquisition, design, and construction of the Project.

DB Contractor shall review existing survey data and determine the requirements for updating or extending the existing survey and mapping data. DB Contractor is responsible for the final precision, accuracy, and comprehensiveness of all survey and mapping.

All hardcopy and electronic files delivered to TxDOT shall be provided as two separate copies delivered, one each, to TxDOT's Bryan and Houston District offices.

9.2 Administrative Requirements

9.2.1 Standards

DB Contractor shall ensure that all surveying conforms to the TxDOT *Survey Manual,* the *General Rules of Procedures and Practices* of the TBPLS, and the TxDOT *Surveying Template Exhibit C* provided in the RIDs. DB Contractor shall ensure that any person in charge of a survey field party is proficient in the technical aspects of surveying.

9.2.2 Right of Entry

DB Contractor shall secure written permission prior to entering any private property outside the Project ROW. It shall be DB Contractors' sole responsibility to negotiate this permission and DB Contractor shall be responsible for any and all damages and claims resulting from that ingress. Proper documentation of right-of-entry shall be maintained at all times by DB Contractor.

9.2.3 Survey by TxDOT

In performing surveys for other adjoining projects, TxDOT may need to verify and check DB Contractor's survey work. DB Contractor shall coordinate with the Contractor of the adjoining project regarding planned construction activities. DB Contractor shall notify TxDOT within two Business Days if TxDOT stakes and marks are altered or disturbed.

9.3 Design Requirements

9.3.1 Units

All survey Work shall be performed in the U.S customary units system of measurement. Work shall conform to state plane coordinates, surface coordinates. DB Contractor shall be responsible for establishing the surface adjustment factor(s) as appropriate for the Project.

$$\frac{\text{Surface Coordinates}}{\text{Adjustment Factor}} = \text{Grid Coordinates}$$

9.3.2 Survey Control Requirements

DB Contractor shall base all additional horizontal and vertical control on the Level 2 and Level 3 control provided by TxDOT. DB Contractor shall be responsible for tying into TxDOT Continuous Operating Reference Stations (CORS) vertical control and local monumentation. TxDOT CORS points to be tied into include Hempstead TXHE, Giddings TXGD, Bryan TXBN, Huntsville TXHN and Conroe TXCN.

DB Contractor shall establish and maintain additional survey control, as needed, and Project ROW monumentation throughout the duration of the Project. DB Contractor shall tie any additional horizontal and vertical control for the Project to the TxDOT-supplied Primary (Level 2) or Secondary (Level 3) control network. If DB Contractor chooses to use GPS methods, DB Contractor shall meet the accuracy of the appropriate level of survey as defined in the TxDOT *GPS User's Manual* and shall utilize the primary survey control provided by TxDOT.

All survey control points shall be set and/or verified by a RPLS licensed in the State of Texas.

DB Contractor shall establish and maintain a permanent survey control network. The control network should consist of, at a minimum, monuments set in intervisible pairs at spacing of no greater than three miles.

Monuments shall be TxDOT bronze survey markers installed in concrete and marked as directed by the TxDOT *Survey Manual*. DB Contractor shall replace all existing survey monuments and control points disturbed or destroyed. DB Contractor shall make all survey computations and observations necessary to establish the exact position of all other control points based on the primary control provided.

DB Contractor shall deliver to TxDOT a listing of all primary and secondary control coordinate values, original computations, survey notes, and other records, including GPS observations and analysis made by DB Contractor as the data are available.

9.3.3 Conventional Method (Horizontal & Vertical)

If DB Contractor chooses to use conventional methods to establish additional horizontal control, DB Contractor shall meet the accuracy of the appropriate level of survey as defined in the following tables.

9.3.3.1 Horizontal Accuracy Requirements for Conventional Surveys

Horizontal control is to be established (at a minimum) on the Texas State Plane Coordinate System, Central Zone (4203), NAD83 (2011) Epoch 2010 and according to the appropriate level of survey as defined below in Table 9-1.

Table 9-1: Level of Survey for Horizontal Control

	TSPS First Order	TSPS Second Order	Remarks and Formulae
Error of Closure	1: 50,000	1:20,000	Loop or between monuments
Allowable Angular Closure	± 3" $\sqrt{N}$	± 8" $\sqrt{N}$	*N*= number of angles in traverse
Accuracy of Bearing in Relation to Course *	± 04"	± 10"	Maximum for any course
Linear Distance Accuracy (Minimum Length of Line)	1: 50,000 (2,500 feet)	1: 20,000 (1,000 feet)	
Positional Tolerance of Any Monument	*AC*/50,000	*AC*/20,000	*AC* = length of any course in traverse
Adjusted Mathematical Closure of Survey (No Less Than)	1:200,000	1:200,000	

Notes: TxDOT policy requires all bearings or angles be based on the following source: Grid bearing of the Texas Coordinate System of 1983, with the proper zone and epoch specified.

9.3.3.2 Vertical Accuracy Requirements for Conventional Surveys

Vertical control shall be established (at a minimum) on the North American Vertical Datum of 1988 (NAVD 1988), (Geoid 12A) and according to the appropriate level of survey as defined below in Table 9-2.

Table 9-2: Level of Survey for Vertical Control

	1st ORDER	2nd ORDER	3rd ORDER	REMARKS AND FORMULAE
Error of Closure	0.013 feet $\sqrt{K}$	0.026 feet $\sqrt{K}$	0.039 feet $\sqrt{K}$	Loop or between control monuments
Maximum Length of Sight	250 feet	300 feet		With good atmospheric conditions
Difference in Foresight and Backsight Distances	±10 feet	±20 feet	±30 feet	Per instrument set up
Total Difference in Foresight and Backsight Distances	±20 feet per second	±50 feet per second	±70 feet per second	Per total section or loop
Recommended Length of Section or Loop	2.0 miles	3.0 miles	4.0 miles	Maximum distance before closing or in loop
Maximum Recommended Distance Between Benchmarks	2000 feet	2500 feet	3000 feet	Permanent or temporary benchmarks set or observed along the route
Level Rod Reading	± 0.001 foot	± 0.001 foot	± 0.001 foot	
Recommended Instruments and Leveling Rods	Automatic or tilting w/ parallel plate micrometer precise rods	Automatic or tilting w/ optical micrometer precise rods	Automatic or quality spirit standard, quality rod	When two or more level rods are used, they should be identically matched
Principal Uses	Broad area control, subsidence or motion studies jig & tool settings	Broad area control, engineering projects basis for subsequent level work	Small area control, drainage studies, some construction and engineering	

9.3.4 Right of Way Surveys

DB Contractor shall base all surveys on the horizontal and vertical control network provided by TxDOT.

9.3.4.1 Accuracy Standards

In performing ROW surveys consisting of boundary locations, DB Contractor shall meet the accuracy standards of the appropriate level of survey as defined below in Table 9-3.

Table 9-3: Chart of Tolerances

	URBAN/RURAL	URBAN BUSINESS DISTRICT	REMARKS AND FORMULAE
Error of Closure	1:10,000	1:15,000	Loop or between Control Monuments
Angular Closure	15" $\sqrt{N}$	10" $\sqrt{N}$	N = Number of Angles in Traverse
Accuracy of Bearing in Relation to Source *	20"	15"	Sin α = denominator in error of closure divided into 1 (approx.)
Linear Distance Accuracy	0.1 foot per 1,000 feet	0.05 foot per 1,000 feet	Sin α x 1000 (approx.) where ± = Accuracy of Bearing
Positional Error of any Monument	AC/10,000	AC/15,000	AC = length of any course in traverse
Adjusted Mathematical Closure of Survey (No Less Than)	1:50,000	1:50,000	

* TxDOT policy requires all bearings or angles be based on the following source: Grid bearing of the Texas Coordinate System of 1983, with the proper zone and epoch specified.

9.3.5 Survey Records and Reports

DB Contractor shall produce a horizontal and vertical control report including coordinate listing, maps showing control, preparation of standard TxDOT data sheets for all primary control, monument description and location description of all primary and secondary survey control points installed, marked and referenced along with a listing of the existing control used to create the installed control points. Control from adjoining, incorporated, or crossed roadway projects, which are currently in design, will be located and a comparison of the horizontal and vertical values will be shown. DB Contractor shall provide survey records and reports to TxDOT upon request.

DB Contractor may use an electronic field book to collect and store raw data. DB Contractor shall preserve original raw data and document any changes or corrections made to field data, such as station name, height of instrument, or target. DB Contractor shall also preserve raw and corrected field data in hardcopy output forms in a similar manner to conventional field book preservation.

Field survey data and sketches that cannot be efficiently recorded in the electronic field book shall be recorded in a field notebook and stored with copies of the electronic data.

All field notes shall be recorded in a permanently bound book. (Loose leaf field notes will not be allowed.) DB Contractor shall deliver copies of any or all field notebooks to TxDOT upon request.

9.4 Construction Requirements

9.4.1 Units

All survey Work shall be performed in the U.S customary units system of measurement. Work shall conform to state plane coordinates, surface coordinates. The surface adjustment factor for the Project is described in Section 9.3.1.

9.4.2 Construction Surveys

DB Contractor shall perform all construction surveys in accordance with the design requirements.

9.5 Submittals

Submittals described in Section 9 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 9-4. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 9-4: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 9			
Survey records as listed in Section 9.3.2	As data becomes available	For Information	9.3.2
A horizontal and vertical control report	Upon request	For Information	9.3.5
Survey records and reports	Upon request	For Information	9.3.5
Copies of all field notebooks	Upon request	For Information	9.3.5
Survey records as listed in Section 9.5.1	Prior to Final Acceptance	Review and Acceptance	9.5.1
All topographic mapping created by DB Contractor	With sufficient time to address comments prior to signing maps	Review and Comment	9.5.2
Updated mapping with any ROW monument information	Upon completion of the ROW acquisition and all Construction Work	For Information	9.5.3
Record Documents	As a condition of Final Acceptance	For Information	9.5.4

9.5.1 Survey Records

DB Contractor shall deliver to TxDOT, for its review and acceptance, a listing of all primary, secondary control coordinate values, original computations, survey notes and other records, including GPS observations and analysis made by DB Contractor.

9.5.2 Project ROW Surveying and Mapping

DB Contractor shall coordinate with TxDOT regarding the assignment of RCSJ numbers for each new mapping project.

The documents produced by DB Contractor, or its Subcontractors, are the property of TxDOT, and release of any such document must be approved by TxDOT. All topographic mapping created by DB Contractor shall be provided to TxDOT in digital terrain model format using the software and version thereof being used by TxDOT at the time the mapping is developed. Two sets of all mapping shall be provided, one each to the TxDOT Houston and Bryan District office surveyors. Mapping shall be provided so as to allow a minimum of 20 days for TxDOT review and comment. DB Contractor shall obtain and address all TxDOT District office comments to TxDOT's satisfaction prior to signing maps.

DB Contractor shall assure assigned parcel numbers avoid duplication of numbers between project map sets.

In preparing the property description, the following will be required:

(a) Scanned copies of the deeds on Computer Disc and a graphics file of the Abstract Map; and

(b) Scanned copies of the field notes, control sketches, and a graphics file of all field survey data.

The Surveyor shall submit the following interim mapping products:

(a) A Preliminary ROW layout to determine if there are any changes to the proposed ROW; and

(b) An initial copy of the ROW map for review purposes.

9.5.3 ROW Monuments

Upon final submittal of the ROW documents to TxDOT, DB Contractor shall set, using permanent and stable monuments as defined in Section 663.17 of the General Rules of Procedures and Practices of the TBPLS, all significant points along all ROW lines of the Project including the following:

(a) Points of curvature;

(b) Points of tangency;

(c) Points of intersection;

(d) Points of compound curvature;

(e) Points of reverse curvature;

(f) All intersecting crossroad ROW lines and all PLIs with the ROW line. These monuments shall be 5/8-inch iron rods, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument); and

(g) All beginning and ending points of Control of Access (denied) lines.

Upon completion of the ROW acquisition and all Construction Work, such that the final ROW lines will not be disturbed by construction, DB Contractor shall replace all rod-and-cap monuments located on the final ROW line at all PCs, PTs, PIs, PCCs, and PRCs, and all intersecting crossroad ROW lines, with TxDOT Type II monuments (constructed according to TxDOT specifications). DB Contractor shall monument with a TxDOT Type II monument all final ROW lines where the distance between such significant ROW line points exceeds 1,500 feet. ROW line intersections with property lines shall remain monumented by a 5/8-inch iron rod with a TxDOT aluminum cap (rod-and-cap monument).

DB Contractor shall purchase all materials, supplies, and other items necessary for proper survey monumentation.

DB Contractor shall submit updated maps with the monumentation information. (This is for final monumentation set, for example, type II, and type of monuments set, etc.) All deed recording information to be added to the map sheets in the ownership blocks on the map sheets.

9.5.4 Record Documents

DB Contractor shall submit the following as part of the Record Documents and as a condition of Final Acceptance:

(a) A listing of all primary and secondary control coordinate values, original computations and other records including GPS observations and analysis made by DB Contractor;

(b) Copies of all survey control network measurements, computations, unadjusted and adjusted coordinate, and evaluation values;

(c) Survey records and survey reports;

(d) Parcels for the ROW maps will be delivered in GPK format;

(e) Electronic files and paper copies of the ROW maps will be delivered to TxDOT; and

(f) The final ROW maps submittal consisting of the Graphics Files and two sets of the paper copy of the ROW maps, exhibits showing the metes and bounds description and parcel plat, signed and sealed by the Surveyor. The required geo-referenced parcel data (features) will be submitted for all existing and revised parcels in ArcGIS 10 format, or the current version in use by the State, and in the format of the TxDOT ROW Geo-Database Template “ROW_Parcels_Edits.”

DB Contractor shall produce reports documenting the location of the as-built alignments, profiles, structure locations, utilities, and survey control monuments. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. DB Contractor’s as-built data shall include the coordinate types (x, y, and/or z) and feature codes in the same format in which the preliminary construction data was generated. Where data has been provided to DB Contractor from TxDOT in an x, y, z only coordinate format, or z only coordinate format, DB Contractor shall provide TxDOT with data in an x, y, z only coordinate format or z only coordinate format.

SECTION 10.0 GRADING

10.1 General Requirements

DB Contractor shall conduct all Work necessary to meet the requirements of grading, including clearing and grubbing, excavation and embankment, removal of existing buildings, concrete slabs, pavement and miscellaneous structures, subgrade preparation and stabilization, dust control, aggregate surfacing, and earth shouldering, in accordance with the requirements of this Section 10 and the latest version of TxDOT Standard Specifications.

DB Contractor shall demolish or abandon in place, all existing structures within the Project ROW, including but not limited to: pavements, bridges, and headwalls that are no longer required for service or are required to be treated as described in Section 4. Any features that are abandoned in place shall be removed to at least 2 feet below the final finished grade or 1 foot below the pavement stabilized subgrade and drainage structures. DB Contractor shall ensure that abandoned structures are structurally sound after abandonment.

10.2 Preparation within Project Limits

DB Contractor shall develop, implement, and maintain, for the Term of the Agreement, a Demolition and Abandonment Plan that considers types and sizes of utilities and structures that will be abandoned during the Term of the Agreement. The plan shall ensure that said structures are structurally sound after the abandonment procedure. The plan shall account for Base Scope, Option 1, and Option 2, and shall be submitted to TxDOT for approval.

TxDOT reserves the right to require DB Contractor, at any time, to salvage and deliver to a location designated by TxDOT within the TxDOT District, in which the portion of the Project is located, any TxDOT-owned equipment and materials in an undamaged condition. TxDOT reserves the right to require DB Contractor to salvage and deliver to a reasonable location, designated by TxDOT, any intelligent transportation system (ITS) equipment and materials in an undamaged condition.

Unless otherwise specified by TxDOT, the material from structures designated for demolition shall be DB Contractor's property. All material removed shall be properly disposed of by DB Contractor outside the limits of the Project.

TxDOT reserves the right to remove buildings to level one finished floor or other appropriate condition on ROW acquired by TxDOT for the Project.

10.2.1 Trees within Project ROW

DB Contractor shall preserve trees within the Project ROW to the greatest extent possible. Horizontal clear zone requirements shall have priority over the preservation of trees within the Project Limits.

10.3 Slopes and Topsoil

DB Contractor shall exercise Good Industry Practice regarding design limitations and roadside safety guidelines associated with the design of slopes along roadways. DB Contractor shall adjust grading to avoid and minimize disturbance to the identified waters of the U.S.

DB Contractor shall perform finished grading and place topsoil to a 4-inch compacted depth in all areas suitable for vegetative slope stabilization (and areas outside the limits of grading that

are disturbed in the course of the Work) that are not paved. DB Contractor shall use only materials and soils next to pavement layers that do not cause water or moisture to accumulate in any layer of the pavement structure.

For designated construction easements and other approved PSLs outside DB Contractor's limits of maintenance, DB Contractor shall provide stable slopes.

For slopes steeper than 4:1, DB Contractor shall submit to TxDOT a slope stability analysis that demonstrates the adequacy of DB Contractor's design. DB Contractor shall submit the slope stability analysis to TxDOT for approval with the Released for Construction Documents.

10.4 Sodding

Block sod shall be placed at all grate inlets, manholes and culvert headwalls.

10.5 Submittals

Submittals described in Section 10 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 10-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 10-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 10			
Demolition and Abandonment Plan	No later than 60 days prior to the scheduled date for NTP2	Approval	10.2
Slope stability analysis	With the Released for Construction Documents	Approval	10.3

SECTION 11.0 ROADWAYS

11.1 General Requirements

The objectives of the Project include the provision of a safe, reliable, cost-effective, and aesthetically-pleasing corridor for the traveling public. The requirements contained in this Section 11 provide the framework for the design and construction of the roadways to help attain the Project objectives.

DB Contractor shall coordinate roadway design, construction, and maintenance with other Elements of the Project to achieve the objectives of the Project.

Where changes to the roadway geometrics result in revisions to the Project ROW, DB Contractor is responsible for demonstrating the proposed change is an equally safe alternative, as well as the initiation and progression of all environmental and public involvement processes in coordination with TxDOT. DB Contractor shall perform all ROW services that are necessitated by proposed changes in accordance with the Contract Documents.

11.2 Design Requirements

DB Contractor shall coordinate its roadway design with the design of all other components of the Project, including aesthetics. The Project roadways shall be designed to integrate with streets and roadways that are adjacent or connecting to the Project. All design transitions to existing facilities shall be in accordance with the TxDOT *Roadway Design Manual*.

The Project roadways shall be designed to incorporate roadway appurtenances, including fences, noise attenuators, barriers, and hazard protection as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

That portion of the Project in Montgomery County shall comply with TxDOT Houston District requirements, and that portion in Grimes County shall comply with TxDOT Bryan District requirements.

11.2.1 Control of Access

Unless shown to be removed in the Preliminary Schematic Design, DB Contractor shall maintain all existing property accesses, including those not shown on the Preliminary Schematic Design, and shall not revise control of access without TxDOT review and the written agreement of the affected property owner.

11.2.2 Roadway Design Requirements

DB Contractor shall design the Elements of the Project to meet or exceed the geometric design criteria shown in Table 11-1, with the exclusion of the roadway design deviations listed in Section 11.2.2.2, in order to meet the Project objectives stated in Section 11.1.

Table 11-1: Roadway Design Criteria

	Main Lanes		Ramps	Access Roads	Cross Streets	Access Driveways	Direct Connectors
	SH 249	SH 105					
Functional Classification	Rural arterial	Rural arterial	Rural arterial	Rural local	See Attachment 11-1	Rural local	-
Design Speed	70 mph	55 mph	50 mph	50 mph	See Attachment 11-1	25 mph (See note 7)	50 mph

	Main Lanes		Ramps	Access Roads	Cross Streets	Access Driveways	Direct Connectors
	SH 249	SH 105					
Horizontal Alignment Criteria:							
Maximum Curvature (Min Radius)	3390 ft	1635 ft	1050 ft	1050 ft	(See note 3)	198 ft (See note 7)	845 ft (min)
Superelevation – e(max)	6%		6%	6%	-	-	6%
Maximum Curvature (Min Radius) without Superelevation	14,100 ft	9410 ft	7870 ft	7870 ft	-	-	7870 ft
Vertical Alignment Criteria:							
Maximum Gradient	3.0%	4.0%	6.0%	6.0%	7% (Design speed <50 mph) 6% (Design speed ≥50 mph)	6.0%	6.0%
Minimum Gradient (See note 1)	0.35%		0.35%	0.35%	0.35%	0.35%	0.35%
Crest (min K-Value)	247	114	84	84	(See note 4)	3	84
Sag (min K-Value)	181	115	96	96	(See note 4)	10	96
Maximum Algebraic Difference w/o Vertical Curve	0.5%		0.5%	0.5%	0.5%	1%	0.5%
Min Vertical Clearance – Roadway	18.5 ft		18.5 ft	16.5 ft	16.5 ft	16.5 ft	-
Min Vertical Clearance – Railroad	23'-4"		23'-4"	23'-4"	23'-4"	23'-4"	23'-4"
Cross Section Criteria:							
Lane Widths	12 ft		14 ft 1-lane/ 12 ft 2-lane	11 ft	12 ft	12 ft	14 ft
U-turn width	-	25 ft min	-	25 ft min	-	-	-
U-turn Design Speed	-	15 mph	-	15 mph	-	-	-
U-turn Radii	-	66 ft min	-	66 ft min	-	-	-
Inside Shoulder Widths	4 ft (See note 2)		4 ft 1-lane/ 2 ft 2-lane	2 ft (uncurbed)	See Attachment 11-2	2 ft (uncurbed)	4 ft (See note 5)
Outside Shoulder Widths	10 ft		6 ft 1-lane/ 8 ft 2-lane	2 ft (uncurbed)	See Attachment 11-2	2 ft (uncurbed)	8 ft (See note 5)
Pavement Cross Slope	0.02 ft/ft		0.02 ft/ft	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft
Side Slopes Within Clear Zone	6:1		6:1	6:1	6:1	6:1	6:1
Side Slopes Outside of Clear Zone	6:1 usual 4:1 max		6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max	6:1 usual 4:1 max
Gore Width – Entrance	-		6 ft	-	-	-	6 ft (See note 6)
Gore Width – Exit	-		10 ft	-	-	-	6 ft (See note 6)
Curb Offset	-		-	-	See Attachment 11-2	-	-
Clear Zone Width	30 ft	16 ft	16 ft	30 ft (uncurbed)	See Attachment 11-1	10 ft	16 ft

	Main Lanes		Ramps	Access Roads	Cross Streets	Access Driveways	Direct Connectors
	SH 249	SH 105					
Intersection Horizontal and Vertical Criteria:							
Corner Radii	-	50 ft min	-	50 ft min	50 ft min	25 ft min	-
Design Vehicle (Intersections)	-	WB-67	-	WB-67	See Attachment 11-1	SU	-
Preferred Corner Geometry	-	Simple Curve	-	Simple Curve	Simple Curve	Simple Curve	-

Notes:

1 0.35% required in urban sections utilizing curb or traffic barrier.
2 For sections with two lanes in the same direction (i.e. Super 2 configuration has two outside shoulders).
3 For design speeds <45 mph, maximum curvature shall be in accordance with the TxDOT RDM, Table 2-6. For design speeds ≥45 mph, maximum curvature shall meet the "Usual Minimum" per the TxDOT RDM, Table 2-3, where emax=6%.
4 Crest and sag values shall be in accordance with TxDOT RDM Figures 2-5 and 2-6 for the applicable design speeds found in Attachment 11-1.
5 Inside shoulder may be 8' and outside shoulder 4' on northbound to westbound travel lane.
6 Applies to the entrances and exits on SH 105.
7 Access Driveway restoring access to properties off FM 149 Design speed is 15mph, with a minimum radius of 50 ft.

DB Contractor shall coordinate, design, and construct the improvements on cross streets in accordance with the Governmental Entity having jurisdiction of said roadway. The cross streets shall incorporate the design criteria in Attachment 11-1 and shall provide for the future typical section, including u-turns as defined in Attachment 11-1 and displayed in Attachment 11-2.

11.2.2.1 Superelevation

In areas where proposed ramps are to connect to existing pavement, DB Contractor's design may retain existing superelevation. Pavement widening may be constructed by extending the existing pavement cross slope. Superelevation transitions shall be designed and constructed such that zero percent cross-slopes will not occur on grades flatter than 0.10 percent.

DB Contractor may maintain the existing pavement normal crown in overlay sections so long as it shall not be flatter than 1.5 percent. At normal crowns, DB Contractor shall construct pavement widening adjacent to existing pavement on a 2 percent cross slope. The transition from existing cross slope to 2 percent shall occur within 1-foot of the closest lane line to the roadway widening.

11.2.2.2 Roadway Design Deviations

The TxDOT-approved roadway design deviations are provided in Table 11-2:

Table 11-2: Main Lane Minimum Radius of Curvature Deviations

Curve #	PC STA.	PT STA.	Radius (ft.)
T2[1]	1232+37.33	1239+48.61	2,888.79
2	1234+15.31	1258+76.46	2,864.79
3	1273+65.19	1292+99.84	2,864.79
4	1297+72.43	1310+81.95	2,864.79
7[2]	1553+32.69	1591+92.19	2,864.79

Notes:

1 Applies to the transition from a four lane section to a Super 2 section for the southbound pavement for the Base Scope only.
2 Stopping sight distance deviation of 645 feet included at this location.

11.3 Miscellaneous Roadway Design Requirements

All roadside safety devices used on the Project shall meet current crash test and other safety requirements in accordance with TxDOT standards.

The border width, measured from back of curb to ROW line, along access roads and crossing streets shall be 20 feet minimum unless specified otherwise.

DB Contractor shall provide a minimum 48 feet median for all four lane divided main lane roadways with a continuous cable median barrier separating the main lane roadways. The guidelines for placement of the cable median barrier can be found in *TxDOT Roadway Design Manual*, *Appendix A* and TxDOT standard drawings. Median dimension shall be measured between two innermost lanes, and includes shoulders.

All portions of Segment 2 and that portion of Segment 1 not developed as a four-lane facility shall meet or exceed design criteria and requirements of Chapter 4, Section 6 – Super 2 Highways of the TxDOT *Roadway Design Manual* and be designed to minimize design and construction expenses required for future construction that will convert the Project to a divided facility.

SECTION 12.0 DRAINAGE

12.1 General Requirements

DB Contractor shall account for all sources of runoff that may reach the Project, whether originating within or outside the Project ROW, in the design of the drainage facilities.

DB Contractor shall avoid designs that increase flooding or increase damage to properties outside the Project ROW. If existing drainage patterns and/or flows are revised during the Project design, DB Contractor shall design and construct a solution that does not have significant adverse impacts to property owners outside the Project ROW. Significant adverse impacts are defined as impacts that have the potential to increase risk to health and human safety, cause and/or exacerbate flooding of developed structures, or significantly increase water surface elevations on undeveloped properties.

DB Contractor's drainage design shall include pre- and post-construction conditions, as well as conditions during construction staging. DB Contractor shall ensure and demonstrate that its drainage design does not cause any material impact to off-Site property owners in terms of developability or marketability of their property, or DB Contractor must obtain the appropriate drainage easement at its own cost. Any grading activities or drainage structures needed outside of the Project ROW require a permanent drainage easement.

DB Contractor shall meet the requirements specified in this Section 12 along with the requirements of the *TxDOT Hydraulic Design Manual*, the *Montgomery County Drainage Criteria Manual* as applicable to Segment 1 of the Project, and the *Grimes County Rules and Regulations* as applicable to Segment 2 of the Project.

12.2 Administrative Requirements

12.2.1 Data Collection

To establish a drainage system that complies with the requirements and accommodates the historical hydrologic flows in the Project Limits, DB Contractor is responsible for collecting all necessary data, including those elements outlined in this Section 12.2.1.

DB Contractor shall collect data identifying all water resource issues, including water quality requirements as imposed by State and federal government regulations; National Wetland Inventory and other wetland/protected waters inventories; Federal Emergency Management Agency (FEMA) mapped floodplains; and official documents concerning the Project, such as the EA or other drainage and environmental studies. For Segment 1, a Drainage Report was issued in 2006 and revised by a later report in 2014 entitled "Segment 1 H&H Report" and is contained in the RIDs. For Segment 2, a Draft Drainage Report was issued in January 2015 entitled "Segment 2 H&H Report" and is also contained in the RIDs.

Water resource issues include areas with historically inadequate drainage (flooding or citizen complaints), environmentally sensitive areas, localized flooding, maintenance problems associated with drainage, and areas known to contain Hazardous Materials. DB Contractor shall also identify watershed boundaries, protected waters, ditches, areas classified as wetlands, floodplains, and boundaries between regulatory agencies (e.g., watershed districts and watershed management organizations).

DB Contractor shall acquire all applicable municipal drainage plans, watershed management plans, and records of citizen concerns. DB Contractor shall acquire all pertinent existing storm

drain plans and/or survey data, including data for all culverts, drainage systems, and storm sewer systems within the Project Limits. DB Contractor shall also identify existing drainage areas that contribute to the highway drainage system and the estimated runoff used for design of the existing system.

DB Contractor shall obtain photogrammetric and/or geographical information system (GIS) data for the Project Limits that depicts the Outstanding National Resource Waters and/or impaired waters as listed by the TCEQ. DB Contractor shall conduct surveys for information not available from other sources.

DB Contractor shall be responsible for creating an inventory of all existing drainage facilities including structures, culverts, ditches, and storm sewers within the Project corridor. The inventory must include the condition, size, material, location, status, videotape or photographs, and other pertinent information. DB Contractor shall verify that all existing drainage components that are to remain have adequate capacity and design life, as defined in Section 13.2, in accordance with TxDOT's procedures. If any of these existing drainage facilities are found to be hydraulically inadequate or found to have insufficient design life, they shall be replaced.

The data collected shall be taken into account in the Final Design of the drainage facilities.

12.2.2 Coordination with Other Agencies

DB Contractor shall coordinate all water resource issues with affected stakeholders and regulatory agencies. DB Contractor shall document the resolutions of water resource issues.

Drainage improvements determined necessary by local Governmental Entities that exceed the requirements of the Agreement shall be handled by DB Contractor with a third party agreement between the local Governmental Entity and DB Contractor. The cost associated with any such third party agreements shall be the responsibility of DB Contractor and the Governmental Entity. Such third party agreement shall be subject to TxDOT approval and shall be provided to TxDOT for review 30 days prior to the anticipated date of execution of the agreement.

DB Contractor shall make every effort to design the Project in a manner to avoid Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) as much as feasible, and design shall be coordinated with TxDOT. If a map revision is found to be warranted, DB Contractor shall prepare the required documentation, perform the necessary calculations and design, and provide to the local floodplain administrators all information and technical data needed to file a CLOMR/LOMR with FEMA.

Drainage areas and structures that fall under the jurisdiction of the USACE shall comply with all USACE requirements. DB Contractor shall coordinate review and approval of the design and construction, if necessary, with the USACE on any such facilities. Information regarding the status of permits for work with the USACE is included in the RIDs. DB Contractor shall be responsible for obtaining applicable USACE permits.

In areas surrounding railroad facilities, DB Contractor shall coordinate with the TxDOT District Railroad Coordinator, as well as the appropriate railroad owner, in accordance with Section 14.

12.3 Design Requirements

DB Contractor shall design all Elements of the drainage facilities in accordance with this Section 12, the applicable design criteria in the *TxDOT Hydraulic Design Manual*, the *Montgomery*

County Drainage Criteria Manual as it applies to Segment 1 of the Project, and the *Grimes County Rules and Regulations,* as it applies to Segment 2 of the Project.

The design of proposed drainage systems shall meet the performance requirements as defined in this Section 12. DB Contractor may make use of existing drainage facilities, provided overall drainage requirements for the Project are achieved and the combined drainage system functions as required. Should a proposed drainage system tie to an existing drainage system, the connecting existing system shall also be designed and reconfigured, as necessary, to ensure the proposed system meets the performance requirements as defined in this Section 12 while maintaining or improving the performance of the connected existing drainage system.

Modifications to existing drainage patterns should be minimized. If existing drainage patterns and/or flows are revised during the Project design, DB Contractor shall design and construct a solution that does not have significant adverse impacts on property owners outside the Project ROW. DB Contractor bears full responsibility for the final design and its effects on property owners outside the Project ROW.

DB Contractor shall make available to TxDOT, as part of the Submittals, all native design files used in the hydrologic and hydraulic analyses to prepare computations and plans. Such native files include input and output data from Storm Water Management Model (SWMM), Hydraulic Engineering Centers River Analysis System (HEC-RAS), or HY-8 Models, culvert hydraulic computations, drainage area reports, and Rational Method or Regional Regression equations. The native files for the models and analyses should represent the record set submitted.

12.3.1 Surface Hydrology

12.3.1.1 Design Frequencies

The DB Contactor shall use the design frequencies listed in Table 12-1 below.

12.3.1.2 Hydrologic Analysis

DB Contractor shall ensure that no significant adverse impacts will result from the construction of the Project. DB Contractor shall evaluate and document the analysis confirming that the proposed drainage improvements do not result in any significant adverse impacts. Flood damage potential for the completed Project shall not exceed pre-Project conditions.

DB Contractor shall be responsible for any mitigation required to ensure that the Project does not create any significant adverse impact. Hydrologic calculations for off-Site run-off shall include the assumption that any undeveloped area adjacent to the Project ROW will be developed as commercial use for the first 150 feet adjacent to the Project ROW.

DB Contractor shall design drainage structures that intercept and convey flow from off-Site through the Project (e.g., cross-culverts), with sufficient capacity to accommodate existing off-site conditions and the 150 feet strip of land adjacent to the Project ROW modeled for commercial-use development. DB Contractor is not responsible for mitigating unforeseen impacts or issues that could not have been anticipated at the time of design, which could be caused by future off-Site development.

As described in the preliminary drainage report for Segment 1, alternatives are provided to mitigate impacts to Mill Creek using a system of regional ponds either two ponds, three ponds, or four ponds at different locations based on current environmental assumptions and constraints. The preliminary drainage reports present conceptual mitigation measures for the

proposed roadway construction based on the current Preliminary Schematic Design. DB Contractor is responsible for performing final detailed H&H analysis/design to ensure effective overall mitigation is achieved using the proposed detention ponds once the number, size and location of the ponds are finalized. The purpose of these regional ponds is to address impervious cover increase only, not for any loss of floodplain storage.

Roadside ditch restrictors are allowed in Segments 1 and 2 only at ditch outfall locations and only as needed for rate control to mitigate increased run-off from the Project and avoid any significant adverse impacts.

Use of underground storage facilities for mitigation of significant adverse impacts is prohibited.

DB Contractor's base hydraulic model should reflect the most current as-built conditions.

Internal drainage systems constructed as part of the Project that convey flow intercepted from the Project shall be designed to accommodate future expansion drainage requirements.

Table 12-1: Drainage Design Summary Table

	Drainage Analysis and Evaluation	Q2	Q5	Q10	Q25	Q50	Q100	Q500
Main Lanes and Ramps	Design frequency for storm sewers, inlets, and laterals where emergency overflow is present. Maximum ponding width shall be the width of the shoulder.			X				
	Design frequency for storm sewers, inlets, and laterals for depressed roadway sections with no emergency overflow. Maximum ponding width shall be the width of the shoulder.					X		
	Bridges shall be designed such that bridge low chords are set at a minimum of 1.5-feet above the 1% AEP WSE. The 500-year storm shall be calculated and analyzed for scour, as required in Section 12.3.5.2.2.						X	X
	Culverts shall be designed to convey the 100-year storm, and the maximum allowable headwater elevation for the design frequency shall not exceed 1.5 feet below the edge of pavement low point of the applicable roadway.						X	
Access Roads	Design frequency for storm sewers, inlets, and laterals where emergency overflow is present. Maximum ponding width shall be 12 feet.			X				
	Design frequency for storm sewers, inlets, and laterals for depressed roadway sections with no emergency overflow. Allowable ponding width is the shoulder.					X		
	Bridges shall be designed such that bridge low chords are set at a minimum of 1.5-feet above the 1% AEP WSE. The 500-year storm shall be calculated and analyzed for scour, as required in Section 12.3.5.2.2.						X	X
	Culverts shall be designed to convey the 10-year storm, and the maximum allowable headwater elevation for the design frequency shall not exceed 1.5 feet below the edge of pavement low point of the applicable roadway.			X				
City and County Cross-Streets	Design frequency for storm sewers for urban roadway sections. Maximum ponding width shall be the width that will allow passage of one lane of traffic.			X				
	Design frequency for open channel and small culverts for rural roadway section. Culverts shall be designed to convey the 10-year storm, and the maximum allowable headwater elevation for the design frequency shall not exceed 1.5 feet below the edge of pavement low point of the applicable roadway.			X				
	Design frequency for inlets along depressed roadways. Allowable ponding width is the depth and width that will allow passage of one lane of traffic.				X			

Notes: A depressed roadway provides nowhere for water to drain even when the curb height is exceeded. Storm drains on facilities such as underpasses, depressed roadways, etc., where no overflow relief is available should be designed for the 2% annual exceedance probability (AEP) event (Q50).

All facilities except storm drains shall be evaluated for the 1% AEP event (Q100). If a feature is within the floodplain, it should be assessed for 20% AEP (Q5), 10% AEP (Q10), 4% AEP (Q25), and 2% AEP (Q50) as well as the 1% AEP.

12.3.2 Storm Sewer Systems

Where precluded from handling runoff with open channels by physical site constraints, or as directed in this Section 12, DB Contractor shall design enclosed storm sewer systems to collect and convey runoff to appropriate discharge points.

DB Contractor shall prepare a storm sewer drainage report encompassing all storm sewer systems that contains, at a minimum, the following items:

(a) Detailed table of contents and narrative of design methodology;

(b) Drainage area maps for each storm drain inlet with pertinent data, such as boundaries of the drainage area, best available topographic contours, runoff coefficients, time of concentration, and land use with design curve number and/or design runoff coefficients, discharges, velocities, ponding, and hydraulic grade line data;

(c) Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, detailed structure designs, and any special designs;

(d) Specifications for the pipe bedding material and structural pipe backfill on all proposed pipes and pipe alternates;

(e) Complete pipe profiles, including pipe size, type, and gradient; station offsets from the centerline of the roadway; length of pipe; class/gauge of pipe; and numbered drainage structures with coordinate location and elevations;

(f) Complete documentation of DB Contractor's assessment of the potential for the Project to cause adverse impacts, including how adverse impacts are mitigated (if needed) and reasonable substantiation that the Project will not cause any significant adverse impacts; and

(g) Demonstration that the drainage design does not cause any material impact to offsite property owners or that DB Contractor has obtained appropriate drainage easements.

This report shall be a component of the Drainage Design Report.

DB Contractor shall design all storm sewer systems such that the hydraulic grade line for the design frequency event is no higher than one foot below:

1. Gutter depression for curb inlet;
2. The top of grate inlet; and
3. The top of manhole cover.

Runoff within the jurisdiction of the USACE shall be conveyed in accordance with applicable Laws and permits.

The gutter depression used for curb and grate combination inlets shall not encroach into the travel lane if the gutter depression exceeds the normal cross slope.

Place manholes or combination manholes and inlets wherever necessary for clean-out and inspection purposes. See Chapter 10, Section 6 of the *TxDOT Hydraulic Design Manual* for the manhole spacing criteria.

The use of “T” connections and “Y” connections in storm sewer systems is not permitted unless approved in writing by TxDOT.

The use of slotted drains will not be allowed.

The use of slotted barriers that allow stormwater runoff to flow under them and into adjacent travel lanes will not be allowed for permanent barriers. Slotted barriers may be used for temporary conditions during construction.

DB Contractor will not be allowed to mitigate impacts by using restrictor plates for in-line closed system detention facilities.

12.3.2.1 Pipes

DB Contractor shall meet the requirements set forth in Chapter 10, Section 7 of the *TxDOT Hydraulic Design Manual,* all applicable sections of the *Montgomery County Drainage Criteria Manual* for Segment 1, and all applicable sections of the *Grimes County Rules and Regulations* for Segment 2.

Storm sewer pipes shall be designed to maintain a minimum velocity of two feet per second if feasible. If design flow velocities less than two feet per second are unavoidable, pipes shall be designed for full flow at 80% of the internal diameter to account for sedimentation in the pipe. Other storm sewer pipes shall be designed using the full internal diameter. Pipes shall be designed to achieve a maximum velocity of 12 feet per second in the pipe. All storm sewers shall be designed and constructed to sustain all loads with zero deflection and shall have positive seals at the pipe joints.

All pipes shall be reinforced concrete pipe, with the exception of pipe drains for mechanically stabilized earth (MSE) walls. On main lanes, ramps, access roads, driveways, and cross-streets, the minimum pipe size inside diameter shall be 24 inches. The minimum pipe size for pipe drains shall be eight inches in accordance with Chapter 10, Section 7 of the *TxDOT Hydraulic Design Manual*.

12.3.2.2 Ponding

DB Contractor shall design drainage systems to limit ponding to the widths defined in Table 12-1.

12.3.3 Miscellaneous Drainage Design Requirements

DB Contractor shall design main lane cross structures (culverts and bridge openings) in accordance with the *TxDOT Hydraulic Design Manual*, the *Montgomery County Drainage Criteria Manual* for Segment 1, and the *Grimes County Rules and Regulations* for Segment 2, along with the following minimum requirements*:*

(a) Design of main lanes and shoulders shall confirm that they are above the 1% AEP WSE for the 100-year storm event for the entire project; and

(b) Water surface elevations will be examined to assure that the Project will not cause any adverse impacts to adjacent properties.

12.3.3.1 Inlet Design Criteria

DB Contractor shall place inlets in accordance with the criteria shown below in Table 12-2, the *TxDOT Hydraulic Design Manual,* the *Montgomery County Drainage Criteria Manual*, and the *Grimes County Rules and Regulations,* as applicable:

Table 12-2: Inlet Design Criteria

Storm Drain Inlets	
Inlet Locations	1. On-grade: Place inlets to keep gutter ponding less than or equal to maximums, as defined in Table 12-1. Carryover is acceptable. 2. Low points: Inlet shall be located at low point of vertical curve, not at P.I. Place flanking inlets both sides of low point at a maximum spacing of 100' from low point. 3. Redundant inlets: Inlets shall be located at ends of curb returns at intersections. 4. 100% flow interception: On pavement at end of ret. Wall, at ramp gores, at intersections. 5. Inlets shall be placed outside the main lane pavement (proposed and future expansion)

12.3.4 Stormwater Storage Facilities

DB Contractor shall complete design of the stormwater storage facilities (SWSF) to meet requirements for water quality, water quantity, and rate control, as determined by the National Pollutant Discharge Elimination System (NPDES) regulations. Types of SWSF include ponds, basins, and any other facility employed to detain or retain quantities of stormwater for a given period of time.

DB Contractor shall ensure that all SWSF meet the requirements listed below by performing all required analyses. Such analyses shall include a detailed routing analysis for SWSF affected by significant environmental issues, such as hazardous waste or groundwater concerns. For Segment 1, an analysis was performed to determine recommended preliminary number of SWSF. The results are reported in the Segment 1 H&H Report contained in the RIDs. DB Contractor shall be responsible for determining the size, number and locations of SWSF in Segment 1 and shall use these SWSF to comply with NPDES regulations. For Segment 2, DB Contractor shall accommodate the required storage volume and satisfy NPDES requirements using the proposed roadside ditches.

12.3.4.1 SWSF Locations

DB Contractor shall analyze and develop SWSF locations and all applicable SWSF information and coordinate these with TxDOT. DB Contractor shall design a Stormwater Management Plan that accounts for any regional SWSF. Ponds are not acceptable as SWSF in Grimes County with the exception of a proposed regional pond in Grimes County for Segment 1, as shown on

the Preliminary Schematic Design, to mitigate potential impacts to Mill Creek. All SWSF may be used to comply with NPDES regulations.

12.3.4.2 Inlets and Outlets

DB Contractor shall design and construct the SWSF inlets to be above the vertical limits of the dead sediment storage volume. DB Contractor shall design and construct SWSF to prevent circuiting and discharge of floating debris (e.g., have a skimmer baffle). The maximum available outflow shall be limited to the existing 1% peak flow.

12.3.4.3 SWSF Depth and Shape

DB Contractor shall design and construct the SWSF depth and shape to include a length-to-width ratio of 3:1.

Any length-to-width ratio variation shall require prior review and concurrence by TxDOT prior to completion of final design. A 10 foot bench, with a 10:1 slope or flatter, must be provided at the normal water level for safety and maintenance. In addition, DB Contractor shall comply with the rules contained in the Aggregate Quarry and Pit Safety Act which can be viewed at:

http://www.txdot.gov/inside-txdot/division/maintenance/quarry.html

12.3.4.4 Freeboard and Spillway

A minimum of two feet of vertical freeboard above the design flood elevations shall be provided on SWSF. All SWSF must have an emergency spillway sized to carry events beyond the 100-year event.

12.3.4.5 Design Details

All inlet and outlet details, skimmers, and emergency spillway designs must be included in the design. Design must address safety and measures to secure access to SWSF.

12.3.4.6 Flood Routing

DB Contractor shall perform all flood routing analysis and submit calculations to the reviewing authorities, such as municipalities, TCEQ, and USACE for approval.

12.3.4.7 Environmental Issues

Special analysis and documentation must be included for SWSF affected by significant environmental issues, such as hazardous waste or groundwater concerns.

12.3.4.8 Documentation

A graphic display (both paper and electronic format) showing what areas are treated by each SWSF shall be included with the design calculations provided to TxDOT. The display must also show those areas not treated.

12.3.4.9 Special Ditch Grades

DB Contractor shall be responsible for the design of both normal and special ditch sections, as needed. When necessary, ditch linings shall be designed by DB Contractor according to Hydraulic Engineering Center (HEC)-15. Open channels shall be designed to minimize sedimentation.

12.3.5 Hydraulic Structures

12.3.5.1 Culverts

DB Contractor shall analyze existing and proposed culverts and drainage-ways impacted, replaced, or created by the Project design, for any localized flooding problems.

For all culverts, the maximum allowable headwater elevation for the design frequency shall not exceed 1.5 feet below the edge of pavement of the applicable roadway. Culverts shall be designed to achieve a minimum tailwater velocity of two feet per second, a maximum tailwater velocity of ten feet per second or less, if feasible. In the event the maximum desirable tailwater velocities are exceeded, velocity-reducing devices shall be included in the design in order to reduce erosion at the culvert outlets. Velocity-reducing device design will be approved by TxDOT prior to installation and use.

Culverts shall be designed to maintain a minimum velocity of two feet per second if feasible. If design flow velocities less than two feet per second are unavoidable, culvert shall be designed for full flow at 80% of the internal diameter to account for sedimentation in the culvert. Culverts shall be designed to achieve a maximum velocity of 12 feet per second in the culvert.

Culverts are classified as major or minor, as follows:

(a) Major Culvert: A culvert that provides an opening of more than 35 SF in a single or multiple installations. A major culvert may consist of a single round pipe, pipe arch, open or closed-bottom box, bottomless arch, or multiple installations of these structures placed adjacent or contiguous as a unit. Certain major culverts are classified as bridges when they provide an opening width of more than 20 feet, measured parallel to the roadway; such culverts shall be included in the bridge inventory.

(b) Minor Culvert: Any culvert not classified as a major culvert.

The minimum box culvert height, inside dimension, for all proposed box culverts shall be 3 feet. Existing box culverts that have inside height dimensions of less than 3 feet but that meet all other hydraulic requirements may be extended at their existing height.

The culvert hydraulic analysis shall include a thorough investigation of field conditions and appropriate survey data to develop hydraulic models to: evaluate water surface elevations, velocities and floodplain boundaries; and, perform scour analysis to determine scour depths and develop countermeasures. DB Contractor shall coordinate with the local Floodplain Administrator and FEMA in order to satisfy all floodplain permitting requirements.

12.3.5.2 Bridges

All bridge hydraulic computations, designs, and recommendations shall be consistent with past studies and projects in the area by the USACE and other State or federal agency studies and projects.

Where bridge design is influenced by upstream storage, the analysis of the storage shall be considered in the design of the bridge.

12.3.5.2.1 Method Used to Estimate Flows

DB Contractor shall use methods outlined in the *TxDOT Hydraulic Design Manual* for flow determination.

12.3.5.2.2 Design Frequency

Major waterway crossings, bridges, culverts and storm drain systems shall be designed for the frequency corresponding to the roadway classification shown in Table 12-1. The functional classification for each roadway is shown in Section 11.

DB Contractor shall evaluate bridges for contraction scour and pier scour concerns and incorporate protection in accordance with Good Industry Practice. DB Contractor shall provide a scour analysis in accordance with TxDOT's *Geotechnical Manual* (Chapter 5 – Section 5 Scour) for all bridges. If necessary, DB Contractor shall provide countermeasures for any instability and scour problems in accordance with FHWA Hydraulic Engineering Circular No. 23 – *Bridge and Scour and Stream Instability Countermeasures Experience Selection and Design Guidance*.

DB Contractor shall calculate the peak discharge for both existing and proposed conditions. Water surface profiles for design and check flood conditions shall be determined.

12.3.5.2.3 Hydraulic Analysis

DB Contractor shall use the best available hydrologic and hydraulic models as design base models, if such models are available. For waterways which are mapped as FEMA Special Flood Hazard Areas (SFHA), DB Contractor must comply with TxDOT *Hydraulic Design Manual* procedures, including coordination with the local floodplain administrator(s) and use of the current effective models to create revised effective and proposed effective models. DB Contractor must also ensure coordination with major adjacent developments which are pursuing a LOMR during the Project development period.

DB Contractor shall design riprap at abutments in accordance with the procedures outlined in HEC-23. For bridge abutments in urban areas, DB Contractor shall install protection in accordance with the Project's aesthetic plan.

12.3.5.2.4 Bridge/Culvert Waterway Design

For existing crossings, DB Contractor shall analyze the existing structure with the proposed flows to ensure the headwater does not exceed allowable headwater elevations, as defined in Table 12-1. If the proposed drainage to the existing crossing produces headwater elevations greater than those allowed by Table 12-1, DB Contractor shall design and construct a replacement structure with sufficient capacity to pass the required design-frequency flows and ensure the maximum headwater for the required frequency event does not exceed that of the corresponding event for the current condition. Culvert extensions may increase the headwater elevation, but not above the maximum allowable headwater, with respect to adjacent property and floodplain concerns.

When designing a bridge that passes over waterways, DB Contractor design shall minimize changes to the existing channel. Bridge waterway design shall maintain the existing channel morphology through the structure. An existing bridge spanning a waterway shall not be replaced with a structure of a lesser total span than the original structure. New bridges spanning a waterway shall not cause a narrowing of the existing channel.

12.3.5.2.5 Bridge Deck Drainage

Stormwater flowing toward the bridge shall be intercepted upstream from the approach slab. Runoff from bridge deck drainage shall be treated as required by TCEQ or other applicable regulation prior to discharge to the natural waters of the State.

Open deck drains and/or slotted rail are not permissible for new bridges passing over waterways or other roadways. If ponding width limits are exceeded on the new bridges, then the runoff must be conveyed in a closed system through the bridge columns to the roadway drainage system below. The bridge deck drainage system shall outlet at the bottom of the substructure either into a storm sewer system, or into an open channel and in no case shall be allowed to discharge against any part of the structure.

12.3.5.2.6 Drainage Report for Major Stream Crossings

DB Contractor shall prepare a Drainage Design Report for each major stream crossing. Major stream crossings are defined as waterways listed as a FEMA SFHA or requiring a bridge class structure, as defined in Section 12.3.5.1.a. Any other waterway will be a minor stream crossing. The report shall include the detailed calculations and electronic and printed copies of the computer software input and output files, as well as a discussion about hydrologic and hydraulic analysis and reasons for the design recommendations. At a minimum, for each crossing the report shall include:

(a) FEMA SFHA

(i) FIRMette;

(ii) Discussion of SFHA and implications, and

(iii) Flood Plain Permit, if required by City or County.

(b) Hydrology

(i) Drainage area maps with watershed characteristics/parameterization including topography, both hardcopy and GIS format;

(ii) Hydrologic calculations (where computer software is used, both hardcopy and electronic input and output files); and

(iii) Historical or Site data used to review computed flows;

(c) Hydraulics and Recommended Waterway Opening and/or Structure

(i) Photographs of the Site (pre- and post-construction);

(ii) General plan, profile, and elevation of recommended waterway opening and/or structure;

(iii) Calculations – hardcopy of output, as well as electronic input and output files for all computer models used for final analysis or for permit request, as well as summary of the basis of the models;

(iv) Cross-sections of waterway (DB Contractor shall provide a hard copy plot, plus any electronic data used); and

(v) Channel profiles.

(d) Scour Analysis

(i) Channel cross-sections at bridge showing predicted scour;

(ii) Calculations and summary of calculations, clearly showing predicted scour and assumptions regarding bridge opening and piers used to calculate predicted scour;

(iii) Discussion of review of long-term degradation/aggradation and effects; and

(iv) Recommendation for abutment protection.

This report shall be a component of the Drainage Design Report.

DB Contractor shall provide bridge hydraulic summary sheets and bridge scour envelope sheets with projected scour calculation summaries for every bridge crossing a waterway in the final record construction plans set.

12.4 Drainage Design Report

A preliminary Drainage Design Report shall be submitted with preliminary construction plans. The preliminary Drainage Design Report shall include at a minimum everything included in the Drainage Design Report. Prior to construction of any drainage Element, DB Contractor shall submit a preliminary Drainage Design Report for each drainage Element to TxDOT.

DB Contractor shall submit to TxDOT, as part of the Record Documents, a final Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system. At a minimum, the Drainage Design Report shall include:

(a) Record set of all drainage computations, both hydrologic and hydraulic, and all support data including all geospatial data. If computations are in electronic format, the original format in which the computations were executed shall be submitted, such as .xlsx for Microsoft Office Excel or .xmcd for MathCAD;

(b) Hydrology/Hydraulic notes, models, and tabulations. Models are to be submitted in the original electronic format (e.g., GeoPak Drainage file *.gdf, HEC-RAS *.prj, Hydraulic Engineering Centers Hydrologic Modeling System [HEC-HMS] *.hms). Please note some programs such as HEC-HMS generate multiple files which are essential to the overall model. All files should be included with the Submittal to ensure the results match those in the record set;

(c) Storm sewer drainage reports;

(d) Bridge and culvert designs and reports for major stream crossings, including all the items listed in Section 12.3.5.2.6;

(e) Open channel design data;

(f) SWSF designs, including graphic display of treatment areas and maintenance guidelines for operation;

(g) Complete documentation of DB Contractor's assessment of the potential for the Project to cause adverse impacts, including how adverse impacts are mitigated (if needed), and reasonable substantiation that the Project will not cause or increase to damage to properties outside the Project ROW;

(h) Demonstration that DB Contractor has obtained appropriate drainage easements;

(i) Correspondence files which include:

(i) Meeting minutes pertaining to drainage;

(ii) Email and letter correspondence with all Governmental Agencies pertaining to drainage and drainage studies, including any issued Flood Plain Permits; and

(iii) Letters to all Government Agencies pertaining to drainage;

(j) Drainage system data (location, type, material, size, and other pertinent information) in a GIS data format for the existing system to remain in place and the proposed system constructed in conjunction with this Project;

(k) Exhibits demonstrating the compatibility of the drainage design with the future expansion configuration; and

(l) SWSF Designs, including graphic display or treatment areas.

12.5 Construction Requirements

DB Contractor shall design drainage to accommodate construction staging. The design shall include temporary erosion control measures and other BMPs needed to satisfy the NPDES and other regulatory requirements. The water resource notes in the plans shall include a description of the drainage design for each stage of construction, including temporary drainage Element.

12.6 Submittals

Submittals described in Section 12 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 12-3. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 12-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 12			
All native design files used in the hydrologic and hydraulic analyses to prepare computations and plans	As part of the design Submittals	Review and comment	12.3
Stormwater Management Facility Plan	With design Submittals or as requested by TxDOT	Review and comment	12.3.4.1 and 12.3.4.8
Preliminary Drainage Design Report	30 days prior to construction of any drainage Element	Review and comment	12.3 12.4
Final Drainage Report	As part of the Record Documents (Prior to Final Acceptance)	Review and comment	12.4

SECTION 13.0 STRUCTURES

13.1 General Requirements

The structural Elements of the Project, including bridges, culverts, drainage structures, signage supports, illumination assemblies, traffic signals, retaining walls, and noise barriers, shall be designed and constructed in conformance with the requirements of the Agreement, the current AASHTO *Load and Resistance Factor Design* (*LRFD) Bridge Design Specifications* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD* and the TxDOT *Geotechnical Manual*, in order to provide the general public a safe, reliable, and aesthetically-pleasing facility. For all specifications listed herein, the latest edition, including interims, as of the Proposal due date, shall be used. The plans shall clearly show the specifications, including the edition and dates, employed in each design.

Bridges, retaining walls, noise barriers, and sign structures shall be designed in conformance with the approved aesthetic schemes, guidelines, and standards throughout the Segments as identified in Section 15. High Visibility bridges, as defined in Section 15 and identified in Table 15-1, for Houston and Bryan Districts shall utilize the aesthetic standards included in the RIDS. In addition, High Visibility bridges located within the Houston District shall utilize the Houston District structural details included in the RIDS.

13.2 Design Requirements

For bridges, walls, bridge class culverts, sign structures and other miscellaneous structures, a Corridor Structure Type Study and Report shall be submitted to TxDOT for review and comment prior to design of these Elements. At a minimum, structural concepts, details and solutions, soil parameters, hydraulics, environmental requirements, wetland impacts, safety, highway alignment criteria, constructability, aesthetics requirements and continuity for the Project shall be evaluated in the Corridor Structure Type Study and Report. Evaluation of existing structures that will be retained shall be included in the Corridor Structure Type Study and Report. The Corridor Structure Type Study and Report shall clearly define DB Contractor's action to achieve a 75-year service life for Project bridges, walls, culverts and miscellaneous structures.

13.2.1 Compatibility with Future Expansion

Bridges crossing over the Project shall, at a minimum, be designed to accommodate the future expansion configurations described in Attachment 11-1 and Attachment 11-2 including location of abutments, retaining walls, foundations, and substructures. DB Contractor shall design bridge structures required for the Project, if applicable, to the total length and span arrangement required, including spanning future lanes that will be constructed below the structure.

13.2.2 National Bridge Inventory Reporting Procedures

Upon completion of the bridge layout during the design phase, DB Contractor shall coordinate with the appropriate TxDOT District Bridge Engineer to obtain National Bridge Inventory (NBI) numbers for all bridges and bridge class culverts. This will require an approved bridge layout and completion of the Permanent Structure Number (PSN) Request Form. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Documents.

DB Contractor shall stencil NBI numbers on all bridge structures. Place the NBI numbers on each side of the structure on the exterior beam closest to the abutment. Place the stencils on opposing corners of the structure.

13.2.3 Design Parameters

Unless otherwise noted, design for all roadway and pedestrian structural elements shall be based on the LRFD methodology included in TxDOT's *Bridge Design Manual – LRFD*, TxDOT bridge design guidance and recommendations listed at http://www.txdot.gov/inside-txdot/division/bridge/specifications.html and the AASHTO *LRFD Bridge Design Specifications*.

Design of foundations shall be in compliance with provisions of the TxDOT *Geotechnical Manual*.

Sidewalks shall be provided on bridge structures in accordance with the provisions of Section 20. DB Contractor shall design sidewalks to meet the criteria of the AASHTO *Roadside Design Guide*.

Steel bridge design shall comply with TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*.

Corrosion protection measures shall be in accordance with TxDOT Bridge Division and the respective District's practices. These can be found at: http://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/district_corrosion.pdf.

Segmental bridges shall additionally conform to the requirements of AASHTO *Guide Specifications for Design and Construction of Segmental Concrete Bridges*.

Pedestrian bridges shall additionally conform to the requirements of AASHTO *LRFD Guide Specifications for the Design of Pedestrian Bridges*.

DB Contractor shall inspect all structures to be reused, widened, lengthened, or modified in accordance with AASHTO *Manual for Bridge Evaluation* and TxDOT *Bridge Inspection Manual*.

Hydraulic design shall be in accordance with the provisions of Section 12.

Structural design of signs, luminaires, and traffic signals shall be in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

Falsework, shoring, and other temporary supports shall be designed in accordance with AASHTO *Guide Design Specifications for Bridge Temporary Works*.

Load ratings shall be in accordance with AASHTO *Manual for Bridge Evaluation* and TxDOT *Bridge Inspection Manual*.

DB Contractor shall proportion bridge spans to avoid uplift at supports.

DB Contractor shall ensure that bridges crossing over waterways withstand a 100-year frequency event with no loss of structural integrity.

All electronic and paper files and calculations design notebooks shall be made available at TxDOT's request.

13.2.4 Bridge Design Loads and Load Ratings

All roadway bridges and bridge class culverts shall be designed to accommodate the following live loads:

(a) An HL-93 truck or a tandem truck, plus lane load as defined in the AASHTO *LRFD Bridge Design Specifications* shall be utilized for bridges except pedestrian bridges; and

(b) Pedestrian bridges and sidewalks of vehicular bridges shall be loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications* and the AASHTO *Guide Specifications for the Design of Pedestrian Bridges*. In addition, all pedestrian bridges shall also be designed for an AASHTO H-10 truck live load as defined in the AASHTO *Standard Specifications for Highway Bridges*, to account for maintenance and emergency vehicles.

Bridges (except pedestrian bridges) shall also be designed to accommodate a minimum future overlay load of 25 psf.

13.2.5 Bridge Decks and Superstructures

Fracture critical members shall not be used for bridges without written authorization from TxDOT, and if allowed by TxDOT, fracture critical members shall be designed to allow full access for inspection.

The type of bridge shall not be restricted to those typically used by TxDOT. Other types and components may be used, but will be allowed only if:

(a) They have been accepted for general use by FHWA; and

(b) DB Contractor can demonstrate that the design of the bridge type and components will meet the functional requirements of the Project.

Modular joints shall be used when anticipated movement exceeds five inches and shall be designed and tested for fatigue loading.

DB Contractor shall minimize the number of deck joints wherever possible. DB Contractor shall locate joints to provide for maintenance accessibility and future replacement. Joints for all grade separation structures shall be sealed.

DB Contractor shall design sidewalks to meet the criteria of the AASHTO *Roadside Design Guide* and protect sidewalks from vehicular impact by a TxDOT-approved bridge railing as required in the TxDOT *Bridge Railing Manual* based on roadway Design Speed. For the Project, pedestrian rail shall be used along structure pavement edges unless pedestrian traffic is protected by an approved traffic rail.

To the extent possible, DB Contractor shall make bridge superstructures, joints, and bearings accessible for long-term inspection and maintenance. DB Contractor shall make open-framed superstructures accessible with walkways or by use of ladders or an under-bridge inspection truck.

DB Contractor shall provide conduit in caps (substructure) for future illumination. No exposed conduit will be allowed on bents, columns, bridge beams, retaining walls, or any other visible surface.

Steel and concrete box girders and caps (substructure) shall be accessible without impacting traffic below; DB Contractor shall make steel and concrete box girders and caps (substructure) with a minimum inside depth of six feet to facilitate interior inspection. DB Contractor shall include a minimum access opening of 3 feet - 0 inch diameter into all cells and between cells of

the girders to allow free flow of air during inspections. The outside access opening cover shall hinge to the inside of the box girder and caps (substructure). An electrical system (110V and 220V) shall be incorporated inside the box girder and caps (substructure) with lighting and power outlets. DB Contractor shall install air-tight, sealed and locked entryways on all hatches and points of access.

Segmental bridges shall additionally conform to the following:

(a) Segmental bridge decks shall use deck protection systems to prevent infiltration of corrosive agents into reinforcing in the superstructure. The deck protection system used shall be such that cracking is minimized and adequate bond strength is developed with the superstructure.

(b) If monolithically cast overlay is used as part of the deck protection system, DB Contractor shall develop fully engineered design guidelines for the thickness of the monolithic concrete removed and replaced in a manner that keeps distress and changes in surface profile at the time of concrete removal to levels that do not reduce the structural integrity of the structure.

(c) All expansion joints shall be sealed or drained. External tendons, if used, shall be protected with a water-tight duct jointing system.

(d) The design, detail and construction of segmental bridges shall provide for the easy addition of supplemental post-tensioning.

13.2.6 Bridge Substructure

Integral abutments, where the superstructure is structurally framed (either completely or partially) into the abutment, shall not be permitted. MSE walls shall not serve as structural foundations for bridges on the Project, and shall not be subjected to vertical loads from the bridges. Bridge approach slabs or other settlement mitigation measures shall be designed and constructed to mitigate settlement immediately behind abutment backwalls.

At cross streets, overpass bridge structures shall clear span all intersection pavement including through lanes and turn lanes on the Project and proposed future expansion configurations as identified in Attachment 11-1 and Attachment 11-2. Bridge foundations and columns may be located between the cross street pavement and U-turns.

Spread footing foundations are not allowed.

13.2.7 Bridge Railing and Barriers

All barrier systems used on the Project shall meet current crash test criteria as specified in National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO *Manual for Assessing Safety Hardware* and other safety requirements as determined by TxDOT. All testing and associated costs for non-standard railings shall be the sole responsibility of DB Contractor and shall be accomplished through a third party acceptable to TxDOT. A current list of standard railing is provided in the TxDOT *Bridge Railing Manual*. Single slope traffic railing (SSTR) shall be utilized on bridge structures. DB Contractor shall protect sidewalks from vehicular impact by using TxDOT-approved bridge railings.

13.2.8 Retaining Walls

The type of wall shall not be restricted to those typically used by TxDOT. Other types and components may be used, but will be allowed only if:

(a) DB Contractor can demonstrate that the design of the wall type and components shall meet the functional requirements of the Project; and

(b) DB Contractor provides the appropriate certifications from the PSQAF and IQF verifying that an independent review of the walls has been performed and that the walls have been designed and constructed to engineering standards appropriate to the Site conditions.

Modular walls employing interlocking blocks shall not be used where surcharge loads from vehicular traffic are present.

Metal walls, including bin walls and sheet pile walls, recycled material walls, and timber walls are not allowed.

The design of wall structures shall take into account live load surcharges. DB Contractor shall apply the appropriate live loading condition (vehicular, heavy rail, transit, etc.) that each wall is subjected to. These live load surcharges shall be based on AASHTO *LRFD Bridge Design Specifications*, American Railway Engineering and Maintenance-of-Way Association (AREMA) *Manual for Railway Engineering*, or the requirements of the specific railroad and transit owner/operator, as appropriate.

Structural integrity of retaining walls shall be inspected and monitored in accordance with Good Industry Practice. Tolerances and mitigation measures shall be in accordance with the Maintenance Management Plan (MMP) and Good Industry Practice.

The retaining wall layout shall address slope maintenance above and below the wall.

To the extent possible, DB Contractor shall design and construct components of the Project to provide embankments without the use of retaining walls. Where earthen embankments are not feasible, DB Contractor may use retaining walls. These retaining walls shall be located and designed to accommodate the future expansion configurations described in Attachment 11-1 and Attachment 11-2.

If pipe culverts are to extend through the retaining walls or noise barriers, the pipe shall be installed so that no joints are located within or under the wall.

No weep holes through the face of the retaining walls will be allowed, except at the base of the walls.

Underdrains are required and shall be a minimum of eight inches with cleanouts at a maximum of 300-foot spacing. Outfalls for underdrains must be provided.

Retaining walls shall end at-grade or riprap shall be used to avoid soil erosions.

13.2.9 Noise Barriers

DB Contractor shall design and construct all noise barriers to achieve the decibel reduction requirement in the NEPA approval(s) and the aesthetic requirements in Section 15.

Any damage to noise barriers caused by DB Contractor-Related Entities shall be repaired in accordance with TxDOT Standard Specifications. Damage caused by third parties shall be repaired in accordance with the Agreement.

Panel design and construction shall limit the risk of falling debris resulting from traffic impacting the noise wall.

Timber noise barriers are not allowed.

13.2.10 Drainage Structures

In developing the design of drainage structures, DB Contractor shall account for maximum anticipated loadings for both the Project and future expansion configurations.

Energy dissipaters, if used, shall be considered as structural Elements.

DB Contractor shall analyze existing drainage structures for capacity and as necessary retrofit or replace elements to accommodate any additional loads, settlements, and/or other structural impacts associated with the Project.

13.2.11 Sign, Illumination, and Traffic Signal Supports

For bridges and walls longer than 500 feet, sign supports shall be provided at 500-foot intervals. The sign supports shall accommodate sign areas up to and including 16 SF.

DB Contractor shall design overhead and cantilever sign supports to accommodate both the Project and future expansion configurations. Cantilever and sign bridge supports shall be placed outside the clear zone or shall be otherwise protected by appropriate safety measures.

13.3 Construction Requirements

Construction shall be in accordance with TxDOT Standard Specifications.

13.3.1 Concrete Finishes

All concrete surfaces that do not have aesthetic treatments shall have a uniform texture and appearance. Color treatment, where required as an aspect of the aesthetic treatment of the concrete, shall be uniform in appearance. Where the following do not have aesthetic treatments as identified in Section 15, Ordinary Surface Finish as defined by the TxDOT Standard Specifications shall be applied as a minimum:

(a) Inside and top of inlets;

(b) Inside and top of manholes;

(c) Inside of sewer appurtenances;

(d) Inside of culvert barrels;

(e) Bottom of bridge slabs between girders or beams;

(f) Vertical and bottom of surfaces of interior concrete beams or girders;

(g) Wingwalls and headwalls;

(h) Riprap, mowstrips, and flumes; and

(i) Traffic railing.

13.3.2 Structure Metals

Welding shall be in accordance with the requirements of the AASHTO/American Welding Society DI.5 *Bridge Welding Code* and TxDOT Standard Specification Item 448, Structural Field Welding.

13.3.3 Steel Finishes

All steel girders shall be uncoated weathering steel. Except for weathering steel, all structural steel shall be protected. The color for structural steel paint shall conform to the aesthetic schemes of the Project.

If weathering steel is used, DB Contractor shall protect all components of the structure (superstructure and substructure) that are susceptible to corrosion and/or staining from weathering steel run-off.

13.3.4 Steel Erection

Steel Erection shall be in accordance with AASHTO/NSBA Steel Bridge Collaboration S10.1-2014. Inspection of steel erection will include oversight by TxDOT personnel.

13.4 Submittals

Submittals described in Section 13 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 13-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 13-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 13			
Corridor Structure Type Study and Report	Prior to the design of bridges, walls, bridge class culverts, sign structures and other miscellaneous structures	Review and comment	13.2

SECTION 14.0 RAIL

14.1 General Requirements

The Project includes multiple rail corridor crossings within the Project ROW as depicted on the Preliminary Schematic Design and listed in Section 1. DB Contractor shall prepare a geometric design for each of the rail corridor crossings. DB Contractor's PMP shall set forth an approach, procedures, and methods that meet requirements set forth in the Contract Documents for design and construction at rail corridor crossings.

DB Contractor shall ensure that the Project does not negatively impact the safety of railroad operations. DB Contractor shall coordinate the Work with the railroads to avoid impacts to railroad operations, except as specifically approved by the railroads. DB Contractor shall be responsible for all fees, flagging charges, and inspection charges required by the railroad.

14.2 Railroad Design Standards

The design for all railroad elements of the Project shall be based on the most recent AREMA and the requirements of the operating railroad. DB Contractor's design shall minimize service interruptions to existing rail lines.

All Work involving railroad companies, Work on railroad ROW, and the development and execution of railroad programs shall be in accordance with the respective railroad, State and federal Law and the practices, guidelines, procedures, and methods contained in the TxDOT *Traffic Operations Manual*, *Railroad Operations Volume* as amended per *Amendments for TxDOT's Traffic Operations Manual, Railroad Operations Volume, February 2000*. Additionally, the requirements of the owner of each facility crossed shall be compared to the requirements in the TxDOT manual, and the most restrictive criteria shall be utilized.

DB Contractor shall adhere to practices and guidelines established in the BNSF Railway – Union Pacific Railroad *Guidelines for Railroad Grade Separation Projects*, found at the following site:
http://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_grade-separation.pdf.

This is a "live" document subject to change, and therefore should be accessed only via the website. The structural design of any Utilities, including drainage structures, installed by DB Contractor and crossing a rail line, shall be in accordance with the operating railroad's design criteria. DB Contractor shall coordinate, design and construct the construction staging, including any shooflies, with the operating railroad.

DB Contractor's design shall minimize service interruptions to existing rail lines.

14.2.1 Design Criteria

The criteria for design and construction shall meet the minimum requirements of standards established by the railroad.

Unless otherwise approved by the operating railroad, the minimum vertical clearance as shown in Section 11 shall be required over the entire railroad ROW within the Project Limits. For the purposes of establishing minimum vertical clearance, top-of-rail elevations shall be determined by measuring the high point of the rail within 1,000 feet on either side of the roadway centerline;

this elevation shall be field-verified. If the track grade is in a sag, then the required clearance will be determined using an average top of rail elevation, based on railroad criteria.

DB Contractor shall avoid placement of temporary or permanent project components inside railroad ROW to the extent possible. Any such placements inside railroad ROW require approval of the operating railroad. DB Contractor shall be responsible for attaining required approvals.

14.3 Administrative Requirements

14.3.1 Railroad Agreements

DB Contractor shall be responsible for obtaining the required approvals, permits, and agreements as required for the Work, including any railroad-related Work.

DB Contractor shall be responsible for executing any required payment agreements with the railroad to reimburse the railroad for required activities during construction, such as flagging and inspection. These agreements shall be between DB Contractor and the railroad.

For any preliminary activities on railroad ROW, DB Contractor shall be responsible for executing any necessary agreements with the railroad to enter railroad property and authorize railroad to provide flagging.

DB Contractor shall obtain all approvals, permits, and agreements as required prior to performing any Work impacting a railroad. Construction and Maintenance (C&M) Agreements shall be between TxDOT, DB Contractor, the appropriate railroad company and appropriate Governmental Entities and may take 12 months or more to obtain from the railroad company. Current approved templates for TxDOT/railroad company agreements are available from the TxDOT Rail Division at Rail-Highway.Section@txdot.gov.

The following agreements may be required based upon the railroad's requirements:

(a) Preliminary Engineering – Most railroads require preliminary engineering agreements in order to proceed with the development and review of plans. These agreements shall be between DB Contractor and the railroad. DB Contractor shall prepare and be responsible for executing any required preliminary engineering agreements with the railroad to reimburse the railroad for preliminary engineering and estimating performed by the railroad or their consultant(s) included attending project meetings, reviewing and approving designs, and developing any necessary cost estimates;

(b) License to Cross and C&M Agreement (License Agreement) – DB Contractor shall prepare the draft agreement to be executed between railroad, DB Contractor and TxDOT. A License to Cross railroad ROW is normally required when the highway project involves a new crossing or grade separation of the railroad. A separate easement agreement may be obtained in lieu of the License to Cross. DB Contractor shall prepare all the documents required to obtain the License Agreement, including preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT. DB Contractor shall submit the draft License Agreement to TxDOT for transmittal to the railroad. TxDOT shall have the opportunity to comment on any submittals, and DB Contractor shall respond to all comments in writing. TxDOT will not proceed with the C&M Agreement until sufficient resolution is reached on all comments. After all comments have been incorporated or satisfactorily resolved by any or all of DB Contractor, railroad or TxDOT, DB Contractor shall submit a complete and final agreement to TxDOT for execution. This agreement shall include provisions for each party's

access to the facilities for regular inspection, maintenance as well as emergency repairs as required;

(i) Aerial Easements (for grade separations only) – DB Contractor may be required by the railroad company to enter into a separate easement agreement to obtain air rights to cross railroad ROW. If an aerial easement is required, the "License" portion of the C&M Agreement will be modified to identify the aerial easement as the right to cross railroad ROW with the new highway facility;

(ii) Temporary Construction Easements – DB Contractor may be required to purchase a temporary construction easement for the railroad company. This requirement will be stipulated in and be a part of the C&M Agreement; and

(c) Railroad's Contractor Right-of-Entry Agreements (Texas approved versions only) – In order to enter the railroad's ROW to perform the Work, DB Contractor or its Subcontractor shall secure a railroad Right of Entry agreement and shall coordinate the arrangements of the necessary agreements directly with the railroad.

All executed agreements shall be submitted in their entirety as part of the Final Design Documents.

14.3.2 Project Work Affecting Railroad Operations

Should the Project cross a railroad ROW owned by an operating railroad, DB Contractor shall coordinate the Work with the operating railroad or lessor of that line/property. DB Contractor shall be responsible for obtaining the required approvals, permits, and agreements as required for the railroad-related Work.

14.3.3 Operation Safety

DB Contractor shall arrange with the operating railroad for railroad flagging as required. DB Contractor shall comply with the operating railroad's requirements for contractor safety training prior to performing Work or other activities on the operating railroad's property and shall maintain current registration prior to working on railroad property.

If not detailed in the respective railroad's Right of Entry agreement, or if not directed otherwise by the respective railroad, DB Contractor shall notify the respective railroad representative at least ten Business Days in advance of DB Contractor commencing its Work and at least 30 Business Days in advance of any Work by DB Contractor in which any person or equipment will be within 25 feet of any track, or will be near enough to any track that any equipment extension such as, but not limited to, a crane boom will reach within 25 feet of any track. No Work of any kind shall be performed, and no person, equipment, machinery, tool(s), material(s), vehicle(s), or thing(s) shall be located, operated, placed, or stored within 25 feet of any track(s) unless authorized by the railroad. Upon receipt of such 30-Day notice, the railroad representative will determine and inform DB Contractor whether a flagman need be present and whether DB Contractor needs to implement any special protective or safety measures.

14.3.4 DB Contractor Right of Entry Agreement

DB Contractor shall cooperate and coordinate with all operating railroads for access by the operating railroad and/or their agents to the rail ROW as necessary for rail maintenance and operations activities, inspection, repair and emergency responses.

14.3.5 Insurance Requirements

DB Contractor shall procure and maintain insurance policies as required in Exhibit 14 of the Agreement.

14.4 Construction Requirements

DB Contractor shall comply with all construction requirements and specifications set forth by the operating railroad and shall invite the appropriate railroad company to all pre-construction meetings

DB Contractor shall be responsible for scheduling the Work to be completed by operating railroad, as well as the Work to be completed by its own forces. DB Contractor shall be responsible for all costs associated with the railroad/transit force account work.

The operation of the railroad and the affiliated railroads (those running through the railroad property in particular), and the operations of the leasees, licensees, and other lawful occupants of the railroad property, shall have absolute priority over the performance of construction for the Project. DB Contractor shall coordinate with the railroads to coordinate the Work with the operations of the railroads.

14.4.1 Flagging

DB Contractor shall arrange for railroad flagging, as required with the railroad company, to ensure the safe passage of rail traffic throughout the Project Limits effecting railroad ROW.

14.4.2 Safety Certification

DB Contractor shall comply with the railroad's requirements for contractor safety training prior to performing Work or other activities on the railroad's ROW and shall maintain current registration prior to working on railroad property.

14.5 Submittals

Submittals described in Section 14 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 14-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 14			
Copies of all insurance policies	Prior to any entry upon operating railroad property	For Information	14.3.5

SECTION 15.0 AESTHETICS AND LANDSCAPING

15.1 General Requirements

This Section 15 defines requirements with which DB Contractor shall design and construct aesthetic treatments for the roadway, structures, drainage, and landscaping elements of the Project. Aesthetic treatments shall be designed to harmonize with the local landscape and architecture, as well as the developed themes of the local settings. DB Contractor shall coordinate with TxDOT to achieve this harmonization.

A landscaping allowance has been established for the Project as referenced in Section 12.1.6 of the Agreement. The landscape allowance shall be limited to furnishing and installing landscaping Elements, but will not include top soil, seeding of grass, and sodding. All design tasks including but not limited to developing the conceptual landscape plan, detailed landscaping plans, estimating and pricing any alternates, and re-design of detailed landscape plans to accommodate the landscape allowance budget are excluded from the landscaping allowance. All other aesthetic elements are excluded from the landscaping allowance including the cost of furnishing and installing hardscape, cost of furnishing and installing irrigation systems, cost of installing water lines, permits and the cost to water and/or irrigate, etc. Cost related to maintenance of landscaped areas is also excluded from the landscaping allowance, as is cost for replacement of dead or distressed plant materials and all costs and materials associated with replacement. Other than landscape plant materials, aesthetic elements as identified in Section 15.2 are not included in the landscaping allowance.

Bids for the landscape allowance as stated in the Agreement shall be in accordance with the sums stated within the Agreement.

Not less than one half of one percent (1/2%) of the landscape allowance shall be utilized for the planting or seeding of wildflowers within the Project ROW. This is a dedicated allotment of a portion of the landscape allowance for wildflowers; it is not a separate amount in addition to the landscape allowance. DB Contractor shall coordinate and take direction from the respective TxDOT Bryan and Houston District offices at the commencement of landscape design with regard to their respective desires for dedicating any higher proportion of the budgeted landscape allowance for wildflower plantings.

This Section 15 presents minimum aesthetics and landscape design requirements for Project designs. For purposes of this Section 15, the following list of items will be considered the aesthetics elements of the Project design:

(a) Material, finish, color, shape and texture of bridge elements;

(b) Materials, finish, and color of barriers and railings;

(c) Paved slope treatments;

(d) Finish, color, and texture of retaining and noise/sound walls;

(e) Contour grading, slope rounding, channel treatments, and drainage;

(f) Sculptural and artistic features of other structures;

(g) Sidewalks, median or pedestrian specialty paving, including material, finish, and color;

(h) Hardscape at interchanges and intersections;

(i) Fencing;

(j) Signage – overhead, attached, and ground-mounted;

(k) Gantries;

(l) Any permanent building construction within the Project, including ancillary support, operational, and toll collections;

(m) Light fixture, ambient light colors, and general layout conditions; and

(n) Landscape plant materials.

15.1.1 Aesthetics Concepts

Aesthetic elements shall be designed as corridor-wide enhancements. To the extent practicable, the aesthetic elements shall remain consistent in form, materials, and design throughout the length of the Project where applied.

DB Contractor shall use the following specified pages and concepts, and only the specified pages and concepts, of the approved *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* as the basis for the development of the aesthetics on Segment 1 of the corridor with the exception of bridges at approximate STA 1842+00 (Future thoroughfare) and 1915+00 (Mill Creek B) which shall use Bryan District Aesthetic Standards. DB Contractor shall use the vertical scheme as provided in these guidelines for Segment 1 except for bridges at STA 1842+00 and 1915+00 as cited above.

1 Overview

2 Regional Urban Design Schemes

3 Corridor Development Zone Concepts

V-0 HOUSTON DISTRICT VERTICAL SCHEME

V-1 CORRIDOR SCHEMES

V-2 RETAINING WALL – 1 of 4

V-3 RETAINING WALL – 2 of 4

V-4 RETAINING WALL – 3 of 4

V-5 RETAINING WALL – 4 of 4

V-10 RETAINING WALL COPING – MSE WALL PRE-CAST COPING

V-11 ABUTMENT WALL – 1 of 2 – MSE PANEL ABUTMENT WALL

V-12 ABUTMENT WALL – 2 of 2 – MSE PANEL ABUTMENT WALL

V-13 ABUTMENT WALL – MSE PANEL SLOPED ABUTMENT WALL

V-14 BRIDGE BENT – BASELINE BRIDGE BENT

V-15 BRIDGE BENT – ARCH SYSTEM BRIDGE BENT

V-16 HOV BENT / DIRECT CONNECTOR

V-17 SIGN COLUMNS – 1 of 2 – OVERHEAD SIGN COLUMNS

V-18 SIGN COLUMNS – 2 of 2 – OVERHEAD SIGN COLUMNS

V-19 SIGN COLUMNS – 1 of 2 – OVERHEAD SIGN COLUMNS

V-20 SIGN COLUMNS – 2 of 2 – OVERHEAD SIGN COLUMNS

V-21 SOUND WALL – 1 of 2

V-22 SOUND WALL – 2 of 2

V-23 SOUND WALL – 1 of 2

V-24 SOUND WALL – 2 of 2

V-25 SOUND WALL – END WALL

TD-0 HOUSTON DISTRICT TYPICAL DESIGN DETAILS

TD-1 HOUSTON DISTRICT INTERCHANGES

TD-2 INTERCHANGE BENT – FLYOVER BENT

TD-3 INTERCHANGE STRADDLE BENTS – STRADDLE BENT-A

TD-4 INTERCHANGE STRADDLE BENTS – STRADDLE BENT-B

TD-5 INTERCHANGE STRADDLE BENTS – STRADDLE BENT-C

TD-6 CAPBEAM

TD-7 TRAFFIC RAIL

TD-8 SIDEWALK PAVING – 1 of 2 – CONCRETE PAVER LOCATIONS

TD-9 SIDEWALK PAVING – 2 of 2 – CONCRETE PAVER LOCATIONS

TD-11 FENCE DETAILS – FENCING SCHEME A

TD-12 FENCE DETAILS – FENCING SCHEME B

DB Contractor shall use the TxDOT Bryan District Aesthetic Standards as the basis for the development of the aesthetics for Segment 2 and the bridges at approximate STA 1842+00 and 1915+00 in Segment 1. It shall be understood that with TxDOT approval, the concepts for components of the Project corridor may need to be adapted to Site specific conditions in one or more Segments of the Project.

DB Contractor shall prepare one or more aesthetics concepts for the Project that provide design intent for submittal to TxDOT. DB Contractor shall base presentation on the principles and approved standards requirements and strategies provided in Section 15.2.

DB Contractor shall meet and review the proposed aesthetics concepts with TxDOT. After TxDOT comment, DB Contractor shall prepare a final aesthetic concept that addresses TxDOT comment and submit it to TxDOT for review and approval. The approved aesthetic concept shall be incorporated into the *Aesthetics and Landscaping Plan(s)* for TxDOT approval.

15.1.2 Aesthetics and Landscaping Plan

DB Contractor shall prepare an *Aesthetics and Landscaping Plan* in conformance with the Project's final aesthetic concept which provides guidelines and requirements for the aesthetics design of the Project. The final aesthetic concept is to be incorporated into the *Aesthetics and Landscaping Plan* and submitted to TxDOT for review and approval.

The *Aesthetics and Landscaping Plan* shall include all elements to fully communicate the proposed aesthetic treatment to TxDOT and shall address:

15.1.2.1 Aesthetics

DB Contractor shall provide:

(a) All plans, sections, elevations, perspectives, isometrics, etc., as needed to fully communicate the aesthetic treatment and approach to aesthetic elements including: walls, noise/sound walls, bridges, traffic rail, landscape pavers, and signage structures;

(b) A master plan that will convey the layout of the various roadway conditions (i.e., depressed sections, elevated sections, at-grade roadways, bridges, cantilevered structural sections);

(c) Drawings showing locations of Site-specific elements (i.e., fences, signage, colored lighting, potential locations of TxDOT approved community improvement opportunity areas, gate way markers, bridge enhancements, and landscaping);

(d) Drawings showing the location of existing and proposed Utilities as they relate to the location of aesthetic improvements. DB Contractor shall provide composite drawings showing potential conflicts for proposed improvements and DB Contractor's proposed solutions to resolve those conflicts; and

(e) Drawings showing color schemes and their locations.

15.1.2.2 Landscaping

DB Contractor shall provide:

(a) A plan that indicates plant palettes, plant size and locations, plant specifications, planting specifications and staking details, soil preparation plan, and planting dates;

(b) An establishment program. DB Contractor shall include as a part of the establishment program a 12-month guarantee for the replacement of all dead or distressed plant material;

(c) A 24-month maintenance program of which the referenced establishment program is a part,

(d) A 24-month minimum watering program, of which the establishment program is a part. DB Contractor watering of plant materials for the Project shall comply with the *Vegetative Watering Schedule for Trees, Shrubs and Vine*s, Sheet 1, and the *Vegetative Watering Schedule for Palms Only*, Sheet 2 of the *Houston District Planting and Establishment* standards; and

(e) Composite drawings of all utilities and easements that would interfere with landscaping, markers, or any other identified enhancements.

The *Aesthetics and Landscaping Plan* shall include all plans, elevations, perspectives, isometrics, details etc., as needed to fully convey the aesthetic treatment. Soil preparation plans, landscape staking, mulching, and other aspects of plant installation and maintenance for all Segments of the Project shall comply with *Houston District Planting and Establishment* standards and all TxDOT specifications and special provisions noted therein. In the event of conflicts between this Section 15 and TxDOT standards, specifications and special provisions, this Section 15 shall take precedence. For landscaping purposes, the *TxDOT Houston District Planting and Establishment* standards shall be utilized for the full Project within both the Houston and Bryan Districts with exception of the use of *Houston and Bryan District Planting Layout Guidelines* referenced in Section 15.2.

Upon completion of the *Aesthetics and Landscaping Plans,* DB Contractor shall consolidate the information, which establishes the requirements for engineering of the highway corridor aesthetics. The guidelines shall serve as the primary standard guidance necessary to produce the intended aesthetic form, function, and appearance of this and future similar projects.

This *Aesthetics and Landscaping Plans* shall be presented in the following format:

(a) 11 inch x 17 inch format;

(b) Front sided only;

(c) Eight paper copies, in color; and

(d) Eight CD copies, with guidelines in PDF.

The *Aesthetics and Landscaping Plans* shall be incorporated into the final engineering design.

TxDOT approval of the *Aesthetics and Landscaping Plans* is required prior to construction of any elements affected by this Plan.

15.1.3 Personnel

DB Contractor shall provide a landscape architect, registered in the State of Texas, with a minimum five years' experience in designing aesthetics and landscaping elements for roadway projects of similar scope and size, to develop the *Aesthetics and Landscaping Plans*. DB Contractor Landscape Architect shall remain involved from the beginning of the *Aesthetics and Landscaping Plans*, through construction, and shall ensure continuity and compliance with the *Aesthetic and Landscaping Plans*, *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* and applicable TxDOT and TxDOT District office standards and these Technical Provisions. DB Contractor landscape architect shall

coordinate with the District landscape architects, or the otherwise TxDOT appointed designee, for the TxDOT Bryan and Houston District offices throughout design and construction relative to compliance with the aforementioned plans, guidelines, and standards. DB Contractor landscape architect shall coordinate in advance with the TxDOT District landscape architect(s) or their designees the scheduling for associated *Aesthetics and Landscaping Plans* design review and aesthetic and landscape construction activities, commencing with a meeting at the respective District's offices to be requested by DB Contractor in advance of the commencement of landscape and aesthetics design.

15.2 Design Requirements

15.2.1 Aesthetics Principles and Strategies

DB Contractor shall follow the guidelines and requirements of the approved *Aesthetics and Landscaping Plans* as well as the aesthetics principles, requirements, and strategies established by TxDOT for the Project design, including the following:

(a) Aesthetics shall not interfere with safety, constructability, and maintenance requirements;

(b) The Project design shall minimize impact on the existing natural environment to the extent possible;

(c) The Project design shall emphasize and enhance the existing natural context and landscape to the fullest extent possible;

(d) All structures shall be carefully detailed so as to achieve the greatest level of aesthetic quality and conform to the approved *Aesthetic and Landscaping Plan*;

(e) Color, texture, and form shall be used appropriately for all structures;

(f) Graphics, signage, and lighting shall be consistent along the entire length of the Project;

(g) Existing native trees and established naturalized trees and natural features shall be preserved to the greatest extent possible and replaced if disturbed;

(h) Aesthetic elements shall be fully integrated with the overall structure and landscape design;

(i) Visual quality of the landscape shall be consistent along the entire length of the Project with the noted differences in plant sizes within the Houston and Bryan District Planting Layout Guidelines. This transition between applicable District Planting Layout Guidelines and the applicable Segment 1 and Segment 2 Aesthetic Guidelines will take place at Station 1838+00;

(j) Native-area and/or naturalized plant materials that exhibit good drought tolerance shall be used to the extent possible;

(k) Aesthetic elements shall be easy to maintain and resistant to vandalism and graffiti;

(l) Aesthetic elements shall conform to the approved *Aesthetic and Landscaping Plan;*

(m) Landscape shall be established and maintained; and

(n) Landscape shall be consistent with the TxDOT Houston and Bryan District Planting Layout Guidelines.

15.2.2 Walls and Sign Columns

DB Contractor shall design noise/sound walls to be similar in color, texture, style, and aesthetic treatment to retaining walls consistent with the approved *Aesthetic and Landscaping Plan*. DB Contractor shall apply aesthetic treatments to the vertical surfaces of retaining and noise/sound walls where the surface is visible from the roadway or adjacent residential dwelling units. Consistent treatments shall be used for retaining and noise/sound walls and exposed concrete column sign support structures that articulate the design themes established for the respective Project Segments 1 and 2.

The roadside face of noise/sound walls shall have a consistent appearance throughout their length. The side of the noise/sound walls facing away from the roadway may vary based upon TxDOT approved conceptual and final design and, if so directed by TxDOT, community input gathered by DB Contractor.

15.2.3 Bridges and Other Structures

All aesthetic treatments for structural Elements shall be coordinated with DB Contractor's structural design team to facilitate constructability and maintain safety requirements. All substructure columns, abutments, bridge rails, and other structures shall be consistent in form and texture within their respective project Segments 1 and 2, with similar shapes and details used for all bridges, in accordance with the approved *Aesthetic and Landscaping Plan.*

No exposed conduits or drain pipes will be allowed on bents, columns, bridge beams, retaining walls, or any other visible surface.

DB Contractor shall ensure that a constant superstructure depth is maintained throughout the bridge length consisting entirely of steel girders or concrete beams. For superstructures where both steel girders and concrete beams are used, such as at direct connection structures and braided ramps, transition from concrete beams to steel girders may be accomplished by dapped end girders and concrete beam spans shall be of constant depth throughout the structure.

15.2.3.1 Low and High Visibility Bridges

Bridges that have been determined by TxDOT to not be clearly visible from the mainline, access roads, and cross-streets at the time of construction or within a foreseeable timeframe are identified as structures of Low visibility in Table 15-1. These Low Visibility bridges do not require substructure aesthetic treatments and can be designed and constructed using standard TxDOT bent caps, standard TxDOT round columns, standard TxDOT overhangs, and sloped concrete riprap at abutments. Aesthetic treatments for superstructure and all other components of the structures shall be applied to those High Visibility bridges identified as such in Table 15-1, in accordance with the applicable *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* and the applicable *Bryan District Aesthetic Standards*. Design and construction of all High Visibility structures shall be in accordance with the aesthetics concepts developed per Section 15.1.1. DB Contractor's design will also comply

with all applicable *Texas Department of Transportation - Houston District Standards,* https://www.dot.state.tx.us/hou/specinfo/specs.htm.

Table 15-1**,** Bridge & Aesthetic Treatment Criteria, identifies project bridges by Low and High "Visibility."

DB Contractor shall not use varying shaped structural columns for Low Visibility bridges within the Segments. All new columns shall have the form specified within the approved *Aesthetic and Landscaping Plan* throughout the Segments. Aesthetic column treatments for High Visibility bridges shall be consistent within the applicable TxDOT District, though bridge column treatments are different for the Houston and Bryan Districts. The applicable District's aesthetic treatment is noted by approximate structure location for structures in Table 15-1.

The following requirements apply to bridge abutments:

(a) On all bridges that have sloped concrete riprap at abutments and are visible to traffic, DB Contractor shall not be allowed to wrap concrete riprap around the bridge abutments. The concrete riprap shall be limited to 3 feet past the limits of the bridge deck overhead. However, this requirement shall not be applicable to bridges spanning creeks; and

(b) DB Contractor shall provide the appearance of a symmetric design for bridges where possible.

Table 15-1: Bridge & Aesthetic Treatment Criteria

Segment	Approx. Station	Facility Carried	Feature Crossed	Aesthetic Treatment[1]	Visibility
1	1190+00	Main lane	West Rollingwood St, FM 1774, Union Pacific Railroad, and Circle Lake Drive	HOU	High
1	1228+00	Main lane	Future Terra Boulevard	HOU	High
1	1250+00	Main lane	Mill Creek Tributary A	HOU	High
1	1250+00	Ramp	Mill Creek Tributary A	HOU	Low
1	1260+00	Main lane	FM 149	HOU	High
1	1293+00	Main lane	Mildred Lane	HOU	High
1	1320+00	Main lane	Mill Creek Tributary B	HOU	Low
1	1350+00	Main lane	Mill Creek Tributary C	HOU	Low
1	1390+00	Main lane	Future thoroughfare	HOU	High
1	1400+00	Main lane	Mill Creek Tributary D	HOU	Low
1	1425+00	Main lane	Mill Creek Tributary E	HOU	Low
1	1455+00	Main lane	Mill Creek Tributary F and FM 1488	HOU	High
1	1455+00	Ramp	Mill Creek Tributary F	HOU	Low

Segment	Approx. Station	Facility Carried	Feature Crossed	Aesthetic Treatment[1]	Visibility
1	1535+00	Main lane	Future thoroughfare and Mill Creek A	HOU	Low
1	1555+00	Main lane	Clear Creek A	HOU	Low
1	1630+00	Main lane	Clear Creek B	HOU	Low
1	1630+00	Main lane	Clear Creek B (Base Scope)	HOU	Low
1	1655+00	Main lane	FM 1486	HOU	High
1	1815+00	Main lane	Mill Creek Tributary G	HOU	High
1	1842+00	Main lane	Future thoroughfare	BRY	High
1	1915+00	Ramp	Mill Creek B	BRY	Low
1	1915+00	Main lane	Mill Creek B	BRY	Low
2	1935+00	Main lane	FM 1774	BRY	High
2	1975+00	Main lane	Mill Creek C	BRY	Low
2	2000+00	Main lane	Union Pacific Railroad	BRY	Low
2	2015+00	Main lane	Urbanosky Lane	BRY	High
2	2075+00	Main lane	Pinebrook South Access	BRY	High
2	2210+00	Main lane	CR 304	BRY	High
2	2225+00 (Green)[2] 2260+00 (Yellow)[2]	Main lane	Northbound to Southbound Access Road Turnaround	BRY	High
2	2280+00 (Green)[2] 2290+00 (Yellow)[2]	Main lane	Beason Creek	BRY	Low
2	2317+00 (Green)[2] 2325+00 (Yellow)[2]	Main lane	CR 307	BRY	High
2	2375+00 (Green)[2] 2400+00 (Yellow)[2]	Main lane	CR 306 and Burlington Northern Santa Fe Railway	BRY	High
2	2415+00 (Green)[2] 2440+00 (Yellow)[2]	Main lane	FM 1748	BRY	High

Segment	Approx. Station	Facility Carried	Feature Crossed	Aesthetic Treatment[1]	Visibility
2	170+00	Direct Connector	Eastbound SH 105 and Union Pacific Railroad	BRY	High

Notes:
1. DB Contractor shall transition between use of Houston and Bryan Districts aesthetic and landscaping guidance documents at STA 1838+00.
2. Reflects one of the two "preferred" "green" and "yellow" alignments awaiting TxDOT approval of a final Segment 2 alignment which is anticipated in conjunction with the completion of the environmental study process as shown in the RID.

15.2.4 Trees, Shrubs, and Other Plant Materials

All trees, shrubs, deciduous vines, and perennials shall comply with the applicable requirements of the *American National Standards Institute Z60.1 American Standard for Nursery Stock*. DB Contractor shall consult with the TxDOT Houston District and Bryan District landscape architects for recommended plant species lists. DB Contractor shall use plant species native to the area or naturalized for the Site.

In order to establish and maintain landscape planting, DB Contractor shall provide a watering program for a minimum of 24 months.

In order to promote rooting establishment, DB Contractor shall provide a soil preparation plan for entire landscape planting areas.

In order to monitor and control weeds, DB Contractor shall provide weed control measures in the *Aesthetics and Landscaping Plan*.

Vegetation provided as a part of DB Contractor's *Aesthetics and Landscaping Plans*, other than grassing, and erosion control measures, shall be incorporated with the following guidelines:

(a) Plants shall be placed in accordance with TxDOT's minimum clearance zones. Trees shall conform to landscape development concepts, guidelines, and principles set forth in the *Houston and Bryan District Planting Layout Guidelines*; and

(b) Design must be in conformance with the Houston and Bryan District Planting Layout Guidelines and shall comply with the *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* goals of having trees planted along roadways wherever appropriate. The native naturalized reforestation design shown in the TxDOT Houston and Bryan District Planting Layout Guidelines is required because of visual considerations and long-term maintenance.

15.2.5 Riprap, Paving and Pavers

Concrete paving or landscape pavers shall be used in hard-to-reach mowing areas or under structures such as, but not limited to, areas between, near, or next to guard fence posts, bent columns, retaining walls, freeway ramp gores, paved ditches, flumes, and ditch inlets to improve roadway appearance.

Concrete riprap and landscape pavers shall be applied per the approved *Aesthetic and Landscaping Plan.*

15.2.6 Color Palette

As part of the *Aesthetics and Landscaping Plan*, DB Contractor shall conform to all standards and documents identified or otherwise specified within this Section 15 including those published by TxDOT on approved TxDOT websites. The color palette for each district must be approved by the respective district during the design approval process.

15.2.7 Lighting Aesthetics

DB Contractor shall design the aesthetic enhancement lighting with the following aesthetic criteria:

(a) One type for the entire corridor. DB Contractor shall provide a lighting layout plan that addresses each light fixture (i.e., roadside lighting, high mast lighting, and under bridge fixture) and type of light fixture (i.e., Light Emitting Diode [LED] lighting, point source lighting, and High Intensity Discharge lamps).

15.3 Construction Requirements

DB Contractor shall provide TxDOT sample panels within the timeframe stated in Table 15-2. DB Contractor shall construct sample panels that meet the requirements of Form Liner Finish as defined in TxDOT Standard Specifications Item 427, Surface Finishes for Concrete, that comply with the principles, requirements, and strategies established by TxDOT and the approved *Aesthetics and Landscaping Plans* and approved TxDOT District Standards. TxDOT must review and approve the sample panels before any construction form liners, paint, or landscape pavers may be ordered, obtained, or used. DB Contractor shall provide sample equivalent to the size of the panels that will be installed when constructed with a representative un-textured surrounding surface. The approved sample panel shall be the standard of comparison for the production concrete surface texture.

For textured panels or concrete surfaces finished with a coating of paint or stain, DB Contractor shall prepare a corresponding coated panel or surface area of an in-place element for approval prior to the coating operation.

All sample panels shall be representative of the actual panel that will be placed. Primary, secondary, and accent colors shall be displayed.

15.4 Aesthetic Enhancements

If requested by TxDOT, DB Contractor shall provide adjacent Governmental Entities the opportunity to enhance aesthetic and landscaping features consistent with the requirements herein. The capital and maintenance costs of any TxDOT approved adjacent Governmental Entity improvements (aesthetic enhancements) shall be the responsibility of the adjacent Governmental Entity. If TxDOT requires, DB Contractor shall coordinate the necessary arrangements directly with the appropriate local Governmental Entity for aesthetic enhancements within the local Governmental Entity's jurisdiction. DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated and provided/maintained for all irrigation controllers and aesthetic lighting within the Project Limits during the D&C period. The local Governmental Entity will maintain local Governmental aesthetic enhancements during the Term of the Agreement and the Maintenance Period. DB Contractor shall provide watering for establishment of local Government Entity plant material within the Project ROW as a part of the approved watering program for the Project, but DB

Contractor will not be responsible for the maintenance or replacement of local Governmental Entity plant materials.

Aesthetic enhancements shall be incorporated into the aesthetic concept to be submitted in plan form to TxDOT for approval.

15.5 Submittals

Submittals described in Section 15 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 15-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 15-2: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 15			
Proposed aesthetic concepts	Prior to determination of final aesthetic concept	Review and comment	15.1.1
Final aesthetic concept	Within 60 days after issuance of NTP1	Approval	15.1.1
Aesthetics and Landscaping Plan	Prior to issuance of NTP2	Approval	15.1.2
Textured panel samples	90 days in advance of starting construction of textured concrete surfaces and landscape pavers	Approval	15.3

SECTION 16.0 SIGNING, DELINEATION, PAVEMENT MARKING, SIGNALIZATION, AND LIGHTING

16.1 General Requirements

This Section 16 includes requirements with which DB Contractor shall design, construct, operate, maintain, and be responsible for cost of power to all signs, delineation, pavement markings, signals, and lighting for the Project during the D&C Period consistent with TxDOT agreements with Governmental Entities.

16.2 Administrative Requirements

16.2.1 Meetings

DB Contractor shall arrange and coordinate all meetings with local Governmental Entities that will assume responsibility for maintaining and operating traffic signals and roadway lighting. DB Contractor shall provide TxDOT with notification of such meetings a minimum of 48 hours prior to the start of the meeting. TxDOT, in its discretion, may attend such meetings.

DB Contractor shall arrange and coordinate all meetings with requesting Governmental Entities or individuals regarding special signs.

16.3 Design Requirements

DB Contractor shall design all signing, delineation, pavement marking, and signalization in accordance with the TMUTCD and TxDOT's *Standard Highway Sign Designs for Texas* (SHSD), TxDOT's *Freeway Signing Handbook,* TxDOT's *Sign Crew Field Book,* TxDOT's Traffic Engineering Standard Sheets and TxDOT Standard Specifications.

DB Contractor shall design all illumination in accordance with the TxDOT's *Highway Illumination Manual* (HIM), National Electrical Code (NEC), AASHTO *Roadway Lighting Design Guide*, TxDOT's Traffic Engineering Standard Sheets, and TxDOT specifications.

DB Contractor's design shall incorporate the following requirements:

(a) Minimum size for all the proposed warning signs shall be 36 inches x 36 inches;

(b) Install warning signs W8-13aT (48 inches x 48 inches) "BRIDGE MAY ICE IN COLD WEATHER" in advance of all bridges;

(c) Use R3-7R "RIGHT LANE MUST TURN RIGHT" and R3-7L "LEFT LANE MUST TURN LEFT" signs where required. Do not use R3-5R or R3-5L "Arrow and ONLY" signs;

(d) Install object markers OM-2Y under the route marker assembly located at the entrance ramp gore between the access road and main lanes;

(e) Install object markers OM-1 on each leg of large ground mounted signs where the signposts are not protected by concrete barrier or metal beam guard fence, similar to the exit sign at the exit gore;

(f) Install appropriate added lane sign W4-3R/L (48 inches x 48 inches) or merge sign W4-1R/L (48 inches x 48 inches) on the main lanes of the freeway in advance of each entrance ramp;

(g) Install advisory exit speed limit sign W13-2 (48 inches x 60 inches) on the main lanes in advance of each exit ramp;

(h) Design guide sign details according to the SHSD for TMUTCD and TxDOT current standard drawings “Typical Sign Requirements”;

(i) Use the B-3 arrow for overhead guide sign panel at the exit ramps;

(j) Design all overhead sign structures for Zone 3, 80 mph wind zone;

(k) All proposed signs installed on overhead sign structure facing same direction of traffic shall have the same height, except for supplemental overhead speed limit signs (which are 72 inches x 90 inches);

(l) Center all proposed overhead sign panels on the overhead sign structure truss;

(m) The bottom of the proposed overhead sign panels facing the same direction of traffic shall be on the same horizontal plane;

(n) All the small signs shall be aluminum type A;

(o) Small roadside signs shall use a triangular slipbase system in accordance with TxDOT standard drawings “Sign Mounting Details Small Roadside Signs Triangular Slipbase System SMD(SLP-1) thru SMD(SLP-3)-08” and shall use anchor type “SA”.

(p) Design all large ground mounted signs for Zone 3 (Type 300) which is 70 mph wind zone. (See TxDOT drawing “Roadside Guide Sign Post Selection Worksheet-SMD (8W1));

(q) All overhead sign panels shall be extruded aluminum; and

(r) All large ground mounted signs shall be extruded aluminum.

(s) At newly constructed intersections DB Contractor shall design and install signing including general signs, street name signs, pedestrian signs, regulatory signs, warning signs, and guide signs.

16.3.1 Final Design

DB Contractor shall advance the Final Design of the signing, delineation, pavement marking, signalization, and lighting based on the preliminary operational signing schematic contained within Exhibit 2 of the Agreement. If a preliminary operational signing schematic does not exist, DB Contractor shall prepare and submit a preliminary operational signing schematic for review and approval by TxDOT and FHWA prior to commencing Final Design. Before placing any signs, delineation, advance toll warning signs, third party signs, non-standard sign structures, pavement markings, traffic signals, and lighting, DB Contractor shall provide TxDOT a layout indicating the proposed location of such items.

16.3.2 Signing and Delineation

DB Contractor shall design and install all signs as shown on the Release for Construction Documents. Signs include new signs, as well as modifications to existing sign panels and structures. DB Contractor’s design shall include the locations of ground-mounted and overhead signs, graphic representation of all signs, proposed striping, delineation placement, guide sign

and special sign details, and structural and foundation requirements. Signs shall be located in a manner that avoids conflicts with other signs, vegetation, DMS**,** lighting, and structures.

DB Contractor shall ensure that signs are clearly visible, provide clear direction and information for users, and comply with all applicable TMUTCD requirements.

DB Contractor shall review with TxDOT all requests for new signs, including traffic generators, or modifications of existing sign text. Such requests are subject to TxDOT's approval.

DB Contractor's design of delineators and object markers shall comply with TMUTCD requirements.

Signs shall meet the requirements of TxDOT's SHSD.

16.3.3 Project Signs – Outside the Project ROW

For signs located outside the Project ROW but within a public ROW, DB Contractor shall install the signs in existing rights of way controlled by local Governmental Entities or other State Governmental Entities. DB Contractor shall coordinate with appropriate Governmental Entities for the design and installation of such signs.

16.3.4 Advance Toll Information Signs

For advance toll information signs, DB Contractor shall be responsible for coordinating with TxDOT to accommodate sign locations and foundation types, and design and installation of the signs. DB Contractor shall prepare and submit a preliminary advance toll information signing schematic meeting the requirements of the TMUTCD and using Good Industry Practice for review and approval by TxDOT with the preliminary operational signing schematic described in Section 16.3.1.

DB Contractor shall coordinate with TxDOT and all local toll entities in the area in determining the locations for advance toll information signs. At a minimum, advance toll information signs shall be installed at the following locations:

(a) At all locations where an existing roadway provides public access to the Project; and

(b) Prior to all entrance ramps to the Project.

16.3.5 Third-Party Signs

In addition to the warning, regulatory, and guide signs within the Project ROW, TxDOT or Governmental Entities may request that third-party signs, including logo signs, be installed by a third party. DB Contractor shall coordinate and cooperate with any third party performing such work. TxDOT may solicit input from DB Contractor in reviewing applications for new third-party signs, but will retain sole authority for approving installation of these signs. All costs associated with fabricating and installing these signs shall be borne by the sign applicant. If approved by TxDOT, TxDOT may require DB Contractor to fabricate and/or install these signs as a TxDOT-Directed Change.

16.3.6 Sign Support Structures

DB Contractor shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practices. Designs for sign supports shall also comply with requirements in Section 13 and Section 15.

DB Contractor shall design sign support structures to provide a vertical clearance of not less than 18 feet 6 inches between the roadway and the bottom of the sign.

DB Contractor's design shall also incorporate the following requirements:

(a) All overhead sign structure towers shall be concrete with the standard truss as shown on TxDOT standards. Coordinate the overhead sign structure elevation details with the overhead sign structure concrete column design; and

(b) All the overhead sign structure towers installed on bridge structures shall be steel pipe with the standard truss as shown on TxDOT standards.

16.3.7 Pavement Markings

DB Contractor shall ensure that the design and installation of all pavement markings comply with applicable TMUTCD requirements, TxDOT's Traffic Engineering Standard Sheets, and TxDOT Houston District Standards as described below.

DB Contractor shall mark median noses of all raised islands and inside edges of exclusive turn lanes (channelized curbs) in accordance with the requirements of TMUTCD and TxDOT's Traffic Engineering Standard Sheets.

DB Contractor shall use contrast markings for skip lines on the controlled access main lanes where light-colored pavement does not provide sufficient contrast with the markings. Contrast markings consist of black background in combination with standard TMUTCD marking colors.

DB Contractor's design shall also incorporate the following requirements:

(a) Thermoplastic longitudinal pavement markings are permitted to be used for locations within the Bryan District;

(b) Within the Houston District, all pavement markings shall be multipolymer pavement markings, except main lane lines, words, symbols, and shields;

(c) Main lane pavement lane lines shall be 12 inches contrast prefabricated pavement markings with warranty (6 inches white with 3 inches black on each side) within the Houston District; within the Bryan District, main lane pavement lane lines shall be seven inches contrast prefabricated pavement markings with warranty (4 inches white with 1.5 inches black on each side);

(d) All word, symbol, and shield pavement markings shall be prefabricated pavement markings Type C;

(e) Where the Project consists of rigid (i.e. concrete) pavement access road lane line pavement markings shall be six inches multipolymer pavement markings with shadow within the Houston District; access road lane line pavement markings shall be four inch thermoplastic

pavement markings in accordance with the TxDOT Statewide standards for locations within the Bryan District.

(f) All edge lines on the main lanes and access roads shall be six inch pavement markings within the Houston District; all edge lines on the main lanes and access roads shall be four inch pavement markings within the Bryan District;

(g) Paint all median noses and exclusive left turn lane curbs with reflective pavement markings (Type II);

(h) Pavement marking shields, cardinal direction (WEST, EAST, NORTH, SOUTH), and arrows shall be used on the main lanes approaching major interchanges to identify exiting and through traffic lanes. Install these pavement markings within approximately one mile of the interchange; and

(i) All signing and pavement markings at the exit ramps and access roads shall be according to TxDOT Houston District Standards ER-FR (1)-09 or ER-FR (2)-09 for those locations within the Houston District. Exit gore pavement markings shall not require 12-inches diagonal pavement markings as shown on FPM (1)-12 through FPM (4)-12. Exit gore pavement markings on main lanes shall include exit number gore markings that match the exit number as shown on standard PM (4)-12. For locations within the Bryan District, used TxDOT Statewide Standards FPM (1)-12 through FPM (4)-12.

16.3.8 Signalization

Traffic signal designs and modifications to existing traffic signals shall be completed in accordance with TxDOT Standard Specifications, the TMUTCD, and the requirements of the appropriate Governmental Entity.

16.3.8.1 Traffic Signal Requirements

DB Contractor shall design and install fully-actuated permanent traffic signals at all TxDOT-authorized intersections within Project Limits. In addition, DB Contractor shall modify, as appropriate, any existing traffic signals impacted by the Final Design. DB Contractor shall coordinate with TxDOT and the appropriate Governmental Entities to define appropriate traffic signal design requirements, local agency oversight of DB Contractor's Work, and final acceptance of traffic signals. DB Contractor shall coordinate with the appropriate Governmental Entities for synchronization of traffic signal networks.

DB Contractor shall purchase and install traffic signals, as well as, controller cabinets, controller cabinet assemblies, and other signal equipment that meet the requirements of the appropriate Governmental Entity. To effectively meet the Governmental Entity traffic signal requirements, as well as, the requirements for controller cabinets, controller cabinet assemblies, and other signal equipment; DB Contractor may consider purchasing signal equipment using contracts that the local Governmental Entities have with signal vendors.

TxDOT authorized intersections requiring permanent traffic signals pending warrant studies are:

(a) FM 1774 (Todd Mission); and

(b) FM 1488.

New or modified traffic signal equipment shall conform to regional ITS architecture and existing interconnected traffic signal systems.

DB Contractor shall provide both pedestrian and vehicle detectors at all traffic signals within the Site and shall comply with TxDOT's *Accessible Pedestrian Signal Guidelines*.

DB Contractor is responsible for preparing traffic signal agreements (or supplements thereto) for execution by TxDOT and the appropriate Governmental Entity having operation and/or maintenance responsibilities.

DB Contractor's design shall also incorporate the following requirements:

(a) Use Type D ground boxes;

(b) Traffic signal heads shall be black polycarbonate housing and with black backplates installed;

(c) Vehicular signal indications shall be 12 inches LED;

(d) Pedestrian signal heads shall be LED and have countdown indications;

(e) Locate signal cabinets between the access roads between the columns of the main lane overpass. Located on the Computerized Traffic Management System-cabinet side, if present;

(f) Single left turn lane to have single 5-section signal head with "<R <Y <G <Y <G" centered over left turn lane;

(g) Dual left turn lanes to have two 3-section signal heads with "<R <Y <G" centered over each left turn lane;

(h) Through signal heads are to be 3-section signal head closest to the stop bar of the one-way access R Y G" centered over each through lane for two through lanes and on the lane lines for three or more through lanes;

(i) For the cross street approaches, the 3-section signal closest to the stop bar of the one-way access road shall have an R6-1L (R) "one way" sign mounted beneath it;

(j) For dual left turn lanes on the cross streets, provide an R3-8 VAR lane assignment sign on the mast arm;

(k) Use radar for vehicle detection;

(l) For electrical services greater than 300 feet in distance from the controller, provide a Type T service at the controller as an electrical service disconnect within the Houston District and provide a Type D service at the controller as an electrical service disconnect within the Bryan District;

(m) Show luminaires on top of signal poles. Use LED luminaires;

(n) Use 1/C #4 XHHW for all power cable;

(o) Use 1/C #4 bare for grounding of all conduits containing power cable;

(p) Use 1/C #6 bare for grounding of all conduits containing non-power cable;

(q) Use 25 PAIR -#22 AWG for copper interconnect, where applicable;

(r) Use 144 STRAND (SM) for fiber interconnects, where applicable;

(s) Use Schedule 40 for all PVC conduits;

(t) Minimum of one 4-inch or two 3-inch conduit for bores or conduit beneath proposed pavement;

(u) Run 4/C #12 TRAY cable for safety lighting in same conduit as signal cable;

(v) Illumination cable to bypass the controller;

(w) Use 2/C #12 AWG Type A for all pedestrian pushbutton cable;

(x) Use 4/C #12 AWG Type A for all pedestrian signal head cable;

(y) Use 7/C #12 AWG Type A for all traffic signal head cable;

(z) Install battery back-up system for signal cabinets.

16.3.8.2 Traffic Signal Timing Plans

DB Contractor shall design signal timing plans for all new and modified traffic signals and shall submit to TxDOT for review. DB Contractor shall coordinate and implement signal timing plans that optimize traffic flows and provide signal coordination with adjacent intersections and arterials for all existing and new traffic signals, modified signals, and interconnected signals. Unless timing maintenance is otherwise provided by a Governmental Entity, DB Contractor shall be responsible for updating signal timing as necessary to maintain optimized flow. Signal timing and phasing plans at diamond interchanges shall conform to the coordinated signal phasing and timing of the corridor.

DB Contractor shall provide copies of all final implemented signal timing plans to TxDOT and the appropriate Governmental Entity.

16.3.8.3 Traffic Signal Warrants

As part of the Final Design process, DB Contractor shall collect traffic data and prepare traffic warrant studies for proposed signalized intersections not signalized at the time of NTP1, including those listed in Section 16.3.8.1, and shall submit these signal warrant studies to TxDOT for review. The warrant studies shall address all signal warrant criteria in the TMUTCD. DB Contractor shall make recommendations for new signal installations based on these warrant studies in consultation with TxDOT and the appropriate Governmental Entities. TxDOT will reasonably determine if a signal or modification is required, based upon the warrant study.

All requests for signals within the Project ROW throughout the Term of the Agreement shall be subject to TxDOT approval. Requests for signals shall include supporting traffic warrant studies and traffic signal plans prepared in accordance with the TMUTCD and TxDOT standards.

Signal warrant studies shall be based on actual traffic and/or opening year traffic projections. If actual traffic volumes are not available, but opening year traffic is available, DB Contractor shall use the procedure in Section 3.5 of the TxDOT *Traffic Signals Manual* to determine the volumes

to be analyzed. If opening year traffic volumes are not available, opening year traffic volumes shall be calculated by applying a 50-percent reduction to the design year traffic projections.

16.3.8.4 Traffic Signal Support Structures

DB Contractor shall coordinate with TxDOT and the appropriate Governmental Entities to determine the type of traffic signal support structures. DB Contractor shall obtain the maintaining Governmental Entities' approval of traffic signal support structures to be used on new signal installations.

Designs for traffic signal support structures shall also comply with requirements in Section 13 and Section 15.

16.3.8.5 Traffic Signal Systems

DB Contractor shall provide interconnection systems between new or modified signals and any other signal system within one mile of the Site as required by TxDOT or the appropriate Governmental Entity. DB Contractor shall make existing signal systems compatible with the proposed interconnections. DB Contractor shall ensure continuous communication with the traffic signal system within the Site, and shall provide all communication hardware/equipment for TxDOT or the appropriate Governmental Entity to communicate with the signal systems within the Site. Connectivity shall be established to Houston TranStar for traffic signal monitoring and control.

DB Contractor shall provide to TxDOT an Acceptance Test Plan (ATP) for all traffic signals. This ATP shall also be submitted to the appropriate Governmental Entity. DB Contractor shall conduct testing in accordance with the ATP and document those results to show conformance.

16.3.9 Lighting

DB Contractor shall provide safety roadway lighting at all entrance and exit ramp gores within the Project Limits, and high mast lighting for the direct connector ramps at the major interchanges. DB Contractor shall provide LED illumination under bridges at all underpass/overpass locations within the Houston District and where warranted by a lighting study within the Bryan District. At underpass/overpass locations within the Bryan District where illumination is not warranted, DB Contractor shall design and construct illumination infrastructure, including conduit and appropriate pull boxes, for future use. DB Contractor shall prepare and underpass and overpass illumination layout to be reviewed by TxDOT for safety and aesthetics.

DB Contractor shall prepare lighting studies that consider illumination levels, uniformity, and sources for the roadways, interchanges, and special areas. DB Contractor shall maintain an average horizontal luminance on the roadways as described below. DB Contractor shall submit a computer generated light level array for all lighted areas within the Project Limits to TxDOT for review.

All third-party requests for lighting within the Site shall be subject to TxDOT approval.

High mast and conventional lighting shall meet the photometric level requirements as stated in TxDOT standards and the AASHTO *Roadway Lighting Design Guide*.

DB Contractor shall design the lighting system to minimize or eliminate illumination of areas outside the Project ROW. DB Contractor shall design continuous and safety lighting systems in

accordance with Chapters 2, 5, 6, 7, and 9 of the HIM. At all times during the Term of the Agreement, DB Contractor shall maintain safe lighting conditions along the Project roadway.

Conventional luminaire poles and breakaway bases shall be designed in accordance with AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. For all poles located within the clear zone of the roadways, DB Contractor's design shall incorporate breakaway devices that are pre-qualified by TxDOT.

DB Contractor shall place all understructure lighting in a configuration that minimizes the need for Lane Closures during maintenance.

DB Contractor shall determine and design appropriate foundation types and lengths for permanent lighting structures.

DB Contractor shall not place ITS cable, fiber-optic lines, signal conductors, or any other non-lighting related cables or conductors in the lighting conduit, ground boxes, or junction boxes.

DB Contractor shall minimize the potential hazards of lighting poles through the careful consideration of mounting options and pole placements, including the following options:

(a) Placing mast arms on traffic signal poles;

(b) Placing pole bases on existing or proposed concrete traffic barrier;

(c) Placing poles behind existing or proposed concrete traffic barrier or metal beam fence; and

(d) Placing high mast lighting outside the clear zone, especially in roadway horizontal curves.

DB Contractor shall ensure that lighting structures comply with Federal Aviation Administration (FAA) height restrictions near airport facilities. In the event that proposed or existing luminaires, mast arms, or poles infringe into an airport's or heliport's base surface, DB Contractor shall coordinate with the FAA and TxDOT to permit or relocate such structures. If FAA restrictions prohibit lighting structures from being placed in certain areas near an airport facility, DB Contractor shall find alternative ways of providing the required level of lighting.

DB Contractor shall provide to TxDOT an ATP for all illumination. This ATP shall also be submitted to the appropriate Governmental Entity. DB Contractor shall conduct testing in accordance with the ATP and document those results to show conformance.

16.3.9.1 Additional Requirements

Additional requirements are as follows:

(a) High-mast lighting must not infringe into residential areas adjacent to the Project ROW;

(b) DB Contractor must coordinate with the FAA regarding installation of obstruction lights, if any, on a case-by-case basis;

(c) At a minimum, underground conduit in interchange areas or temporary detours shall not be less than two inches or Schedule 40 PVC; all other underground conduit installations shall not be less than two inches or Schedule 40 PVC;

(d) The minimum conductor size shall be #8 AWG copper on roadway and #12 AWG on underpass lights. DB Contractor shall not use duct cable for illumination purposes;

(e) DB Contractor shall place bridge lighting brackets no more than ten feet from abutments or bents; however, in special circumstances, the bridge lighting brackets may be placed a maximum of 20 feet from abutments and piers;

(f) Non-standard light pole design shall be submitted to TxDOT for approval. For light poles with a base 25 feet above the elevation of surrounding terrain, DB Contractor shall electronically submit design calculations and shop drawings to TxDOT, Bridge Division.

(g) Minimum inside dimensions for ground boxes shall be 15.25 inches (width) x 28.25 inches (length) x 20 inches (depth);

(h) Ground box covers shall be 2-inch-thick (nominal), non-conducting material and labeled “Danger High Voltage Illumination;”

(i) Riprap aprons shall be provided around all ground boxes;

(j) Lights shall have an identification tag denoting a contact person or office in case of emergency or for maintenance, and the address and telephone number;

(k) Electrical part of the installation shall be designed and installed in conformance with the NEC, TxDOT standards, and Specifications;

(l) Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes instead of the cast iron junction boxes shown on standard sheets CTBI (3), CTBI (4), AND SSCB (4). Mount the junction boxes flush (+ 0 inch, - ½ inch) with concrete surface of concrete barrier. Mount the polymer concrete junction boxes shown on the concrete safety barrier standard sheets recessed (- ¼ inch, - ¾ inch) and weld a ¼ inch steel plate to the captive bolts so that it is flush (+0 inch, - ¼ inch) with surface of concrete barrier;

(m) Seal all conduit ends with lighting circuits with at least three inches of polyurethane foam approved by the Engineer that will not adversely affect other plastic materials or corrode metals; and

(n) Seal ground boxes for lighting circuits with polyurethane foam approved by the Engineer that will not adversely affect other plastic materials or corrode metal.

16.3.10 Visual Quality

Notwithstanding the requirements of Section 16.3.8, DB Contractor shall make a reasonable attempt to provide luminaires of equal height along the roadway.

DB Contractor shall not use timber poles for permanent installation.

DB Contractor shall re-sod or re-seed areas of construction disturbed by the installation of signs, traffic signal systems, or lighting systems after final installation.

16.4 Construction Requirements

16.4.1 Permanent Signing and Delineation

DB Contractor shall use established industry and utility safety practices to erect and remove signs located near any overhead or underground utilities, and shall consult with the appropriate Utility Owner(s) prior to beginning such Work. DB Contractor shall stake each sign location in the field and provide TxDOT 72 hours' notice prior to installation of any sign.

DB Contractor shall leave all applicable advance guide signs and/or exit direction signs in place at all times and shall not obstruct the view of the signs to the motorist. DB Contractor shall replace any other removed signs before the end of the work day.

DB Contractor shall affix a sign identification decal to the back of all signs for inventory purposes and shall submit inventory information to TxDOT in a TxDOT-compatible format for inclusion into the Maintenance Management System (MMS).

All installed signs are required to meet the minimum retro-reflectivity values specified in TMUTCD *Table 2A-3 (Minimum Maintained Retroreflectivity Levels)*.

16.4.2 Permanent Pavement Marking

DB Contractor shall meet the following minimum retroreflectivity values for edge line markings, centerline/no passing barrier line markings, and lane line markings when measured any time after three days, but not later than ten days after application:

(a) Type I, Thermoplastic, Pavement Markings:

(iii) White markings: 250 millicandelas per square meter per lux (mcd/m2/lx); and

(iv) Yellow markings: 175 mcd/m2/lx.

(b) Type II, Paint & Beads, Pavement Markings:

(v) White markings: 175 mcd/m2/lx; and

(vi) Yellow markings: 125 mcd/m2/lx.

16.4.3 Permanent Signalization

DB Contractor shall coordinate with the Utility Owner(s) and ensure necessary power service is initiated and maintained for permanent signal systems. DB Contractor shall ensure power is provided to all DB Contractor-installed signals. DB Contractor shall stake each pole location in the field and provide TxDOT 72 hours' notice prior to installation of any foundation.

Separately metered electrical service shall be installed for permanent signals. When safety lighting is installed by the state in an incorporated city as part of a traffic signal installation, a separate electrical service is not required for this safety lighting. All other elements of the Work requiring electrical service shall be separately metered from the traffic signals.

DB Contractor shall provide TxDOT with copies of all signal warrant studies as required in this Section 16. DB Contractor shall also provide copies of all final signal timing.

Before placing any permanent traffic signals, DB Contractor shall provide TxDOT a layout indicating the proposed location of such items.

16.4.4 Permanent Lighting

DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated and maintained for permanent lighting systems. Where the Work impacts existing lighting, DB Contractor shall maintain existing lighting as temporary lighting during construction and restore or replace prior to Substantial Completion of the Segment. At all times during the Term of the Agreement, safe lighting conditions shall be maintained along the Project roadway. DB Contractor shall stake each pole location in the field and provide TxDOT 72 hours' notice prior to installation of any foundation.

DB Contractor shall remove all old illumination-related cable and conduit that does not have existing pavement or riprap above it; any existing illumination-related cable and conduit that is under the existing pavement or riprap may be abandoned. Existing conductors shall be removed.

DB Contractor shall place all bore pits safely away from traffic, provide positive barrier protection, and provide necessary signs to warn of the construction area.

DB Contractor shall contact Utility Owners regarding their specific required working clearance requirements.

DB Contractor shall affix an identification decal on each luminaire, ground box, and electrical service maintained and/or operated by DB Contractor for inventory purposes and shall submit inventory information to TxDOT in a TxDOT-compatible format for inclusion in the MMIS. This identification shall denote that these are property of DB Contractor and shall provide a contact phone number and address in the event of Emergency or necessary maintenance.

16.5 Submittals

Submittals described in Section 16 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 16-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 16-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 16			
Notification of meetings with local Governmental Entities	At least 48 hours prior to the start of the meeting	For Information	16.2.1
A preliminary operational signing schematic	Prior to commencing Final Design	Approval	16.3.1
A proposed sign, delineation, traffic signal, lighting, etc. layout	Before placing any such items	For Information	16.3.1
A preliminary advance toll information signing schematic	With the preliminary operational signing schematic	Approval	16.3.4

Table 16-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Traffic signal timing plans	As part of the Final Design Submittal	Review and comment	16.3.8.2
Copies of all final implemented signal timing plans	With Record Documents (Prior to Final Acceptance)	For Information	16.3.8.2
Signal warrant studies	As part of the Final Design Submittal	Review and comment	16.3.8.3
Acceptance Test Plan (ATP) for all traffic signals	As part of the Final Design Submittal	Review and comment	16.3.8.5
A computer generated light level array for all lighted areas within the Project Limits	As part of the Final Design Submittal	Review and comment	16.3.9
Acceptance Test Plan (ATP) for all illumination	As part of the Final Design Submittal	Review and comment	16.3.9
Non-standard light pole design	As required	Approval	16.3.9.1(f)
Notice of installation of any sign	72 hours prior to installation	For Information	16.4.1
Notice of installation of any signal foundation	72 hours prior to installation	For Information	16.4.3
Notice of installation of any lighting foundation	72 hours prior to installation	For Information	16.4.4

SECTION 17.0 INTELLIGENT TRANSPORTATION SYSTEMS

17.1 General Requirements

An ITS is necessary for monitoring the Project's traffic flow and performance as a permanent installation. The Project ITS must accurately detect traffic and traffic operational conditions throughout the Project Limits, and clearly communicate relevant and useful travel information to the Users.

TxDOT operates an ITS network within and/or in the direct vicinity of the Project Limits. DB Contractor will connect the Project ITS that they provide to the existing ITS network while fulfilling all requirements herein. The Project ITS must be compatible with such in-place system(s) that TxDOT and other entities (government or private) are currently operating. DB Contractor shall coordinate the ITS planning and implementation with TxDOT and other Governmental Entities that have roadways within or intersecting the Project. Upon Substantial Completion, TxDOT will operate the ITS and continue to do so during the Maintenance Period. DB Contractor shall provide a warranty for all ITS components commencing upon Substantial Completion and remaining in effect until two years after Final Acceptance.

DB Contractor shall maintain and protect any existing ITS functionality to include communications networks within the Project until Substantial Completion, except during force majeure events, periods of system maintenance or system crossovers, or other periods approved by TxDOT.

The Project ITS shall conform to the Houston-Galveston Regional ITS Architecture, conform with the Regional Data and Video Communications System, and have physical connections with the existing TxDOT ITS communications network on major freeways. The functionality of the ITS shall be such that command and control of appropriate field devices is shared and exchanged with appropriate Governmental Entities.

DB Contractor shall be responsible for the planning, design, installation, testing, and operations support of safe and functional ITS for the Project using Good Industry Practice. All components of the ITS shall conform to the provisions of the National Transportation Communication for ITS Protocol (NTCIP). DB Contractor shall maintain ITS interoperability over the Term of the Agreement with TxDOT's Houston TranStar Traffic Management Center (TMC) and other Governmental Entities. The ITS shall be coordinated with the Electronic Toll Collection System (ETCS) such that the communication requirements of the ETCS are accommodated.

The Project ITS shall operate under the Houston-Galveston Regional ITS Architecture. Houston TranStar shall be the main TMC for this Project. Communication and interoperability shall be achieved with other TMCs in the region, including Houston TranStar, such that with appropriate privileges, access to data, command, control, and information sharing can occur among centers. All communication and access of information shall occur in near real-time (within logistical restraints).

The following list includes, but is not limited to, ITS elements with the most recent special specifications:

(a) ITS System Support Equipment – Furnish, assemble, fabricate, or install ITS system support equipment. (2004 SS6009). (Change Memo: de-43-04). Statewide Use. SS6003;

(b) Fiber Optic Cable (Single Mode) – SS6007;

(c) Intelligent Transportation System (ITS) Ground Mounted Cabinet – Provides for furnishing, fabricating, delivering, installing, and testing ITS ground mounted cabinets of the various types and sizes at locations shown on the plans or as directed. Replaces SS 6008(14), "ITS Field Equipment". (Change Memo: de-08-15). Statewide Use. SS6008;

(d) Closed Circuit Television (CCTV) Field Equipment – SS6010;

(e) Camera Pole Structure w/Cabinet – SS6031;

(f) Multi-duct Conduit System – SS6016;

(g) RS-232 Fiber Data Modem – SS6015;

(h) Communication Building (Environmental) (8 feet x 12 feet) (One-time use) – SS6499;

(i) Communication Hub – SS6017;

(j) Fiber Optic Video Transmission Equipment – SS6035;

(k) Dynamic Message Sign System SS6028;

(l) Radar Vehicle Sensing Device – SS6029; and

(m) ITS Pole with Cabinet – Provides for furnishing, installing, relocating, or removing ITS pole structures and pole mounted cabinets of the various types and sizes at locations shown on the plans or as directed. Replaces SS 6008(14) "ITS Field Equipment", SS 6031(14) "Camera Pole Structure" and SS 6034(14) "Radar Vehicle Sensing Device Pole Assembly". (Change Memo: de-09-15). Statewide Use. SS6064.

17.2 Design Requirements

DB Contractor shall provide a complete and operational ITS network throughout the Project that is expandable as capacity is increased along the Project roadways, utilizes hardware and software components consistent and compatible with TxDOT in the manner described in this Section 17.2 and the other affected Governmental Entities, resistant to weather encountered in the Project area, and places components in locations that are not hazardous to Users.

Prior to beginning ITS and toll design efforts, DB Contractor shall conduct an ITS and toll design workshop with TxDOT, the toll Systems Integrator, and affected Governmental Entities (per TxDOT's direction) to:

(a) Confirm TxDOT's operational requirements;

(b) Review DB Contractor's survey of existing ITS infrastructure and condition assessment;

(c) Discuss concepts, identify potential resolutions for Site-specific issues (as identified by DB Contractor);

(d) Determine communication requirements;

(e) Determine requirements for design;

(f) Determine requirements for construction;

(g) Determine requirements for construction and coordination of activities with adjacent roadways;

(h) Confirm requirements of other affected parties and Governmental Entities; and

(i) Address other topics as needed to ensure the design meets all requirements herein.

DB Contractor shall prepare a preliminary ITS layout for review and concurrence by TxDOT to ensure adequate planning of the ITS implementation. Subject to the specific requirements of this Section 17, DB Contractor shall determine the number and specific locations of all ITS components.

DB Contractor shall provide safe ingress/egress areas and structures to accommodate authorized personnel access to ITS components for maintenance and operation activities. Unless approved by TxDOT, ITS components shall be placed in locations that allow maintenance without a lane closure.

All components of the ITS shall conform to the provisions of the NTCIP and be compatible with the latest version of TxDOT's LoneStar Software that is operational at Houston TranStar.

All ITS devices and associated mountings shall meet the 100 mph wind load design standards.

The installed ITS equipment shall provide TxDOT accurate and reliable data and quality video images, and accurate control of field devices from Houston TranStar on a real-time basis 24 hours a day, 7 days a week. Real-time is defined as correct data being available at Houston TranStar within 30 seconds of being processed or the correct response of a field component within one millisecond of the command being sent.

DB Contractor shall be responsible for ensuring the CCTV, DMS, and vehicle detection systems meet the reliability requirements specified in the TxDOT statewide and/or Houston District Standards, as well as any standard publications provided by TxDOT at the time of actual Design Work. The design and construction requirements, together with the design criteria presented in the most current TxDOT statewide and/or TxDOT Houston District specifications, as well as any standard publications provided by TxDOT at the time of the actual Design Work, define the minimum standards and scope that must be met by DB Contractor. DB Contractor shall be responsible for ensuring the CCTV, DMS, and vehicle detection systems meet the reliability requirements specified in the most current TxDOT statewide and/or TxDOT Houston District specifications as well as any standard publications provided by TxDOT at the time of actual Design Work.

Any recommended modifications to the specifications shall be presented by DB Contractor to TxDOT and shall be subject to TxDOT approval.

DB Contractor is responsible for designing and constructing lightning protection, grounding, and surge suppression for each ITS structure and equipment cabinet. Ground mounted equipment cabinets next to ITS support structures will not be allowed and must be mounted to the support structure.

DB Contractor shall be responsible for the design, installation, and provision of power required to operate the ITS devices, including all utility costs until Final Acceptance by TxDOT, at which time the utilities will be transferred to TxDOT.

17.2.1 DB Contractor ITS Communications Requirements

DB Contractor shall provide a communications network that has redundant routing capabilities. The communications network shall serve the highway ITS components along the highway Elements of the Project. Where necessary, as determined during design and approved by TxDOT, DB Contractor shall provide communication node buildings and cabinets to support the communications network.

The current TxDOT communications network backbone is a ten Gigabit multiple protocol label switching ethernet network.

Each field network switch shall provide a primary and secondary fiber path of two fibers each from the field cabinet to separate satellite buildings. The maximum number of Layer 2 field network switches forming a network path between an end device (TxDOT ITS) and a satellite building based data aggregating Layer 3 network switch shall not exceed 12. The calculated data throughput assigned to any sub-network path shall not exceed 50% of the path's throughput capacity. Calculations for band usage shall be provided during the preliminary design efforts.

New devices and any existing devices interconnected during Project implementation shall not be assigned within the same network path or otherwise daisy-chained to avoid possible inconsistencies in communication protocols.

DB Contractor shall install a 144 strand single mode fiber optic cable in the duct bank. No splicing of the trunkline fiber is allowed unless approved by TxDOT. Pull boxes shall be spaced at each ITS device location, Toll Zone, satellite building and a maximum of every 700 feet along the Project corridor. DB Contractor is responsible for confirming that 144 strands of fiber can support the proposed ITS deployment and providing additional fiber at no cost to TxDOT, as needed, to ensure that no more than 50% of the throughput capacity of a sub-network path is exceeded. Type II ground boxes shall be utilized unless otherwise approved by TxDOT.

DB Contractor shall provide terminal servers, video encoders, media converters, and modems to establish communications as required. Video encoding shall meet MPEG-4 standards and be compatible with TxDOT's traffic management system software requirements for TxDOT CCTV.

The fiber optic cable and duct bank shall be installed and tested no later than 180 days prior to turnover of the toll and toll-related ITS locations to the Systems Integrator.

17.2.2 Conduit

DB Contractor shall recommend, with TxDOT's concurrence the type, quantity, and design of the conduit above and below ground, ground boxes, all communication cables, and electrical conductors to support the ITS network and operations. No exposed conduit sections will be permitted. All sections shall have a minimum of 48 inches of cover over all ITS conduit except:

(a) Where boring is required to cross under intersections; and

(b) In the case of large bridge crossings, built into the bridge structure.

DB Contractor shall install bored conduit below the base layer of pavement structure. TxDOT approval will be required for any placement on existing structures. DB Contractor shall provide separate conduits for tolling and toll-related ITS communication, tolling and toll-related ITS power, general ITS communication and general ITS power. Two spare 3-inch Schedule 40 conduits for future expansion shall be provided. The location of the two spare conduits shall be coordinated with TxDOT during design. A #8 bare electrical conductor wire for detection shall be placed in both trunk lines.

Specifications for the conduit and other communications infrastructure needed for tolling are located in Section 21.

Conduit shall be three in diameter. The conduit shall support a minimum of 144-strand fiber optic cable and be in a different duct bank than conduit for tolling elements.

DB Contractor shall maintain adequate separation between proposed conduits and any existing TxDOT or other entity's installation for construction, maintenance, and repair.

DB Contractor shall repair each existing communication cable or electrical conductor that is severed or otherwise rendered not usable within 72 hours.

DB Contractor shall provide materials and use construction methodology that, at a minimum, meets the most current or applicable TxDOT statewide and/or TxDOT Houston District specifications, including placement of a trace wire within the conduit, placing locator tape and installing above ground markers, and providing the required 48 inches or more of cover. DB Contractor shall provide alternatives to TxDOT to improve TxDOT's current practices for securing ground box lids and are subject to TxDOT approval.

17.2.3 CCTV Cameras

DB Contractor shall provide CCTV cameras for Incident verification and traffic management. The system of cameras shall accurately identify all vehicle(s) involved in an Incident or Emergency, the extent of vehicle(s) damage, and if applicable the likelihood of personal injury. Operation of the cameras shall result in no visual delay in response of the camera pan/tilt/zoom by a user.

17.2.3.1 Equipment

DB Contractor shall provide all necessary CCTV equipment, including cameras, camera controls, cables, and connections. DB Contractor shall provide all the equipment necessary for TxDOT control of all CCTV cameras. The method of control shall be in accordance with TxDOT standards and specifications.

DB Contractor shall provide a digital video format and communications protocol at all connections with TxDOT systems. The format and protocol provided by DB Contractor shall be compatible with systems in use by TxDOT at Houston TranStar, and if necessary convertible for use by TxDOT's in-place ITS network.

17.2.3.2 Placement

DB Contractor shall provide overlapping roadway coverage by CCTV cameras for all highway lanes and intersecting cross streets within the Project Limits to provide redundant camera field of view. CCTV cameras shall be placed to enable TxDOT to monitor traffic conditions on highway lanes, access roads, connecting facilities, entrance and exit ramps, and messages

displayed on any remotely-controlled DMS in the Project area. To provide a stable video image, DB Contractor shall mount cameras on dedicated structures unless otherwise approved by TxDOT.

Distance between CCTV cameras shall not exceed 0.5 miles; however, DB Contractor is responsible for placing cameras to ensure 100% coverage. 100% coverage shall be defined as no blind spots for any reason, including but not limited to: trees, bridge structures, horizontal or vertical alignment, overhead or side mounted sign structures, or toll gantries. Additionally, each CCTV camera shall be able to view the CCTV camera immediately upstream and downstream from itself unless approved otherwise by TxDOT.

17.2.3.3 Video Requirements

DB Contractor shall provide state-of-the-art CCTV cameras that meet the requirements of the applicable TxDOT statewide or TxDOT Houston District Standards. At any time prior to Final Acceptance, should any CCTV cameras fail to meet the latest TxDOT statewide or TxDOT Houston District Standards at the time of design, DB Contractor shall replace such cameras within 48 hours of discovery of lack of compliance.

17.2.3.4 Operating Requirements

DB Contractor shall provide cameras with built-in heaters, mounting structure, and related equipment capable of operating within the following weather conditions:

(a) Wind load of 100 mph without permanent damage to mechanical and electrical equipment;

(b) Ambient temperature range of -35 degrees Fahrenheit to +140 degrees Fahrenheit;

(c) Relative humidity range not to exceed 95 percent within the temperature range of +40 degrees Fahrenheit to +110 degrees Fahrenheit; and

(d) Humidity range of 0 to 100 percent condensing.

17.2.3.5 Control Requirements

DB Contractor shall supply CCTV equipment on this Project which is fully compatible with the existing CCTV control systems operated from Houston TranStar. In order to prove compatibility and operability of CCTV systems submitted for use on this Project, DB Contractor shall deliver one complete set of CCTV equipment to TxDOT for testing by Houston TranStar information technology personnel as part of the equipment submittal and approval process. Allow a minimum of 30 days for testing by TxDOT ITS personnel. Submit the CCTV equipment for testing no later than 60 days after completion of TxDOT submittal review. The equipment submitted for testing must be fully assembled and in a fully operational condition. Configure all equipment submitted for testing as is intended for use on the Project. Prototype equipment will not be allowed. The equipment will be interconnected to the existing CCTV control system and must be fully operational using that system. No modifications to the existing CCTV control system will be made to accommodate the submitted CCTV equipment. To be considered fully operational, as a minimum, the equipment must correctly respond to the following commands:

(a) Pan left;

(b) Focus far;

(c) Pan right;

(d) Iris override;

(e) Tilt up;

(f) Iris open;

(g) Tilt down;

(h) Iris close;

(i) Zoom in;

(j) Camera power (latching);

(k) Zoom out;

(l) Pan tilt position preset; and

(m) Focus near.

Upon completion of installation, DB Contractor shall test the communications link installed between the satellite building and the CCTV field equipment locations. DB Contractor shall perform the test at all CCTV locations on the Project.

DB Contractor shall use a test signal generator and a video monitor to demonstrate the ability of the video signal link to transmit a National Television System Committee compliant video signal from the CCTV cabinet to the satellite building. After completion of testing with the signal generator, connect the CCTV camera to the link and use a video monitor at the satellite building to verify the presence of a National Television System Committee compliant video signal. No degradation of the video signal must be discernible using the video monitor.

Connect a laptop computer containing TxDOT-supplied CCTV control software on the link and use to demonstrate the ability to control all CCTV functions outlined in the specifications.

DB Contractor shall supply all test equipment, cabling, and connectors necessary for performing the tests by DB Contractor.

The equipment must be fully operational using the existing control system from Houston TranStar. Equipment which in any manner is not fully operational with the control system will be considered as not passing the test. Equipment which does not pass the test will be allowed one opportunity for retesting. The retest must occur within 30 days after the initial test. All issues of non-compliance and all discrepancies must be resolved before commencing the second test. Equipment which is not able to be retested within 30 days, or which does not pass the second test, will be rejected and cannot be used on the Project. No additional time or compensation will be granted for the testing of the CCTV equipment. Successful testing of the CCTV equipment must be completed prior to any construction activities at the CCTV locations. No camera poles, cabinets, or any other CCTV related equipment shall be installed until CCTV equipment testing is successfully completed.

17.2.4 Vehicle Detection

DB Contractor shall provide permanent, high definition microwave radar detection in each highway lane of the Project that measures vehicle classification, vehicular volume, lane occupancy, and vehicle speed information on the roadway. The detectors shall be non-intrusive to the roadway users. Spacing for the permanent vehicle detection shall be no greater than one mile in each highway lane in the Project, or, at a minimum, provide detection for all highway lanes at one location between interchanges, each entrance ramp lane, and each exit ramp lane. For sensors which are not placed in the pavement, DB Contractor shall locate the devices on the side of the Project nearest the largest shoulder so as to limit the potential interference of the concrete traffic barrier on detecting vehicles and collecting information.

Vehicle detection sensors shall determine vehicle speed for each vehicle passing the sensor. The sensors shall provide raw speed data (volume, speed, lane occupancy, and vehicle classification counts) and direction of travel for all lanes. Additionally, the sensors (or the software controlling the sensors) shall be capable of determining vehicles traveling in the wrong direction. For sensors that collect data across multiple lanes of traffic, data shall be collected and provided by lane. In areas where a sensor would have to collect data on more than 12 lanes of traffic, including shoulders or over distances/widths greater than 250 feet, DB Contractor shall provide additional detectors as required. TxDOT shall be able to adjust the frequency rates that the data files are provided by device.

DB Contractor shall also install Bluetooth readers every two miles and/or at locations approved by TxDOT. These readers will be used to determine average segment speeds and travel times. The Bluetooth readers must be compatible with existing systems at Houston TranStar.

DB Contractor may attach detection units to existing structures with prior concurrence from TxDOT. Where an existing structure is not available, or in lieu of attaching the detection unit to an existing structure, DB Contractor shall install a mounting pole solely for the vehicle detector. Any mounting poles placed specifically for ITS items shall conform to TxDOT specifications for CCTV mounting poles and must adhere to minimum vertical clearance requirements. DB Contractor shall provide all necessary support structures, equipment, including, but not limited to, vehicle detection system devices, controls, cables, and connections.

17.2.5 Dynamic Message Signs

DB Contractor shall provide a comprehensive network of electronic DMS as needed to satisfy the operational requirements using only LED display technology. The DMS shall operate as part of an overall regional system. DB Contractor shall provide TxDOT the ability to provide DMS messaging. DB Contractor shall incorporate current DMS messaging hierarchy into the DMS operations.

DB Contractor shall position each DMS to allow motorists to safely view the messages being displayed. DB Contractor shall locate the DMS to comply with large guide sign spacing stated in the TMUTCD.

DMS shall be used to inform motorist of the availability of alternate routes, and to advise travelers of adverse road conditions and congestion. DMS shall be placed to provide a driver-friendly sign-viewing angle at each DMS location.

Location and placement of DMS shall be approved by TxDOT. A DMS shall also be placed at one mile before the approach prior to any main lane tolling facility. DMS shall have the ability to be controlled using the latest TxDOT's DMS operating system being used at Houston TranStar.

DMS shall be mounted using a T-mount and located so that main lane closures are not needed to maintain the sign. DMS site shall be accessible in all weather conditions. Access pads shall be provided if necessary to support maintenance. DB Contractor shall provide DMS, which use LED display technology and support full matrix graphics and color. DMS used shall conform to the TxDOT special specification NTCIP for DMS and shall demonstrate compliance before installation of DMS.

DB Contractor shall provide all necessary dynamic message signs, support structures and equipment, including, but not limited to, DMS devices, controls, cables, and connections.

DB Contractor shall not impact the operation of any existing DMS within the Project during construction absent approval from TxDOT.

17.2.6 Lane Control Signals

No lane control signals are required.

17.2.7 Single-Line DMS

No SDMS required.

17.2.8 Roadside Weather Information

Two Roadside Weather Information Stations (RWIS) shall be provided and installed by DB Contractor. DB Contractor shall coordinate final locations of the RWIS with TxDOT during design.

The RWIS shall comply with Houston District Standards and shall be based upon and integrated into the existing ALERT (Automated Local Evaluation in Real Time) System maintained by the Harris County Flood Warning Systems (FWS). All components utilized for environmental monitoring shall be fully compatible with the existing FWS hardware and software at the TranStar facility.

DB Contractor shall provide all infrastructure and communications interconnects necessary to provide a fully integrated RWIS.

17.2.9 Communications Hub Enclosures/Communications Cabinets/ Environmental Communications Buildings

DB Contractor shall coordinate with TxDOT the connection of all new ITS components to any existing ITS communication hub enclosures and communication cabinets covering the Project or adjacent to the Project such that regional communications, including connectivity to Houston TranStar, can be established.

Connectivity to Houston TranStar will be facilitated by fiber connectivity to the south of the Project Limits extending to an existing network at FM 2920. TxDOT will make necessary arrangements for dark fiber allocation outside the Project Limits. DB Contractor shall make use of the dark fiber extending to FM 2920 to establish project ITS connectivity with Houston TranStar and provide all necessary network switching hardware as required.

DB Contractor shall provide two environmental communications buildings within the Project Limits and four communications hub buildings within the Project Limits. A preliminary, conceptual layout of the building locations is provided in Attachment 17-1. The buildings depicted south of the Project Limits will be provided by others.

17.3 Construction Requirements

17.3.1 General

DB Contractor shall notify TxDOT in advance of making connections to the existing TxDOT system.

DB Contractor shall maintain any existing ITS communications functionality during construction activities. Required functionality can be accomplished by phasing construction to establish new equipment locations prior to removal of existing location, allowing minimal service interruption of no more than four hours for any disruption associated with communications and 72 hours for the transfer of devices from existing to new locations, or by use of portable equivalents for ITS devices, such as trailer mounted DMS, sensors or CCTV, positioned to allow removal of devices while new locations are constructed.

DB Contractor shall coordinate with Utility Owner(s) and ensure that power service is available for permanent ITS systems.

17.3.2 Salvaging Existing Items

DB Contractor shall salvage any existing ITS equipment removed during construction of the Project, deliver to the TxDOT Houston District headquarters, and stockpile as requested by TxDOT, all in an undamaged condition.

17.3.3 Existing ITS Relocation

DB Contractor shall relocate any existing ITS components, including hubs, satellite buildings, CCTV cameras, DMSs, detection devices, and fiber-links, as required to continue service from the existing components. DB Contractor shall sequence construction and relocation of existing ITS components, facilities, and systems to prevent lapses in TxDOT's receipt of video or data within the Project area. The existing physical links and the proposed physical links shall be in separate physical conduits.

Before removing existing ITS items and before beginning construction of segments without existing ITS, DB Contractor shall perform all activities necessary to maintain system operations during construction, including installing new ITS items, relocating or replacing existing ITS items, and connecting such ITS items to the existing network.

17.3.4 ITS Implementation Plan

DB Contractor shall provide an ITS Implementation Plan for approval as part of the Final Design Submittal to demonstrate system interoperability with other TMCs in the region, as well as compatibility with the operational procedures for command and control of devices, sharing of data, and priority control that various parties will assume under different operating conditions of the corridor and surrounding roadway system. The ITS Implementation Plan shall include the following:

(a) Functional design plan;

(b) Communications analysis report;

(c) Operational and requirements report; and

(d) ATP.

The functional design plan shall show each device's relationship in the overall functional design of the ITS and proposed roadway system. This functional design plan shall include the location of devices, technology and functional specifications of devices, and any unique design elements that are necessary to achieve the desired functionality or space restrictions.

The communications analysis report shall document the communications design. This report shall show all ITS field devices, their flow through all communications mediums, and throughput within the ITS. This shall include communications between any involved Governmental Entities. The report shall contain a narrative describing the information to be transmitted, as well as a high level plan for its use. Communications diagrams shall be provided showing the location of any communication hubs (existing or proposed), any planned fibers (source as well as identification tag), modem/transceiver equipment planned at field equipment cabinets, and other equipment deemed necessary to functionally operate the ITS.

The operational and requirements document for the ITS shall describe the functional capability of the system and the method and level of integration. The document shall describe in detail the design of the system, hardware and software to be utilized, functional capabilities, command and control, data sharing capabilities, and priority use of devices by multiple agencies. In developing the operational and requirements document, DB Contractor is required to hold scoping meetings with TxDOT such that requirements are defined to achieve interoperability with other TMCs and the ETCS, and priority logic and information for command, control, and data sharing is created to enable effective management and Incident response along the corridor, as well as regionally.

For each component of the ITS, an ATP shall assure proper operation, control, and response of each device meeting the functional requirements. DB Contractor shall implement the ATPs and provide certified documentation that its requirements have been met prior to operational use of the ITS.

As part of the ATP, DB Contractor shall prepare a system acceptance procedure prior to start of construction to assure proper operation, control, and response of each device as part of the overall ITS, including the overall operating system and software. DB Contractor shall conduct the procedure and provide certification that the ITS effectively meets the required functional requirements. DB Contractor shall provide this certification prior to substantial completion.

DB Contractor shall provide the CCTV secondary control equipment and design to TxDOT for approval a minimum of six months prior to Substantial Completion.

17.3.5 End-to-End Testing

DB Contractor shall provide notice and coordinate with TxDOT to allow for end-to-end testing of the ITS. Testing will occur during the 21 calendar Day period prior to Substantial Completion and shall provide TxDOT, Houston TranStar staff, and the Systems Integrator with an opportunity to conduct full system tests, conduct daily operations to confirm operation plans and standard operating procedures, and to otherwise prepare for operational use of the facility. End-to-end testing will also occur after hours and on weekends. DB Contractor, TxDOT, Houston TranStar, and Systems Integrator shall have completed all their testing, training of Houston TranStar and TxDOT staff, and acceptance requirements for DB Contractor installed ITS devices, satellite buildings, communication and electrical networks, and generators prior to the start of end-to-end testing.

DB Contractor shall be responsible, at a minimum, for the following:

(a) Coordinating the end-to-end testing with TxDOT, Houston TranStar, and the Systems Integrator to ensure that there will be no conflicts between TxDOT, Houston TranStar, the Systems Integrator and their affiliated contractors, and DB Contractor's staff;

(b) Providing temporary advance signing (if needed) stating that the facility is closed and testing occurring;

(c) Providing maintenance of traffic/traffic control at all necessary locations for a maximum of five full days, which could include evenings and weekends and may not be consecutive;

(d) Providing access to the facility for authorized TxDOT, Houston TranStar, and Systems Integrator's staff and contractors; and

(e) Repairing any issues found with DB Contractor's work, efforts within one Calendar Day unless otherwise approved by TxDOT.

DB Contractor shall not expect to have access to, nor conduct work within, the Project during the end-to-end testing, with the exception of providing services as described above. TxDOT may, at its own discretion, provide DB Contractor access to the Project to conduct work outside the services described above.

17.3.6 Record Documents

The Record Documents shall include the construction drawings, as well as catalog sheets for all equipment and components. DB Contractor shall maintain for the duration of the Term of the Agreement records of all updates and modifications to the system.

For each component of the ITS, all computer codes and software shall be available to TxDOT.

17.4 Submittals

Submittals described in Section 17 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 17-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 17-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 17			
A preliminary ITS layout	Within 60 days after issuance of NTP1	Review and acceptance	17.2
Any recommended modifications to the ITS specifications	At least 2 weeks prior to the ITS and toll design workshop	Approval	17.2
Alternative practices to improve securing ground box lids	At least 2 weeks prior to the ITS and toll design workshop	Approval	17.2.2

Table 17-1: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
One complete set of CCTV equipment for testing	Deliver for testing within 60 days after review by TxDOT and prior to installation	Approval	17.2.3.5
Location and placement of Dynamic Message Signs	As part of the Final Design Submittal	Approval	17.2.5
Notification of intent to make connections to the existing TxDOT system	At least 30 days in advance of making the connections	For information	17.3.1
Any salvaged existing ITS equipment	As required	N/A	17.3.2
ITS Implementation Plan	As part of the Final Design Submittal	Approval	17.3.4
Notice/coordination to allow for end-to-end testing of the ITS	No later than 90 days prior to Substantial Completion	For information	17.3.5
All computer codes and software for each component of the ITS	As part of the Record Documents (Prior to Final Acceptance)	For information	17.3.6

SECTION 18.0 TRAFFIC CONTROL

18.1 General Requirements

DB Contractor shall design, construct, operate, and maintain the Project, in conformance with the requirements stated in this Section 18, to provide for the safe and efficient movement of people, goods, and services, through and around the Project, while minimizing negative impacts to Users, residents, and businesses. DB Contractor shall coordinate with local Governmental Entities on the development of the TCP.

It shall be the responsibility of DB Contractor to gain approval from the appropriate Governmental Entity or property owner on each intersecting street or driveway closure.

During all phases, temporary or existing ITS equipment, street lights, and traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system.

18.2 Administrative Requirements

18.2.1 Traffic Management Plan

DB Contractor shall prepare and implement a Traffic Management Plan (TMP) that includes the following items:

(a) Descriptions of the qualifications and duties of the traffic control coordinator(s), and other personnel with traffic control responsibilities;

(b) Procedures to identify and incorporate the needs of transit operators, Utility Owners, Governmental Entities, Emergency Service providers, school districts, business owners, and other related Users, Customer Groups or entities in the Project corridor and surrounding affected areas;

(c) Procedures for developing Traffic Control Plans (TCPs) including implementing, and maintaining detours, road and lane closures, and other traffic pattern modifications with detailed phasing and steps showing the different traffic control phasing;

(d) Procedures for obtaining approval of TCPs from TxDOT and applicable Governmental Entities including review of TCP submittal timeframes;

(e) Procedures for signing transitions during construction from one phase to the next and from temporary to permanent signing;

(f) Procedures for maintenance and replacement of traffic control devices, including pavement markings and traffic barriers, if used, and transitions from one stage to the next and from interim to permanent placement;

(g) Procedures to regularly evaluate and modify traffic signal timings in coordination with local Governmental Entities and TxDOT. Procedures for the development, implementation, testing, and maintenance of all affected signals with local Governmental Entities and TxDOT;

(h) Procedures to coordinate with the appropriate Governmental Entities operating signal networks along the Project or Project detour routes to ensure temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, temporary signals, if implemented by DB Contractor shall be the responsibility of

DB Contractor from the time it is implemented until Final Acceptance when the final is accepted by the future maintenance entity and has coordinated traffic signal timing with local signal networks;

(i) Procedures and process for the safe ingress and egress of construction vehicles in the work zone;

(j) Provisions to provide continuous access to established truck routes and Hazardous Material routes, and to provide suitable detour routes, including obtaining any approvals required by TxDOT and the appropriate Governmental Entities for these uses;

(k) Procedures to modify TCPs as needed to adapt to current Project circumstances, including a contingency plan to alleviate unreasonable construction-related back-ups that can be implemented immediately upon notification from TxDOT;

(l) Procedures to communicate TMP information to DB Contractor's and TxDOT's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Section 3;

(m) Descriptions of contact methods, TxDOT and DB Contractor personnel contacts, in compliance with the approved TxDOT-DB Contractor Communications Plan, and response times for any deficiencies or Emergency conditions requiring attention during off-hours;

(n) Procedures for Off-Peak Period (weeknights) Work to include a work zone light system design in accordance with NCHRP Report 498 – *Illumination Guidelines for Nighttime Highway Work*; and

(o) Procedures for compliance with reporting height and width restrictions per Section 18.4.4.

DB Contractor shall coordinate with TxDOT and local Governmental Entities on the development of the TMP. DB Contractor shall also participate in traffic management coordination meetings scheduled by others. These meetings shall include Traffic Management Committee meetings convened by TxDOT and/or its representatives, with local representatives and stakeholders impacted by the Project.

DB Contractor shall submit the TMP as a part of the PMP. DB Contractor shall provide TxDOT 21 days for review of, and comment on, the TMP. TxDOT retains the right to require revision and re-submittal of the TMP within a reasonable amount of time.

18.3 Design Requirements

18.3.1 Traffic Control Plans

DB Contractor shall use the procedures in the TMP, TxDOT standard drawings, and TMUTCD requirements to develop detailed TCPs which provide for all construction stages and phasing, as well as all required switching procedures. TCPs are required for the Work during the Term of the Agreement.

DB Contractor shall provide TxDOT with a TCP concept presentation for approval at or near 30% design status, but prior to TCP plan sheet development. DB Contractor shall utilize PowerPoint and roll plots to convey this concept at a TCP concept presentation meeting.

DB Contractor shall produce a TCP for each and every phase of Work that impacts traffic and involves traffic control details, and shall coordinate with appropriate Governmental Entities on the development of the plan. DB Contractor is responsible for obtaining all necessary permits from such local entities to implement the plans. TCPs shall be designed, signed, sealed and dated by a Registered PE in the State of Texas.

Each TCP shall be submitted to TxDOT for review. The TCP shall include details for allowable time and duration of lane closure, all detours, traffic control devices, striping, and signage applicable to each phase of construction. Information included in the TCPs shall be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections showing lane width, concrete traffic barrier and barrel placement, alignment, striping layout, drop off conditions, and temporary drainage. The TCPs shall clearly designate all temporary reductions in speed limits. Changes to posted speed limits will not be allowed unless specific prior approval is granted by TxDOT.

Opposing traffic on a normally divided roadway shall be separated with appropriate traffic control devices in accordance with Good Industry Practice and TMUTCD based on roadway design speed. Approved traffic control devices can be found in the *Compliant Work Zone Traffic Control Device List*. Any traffic control that involves the physical separation of contiguous lanes of the same roadway component (i.e., managed lanes, general purpose, or access road lanes) traveling in the same direction will not be allowed.

DB Contractor shall maintain signing and striping continuity on all active roadways within or intersecting the Project at all times.

Throughout the duration of the Project, DB Contractor shall ensure all streets and intersections remain open to traffic to the greatest extent possible by constructing the Work in phases except as shown on pre-approved TCP. DB Contractor shall maintain access to all adjacent streets and shall provide for ingress and egress to public and private properties at all times during the Project.

DB Contractor shall prepare public information notices, in coordination with Section 3, in advance of the implementation of any Lane Closures or traffic switches. These notices shall be referred to as Traffic Advisories. DB Contractor shall also notify the traveling public by placing changeable message signs a minimum of seven days in advance of actual roadway closure or major traffic modifications. Where available and when possible, DB Contractor shall coordinate and utilize DMS on the regional ITS system.

DB Contractor shall utilize uniformed police officers with jurisdiction in the area to effect Lane Closures. DB Contractor shall be responsible for noting the requirement for uniformed police officers in TCPs when applicable. DB Contractor shall be responsible for the costs associated with the use of uniformed police officers.

18.3.2 Design Parameters for Traffic Control Plans

18.3.2.1 Design Vehicle

Turning movements on all local streets and driveways shall, at a minimum, provide the same operational characteristics as their existing conditions or better.

18.3.2.2 Design Speed

The minimum design speed shall be the existing posted speed for all locations.

18.3.2.3 Number of Lanes

The minimum number of lanes to be maintained shall be the number of lanes currently available on each facility, with the exception of SH 105 where the closure of the additional passing lane is permitted and will not be subject to lane rental charges as long as DB Contractor maintains one lane open in each direction at all times. Lane Closures on other minor roadways may be considered, within reason, so long as all traffic patterns and accesses are maintained.

18.3.2.4 Lane Widths

Lane widths shall be 12 feet. The minimum lane width shall be 11 feet. TxDOT may, in its sole discretion, allow ten (10) foot lanes in limited circumstances.

18.3.2.5 Shoulders

A minimum two foot offset from the edge of travel way to the edge of pavement or traffic barrier is required. For traffic barrier, a minimum of one foot offset will be allowed if approved by TxDOT. Work on shoulder without positive protective barriers during peak hours, including setting of barrier during peak hours, constitutes a lane closure and requires TxDOT approval.

18.3.3 Allowable Lane and Roadway Closures

Closures will only be permitted when DB Contractor can demonstrate that the closure will provide clear benefit to the progress of the Work. Closures must be coordinated with adjacent projects and priority shall be given to the closure submitted first. DB Contractor shall gain approval from local Governmental Entities and seek TxDOT's approval for such traffic closures.

18.3.3.1 Lane Closures

The safety of workers and the traveling public must be the first consideration when determining the appropriate time to implement a lane closure.

At a minimum, DB Contractor shall inform the PIO of all road closures or major lane closures that will affect mobility so they can inform the public, emergency services, schools, etc. as needed.

Prior to implementing any lane closure, DB Contractor shall input lane closure information into the Highway Conditions and Reporting System (HCRS).

The following TxDOT policy and procedure manuals and references apply for all lane closures:

- *Texas Manual of Uniform Traffic Control Devices* (TMUTCD)
- TxDOT Traffic Control Plan (TCP) standards
- TxDOT Barricade and Construction (BC) standards
- TxDOT Standard Specifications Item 502 (Barricades Signs and Traffic Handling)

Table 18-1 below lists the permitted lane closures for the Project and are intended to supplement the above list of manuals and references:

Table 18-1: Permitted Lane Closures

Description of Operations		Permitted Lane Closures		
Category of Work	**Roadway Lanes**	**Peak Period***	**Off Peak Period***	**Lowest Volume Times***
Placement of Concrete Traffic Barrier, Placement of Pavement Markings, Full Depth Roadway Repair, Placement of Bridge Beams, Bridge Demolition or Similar Operations	2	None	1**	1**
	1	None	None	None
Adjacent Construction, Lanes for Construction Traffic or Similar Operations	2	None	1**	1**
	1	None	None	None

Notes to Table 18-1:

*Peak Period, Off Peak Period and Lowest Volume Times mean the periods described in Exhibit 17 of the Agreement. Peak Period hours shall be evaluated on an annual basis and shall be adjusted as necessary using seven day, 24-hour traffic counts to be performed by DB Contractor, results of which shall be provided to TxDOT for evaluation.

**A minimum one lane in each direction is required on SH 105 at all times except as specifically approved by TxDOT.

If DB Contractor fails to comply with the permitted lane closures as defined above in Table 18-1, then DB Contractor will be subject the Lane Rental Charges specified in Exhibit 17 of the Agreement.

Any full roadway closure or lane closures shall require a TCP showing signing and striping with appropriate detour routing and time of proposed closure. The TCP shall be submitted to and approved by TxDOT and coordinated with all affected local Governmental Entities. DB Contractor shall demonstrate to TxDOT and affected local Governmental Entity that the reduction in lanes is acceptable based on current traffic counts.

When Lane Closures are necessary, DB Contractor shall use the public information and communication methods available to inform the appropriate Customer Groups (refer to Section 3). DB Contractor shall issue a Lane Closure Notice (LCN) to TxDOT and affected Governmental Entities 14 days prior to the publication of any notices or placement of any traffic control devices for the following: (i) full roadway closures, and (ii) lane closures and/or traffic switches planned to be in effect longer than 24 hours. DB Contractor shall also issue a LCN to TxDOT and affected Governmental Entities a minimum of 48 hours prior to the publication of any notices or placement of any traffic control devices associated with lane closures that are planned to be in effect less than 24 hours. The LCN shall contain the estimated date, time, duration, and location of the proposed Work requiring the lane closure and/or traffic switches. If an Emergency condition should occur, DB Contractor shall notify TxDOT and Customer Groups immediately in accordance with Section 3.2.7. For non-TxDOT controlled facilities, DB Contractor shall immediately notify the controlling Governmental Entity. DB Contractor shall keep TxDOT and affected Governmental Entities informed of any and all changes or cancellations of proposed lane closures prior to the date of their implementation.

DB Contractor shall provide a contingency plan showing how lane closure modifications will be implemented and identify the specific actions to alleviate congestion. If, at any time, permitted lane closure backups become unreasonable, such that motorist delay is greater than twenty minutes, modifications to alleviate this congestion shall be taken immediately, including reopening the lane as soon as possible. If DB Contractor does not immediately implement the approved contingency plan, the congestion would be considered a lane closure and is subject to Lane Rental Charges.

18.3.3.2 Ramp Closures

For continuous access road sections, ramp closures are allowed, with TxDOT approval, provided that an alternative ramp that maintains the same access is provided.

For non-continuous access road sections, ramp closures may be allowed, with TxDOT approval, provided that an adequate detour route is approved by TxDOT and the applicable Governmental Entity.

When ramp movements are diverted or detoured along existing roads, DB Contractor shall be responsible for any and all costs that may be assessed for the use of these existing roads. This may include an operational analysis, temporary traffic control devices, road user costs, and any other costs associated with impacts to local facilities to the satisfaction of the TxDOT and/or Governmental Entity having jurisdiction.

No two adjacent ramp closures may occur at the same time.

18.3.3.3 Cross Streets

For any proposed cross street closure, DB Contractor shall provide a TCP including a detour plan and obtain approval from TxDOT and any local Government Entities affected by the closure. When a cross street is closed, the adjacent cross street must remain open and have a minimum of one lane in each direction.

18.3.3.4 Driveway Closures

DB Contractor shall be responsible for coordinating with the property owner on driveway closures. DB Contractor shall maintain a minimum of one driveway per business at all times. For businesses with multiple driveways, when driveway closure is necessary to progress Work, no driveway may be closed for more than 30 consecutive days or more than 45 days in a 90-day period without written approval of the property owner. No two consecutive driveways shall be closed at the same time without the written permission of TxDOT and the Property Owner(s).

18.3.3.5 Additional Requirements

Upon commencement of construction, DB Contractor shall maintain diligent progression of Work adjacent to closed traffic lanes.

DB Contractor shall reopen closed traffic lanes during planned or actual periods of inactive Construction Work greater than or equal to five days.

Inclement weather should be considered when planning the Work. No temporary lane closures will be allowed during inclement weather condition.

18.3.3.6 Detour Usage

DB Contractor shall use State routes for detour routes, wherever applicable. If State routes are unavailable, DB Contractor may use local streets, provided that DB Contractor has obtained the necessary permits from the Governmental Entity having jurisdiction including, but not limited to, emergency medical services, fire services, police, school, and post office. DB Contractor shall not use local surface streets for detour routes without the prior written approval by TxDOT and the Governmental Entity having jurisdiction. In situations where this occurs, DB Contractor shall perform and submit a video survey and existing conditions report prior to the use of the detour. DB Contractor shall return the detour route back to pre-construction condition.

DB Contractor shall provide motorists with detour signs to guide the traffic around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary detour signs to divert traffic around the Project.

18.3.4 Restrictions on Lane and Roadway Closures

18.3.4.1 Major Event and Holiday Restrictions

No Lane Closure that restricts or interferes with traffic shall be allowed during the major event and holiday time periods listed in Table 18-2 below. No additional lane or ramp closure that restricts or interferes with traffic shall be allowed. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant.

Table 18-2 Major Event and Holiday Restrictions

Ref.	Major Event or Holiday	Duration	Restricted Period
(a)	New Year's Day	36-60 hours	Noon on December 31 through midnight the day after the observed holiday
(b)	Spring Break Week*	204 hours	Noon of the Friday before through midnight on the Sunday after
(c)	Easter Weekend	72 hours	Noon of the Friday before through noon on the Monday after
(d)	Memorial Day Weekend	96 hours	Noon of the Friday before through noon on the Tuesday after
(e)	Independence Day	36-60 hours	Noon of July 3rd through midnight the day after the observed holiday
(f)	Tax-free Shopping Weekend	72 hours	Noon of the Friday before through noon on the Monday after
(g)	Labor Day Weekend	96 hours	Noon of the Friday before through noon on the Tuesday after
(h)	Thanksgiving Holiday	120 hours	Noon of the Wednesday before through noon on the Monday after

Ref.	Major Event or Holiday	Duration	Restricted Period
(i)	Christmas Holiday	60-84 hours	Noon of December 23rd through midnight the day after the observed holiday
Total of Restricted Hours		792-864 hours	

*Typically the second or third week of March. Refer to the Texas A&M University Calendar (http://calendar.tamu.edu) and obtain advance approval from TxDOT.

18.3.4.2 Event Restrictions

DB Contractor shall coordinate with TxDOT regarding Lane Closures during regional events. No additional lane or ramp closure that restricts or interferes with traffic shall be allowed during the regional events set forth below. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant. TxDOT also has the right to modify the list of major events as they are added, rescheduled or warranted.

(a) Any events held within a three mile radius of any point along the length of the corridor with an expected attendance greater than 20,000 (restricted from three hours before the start of the event to three hours after the end of the event); and

(b) Within one mile radius of major retail traffic generators (i.e., malls) (Thanksgiving Day through January 2).

(c) Texas Renaissance Festival (all weekends from October 10 – November 29)

(d) All Texas A&M University home football games. Refer to schedule at: http://www.12thman.com/schedule.aspx?path=football

18.4 Construction Requirements

Construction of the traffic control elements shall be in accordance with DB Contractor's TMP, the manufacturer's directions or recommendations where applicable, and the applicable provisions of the TMUTCD.

18.4.1 DB Contractor Responsibility

If at any time TxDOT determines DB Contractor's traffic control operations do not meet the intent of the TMP or any specific TCP, DB Contractor shall immediately revise or discontinue such operations to correct the deficient conditions.

DB Contractor shall provide TxDOT the names of the Traffic Control Coordinator and support personnel, including a backup coordinator in the event the primary coordinator is unavailable, and the phone number(s) where they can be reached 24 hours per day, seven days per week.

18.4.2 Access

Existing bicycle and pedestrian access and mobility shall be maintained parallel with the access roads and across all cross streets. Access to existing transit stop locations shall be maintained during construction or reasonable alternative locations shall be coordinated with and approved by transit operators.

18.4.3 Detours

DB Contractor shall maintain all detours in a safe and traversable condition. A pavement transition, suitable for the posted speed and accounting for the vertical and horizontal geometry of the section shall be provided at all detour interfaces. DB Contractor shall repair any damage due to detour traffic onto local roads.

Pursuant to the requirements set forth in Section 19.1.6, if the pavement used in detours deteriorates to such poor condition that it presents a hazard, then modifications to the detours must be implemented until the hazard is corrected or the detour is removed.

18.4.4 Changes to Roadway Height and Width Restrictions

DB Contractor shall report any changes in the height or width of roadway restrictions during the Term of the Agreement. The reporting shall be made via email to the Texas Department of Motor Vehicles (TxDMV) at mcd_permit-restriction-@txdmv.gov, with an email copy to TxDOT at Samir.Goel@txdot.gov for locations in the Houston District and Terry.Paholek@txdot.gov for locations in the Bryan District, and the TxDOT PM using the *TxDMV Permit Restriction Application* form shown in Attachment 18-1. Any changes to the height or width of the roadway restrictions and increase to the restriction requires a minimum of 14 days advance notice while decrease or removal of the restriction must be reported no later than the next business day following the change.

Upon placement of the first beam over a roadway, DB Contractor shall notify the TxDOT PM, Area Office, District Bridge Section, and the local Governmental Entities of the field measured vertical clearance of newly set beams no later than the following business day.

The height and width shall be reported in feet and inches, and the distances in miles to the nearest 0.25 mile or from the nearest intersection.

DB Contractor shall provide advance signing for vertical clearance with clearance height three inches less than field measured clearance along traveled roadway, or as dictated by the requirements of the current TxDOT policy.

18.4.5 Pavement Markings

DB Contractor shall remove existing pavement markings that conflict with temporary or permanent pavement markings. These pavement markings shall be removed by any method that does not materially damage the surface or texture of the pavement. Pavement marking removal by over-painting is prohibited.

18.4.6 Reinstatement of Utility Cuts

After installation of drainage structures, storm sewers, or any other public or private Utility facility by open cut beneath existing pavements carrying traffic during construction, the pavement shall be restored to a structure acceptable to TxDOT or the Governmental Entity having jurisdiction over the affected area and restore it to a riding surface equal to or better than the existing surface.

18.4.7 Hauling Equipment

DB Contractor shall keep traveled surfaces used in its hauling operations clear and free of dirt or other debris that would hinder the safe operation of roadway traffic.

Rubber-tired equipment shall be used for moving dirt or other materials along or across paved surfaces. Excess dirt or debris shall be swept or removed from the job site with regular cleaning and sweeping.

Where DB Contractor moves any equipment not licensed for operation on public highways on or across any pavement, DB Contractor shall protect the pavement from all damage caused by such movement. Any damage caused by the operation of DB Contractor shall be repaired at the expense of DB Contractor.

All haul routes utilizing any street of an adjacent Governmental Entity shall be coordinated with the appropriate Governmental Entity

18.4.8 Final Clean-Up

DB Contractor shall clear and remove from the Site all surplus and discarded materials and debris of every kind and leave the entire Project in a clean, smooth and neat condition, after any construction process.

18.4.9 Stockpiles

Barricades and warning signs are to be placed at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT's Traffic Engineering Standard sheets and the TMUTCD. All material stockpiles shall not be located within the clear zone of any traveled lane, unless positive protection is provided.

18.5 Submittals

Submittals described in Section 18 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 18-3. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 18-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 18			
Traffic Management Plan	Within 90 days after NTP1	Approval prior to issuance of NTP2	18.2.1
Traffic Control Plan concept presentation (meeting)	Prior to TCP plan sheet development	Approval	18.3.1
Traffic Control Plans	At least 14 days prior to implementation	Approval	18.3.1
Requests for a lane closure	At least 14 days in advance of the proposed closure	Approval	18.3.3
Notice of a lane closure to TxDOT PIO	By 3:15 p.m. the day prior to all road closures	For Information	18.3.3.1

Table 18-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Lane Closure Notice (LCN) for: (i) full roadway closures, and (ii) lane closures and/or traffic switches planned to be in effect longer than 24 hours	At least 14 days prior to the publication of any notices or placement of any traffic control devices	For Information	18.3.3.1
Lane Closure Notice (LCN) for: (i) lane closures that are planned to be in effect less than 24 hours	At least 48 hours prior to the publication of any notices or placement of any traffic control devices	For Information	18.3.3.1
Notice of any decrease to the height or width of the roadway restrictions	At least 14 days prior to the change	For Information	18.4.4
Notice of any increase to or removal of the height or width of the roadway restrictions	The next business day following the change	For Information	18.4.4
The vertical clearance of newly set beams	The next business day following placement	For Information	18.4.4

SECTION 19.0 MAINTENANCE

19.1 General Requirements

19.1.1 General Maintenance Obligations

Throughout the period between NTP2 and Substantial Completion, DB Contractor shall be responsible for and shall carry out Maintenance Work within the Maintenance Limits. DB Contractor shall establish and maintain an organization that effectively manages all Maintenance Work in a manner set forth in the approved Maintenance Management Plan (MMP) and the requirements of the Contract Documents. DB Contractor shall:

(a) Coordinate activities of other entities with interests or activities within the Maintenance Limits;

(b) Conduct daily patrols of all lanes of the Project within the Maintenance Limits to identify conditions that are unsafe or have the potential to become unsafe, conditions that could threaten the infrastructure, and to attend to existing or changing conditions;

(c) Minimize delay and inconvenience to Users and, to the extent DB Contractor is able to control, users of related transportation facilities;

(d) Identify and correct all Defects and damages from Incidents;

(e) Monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to high winds, severe thunderstorms, tornadoes, heavy rainfall and flooding, hail, snow, ice, or other severe weather events;

(f) Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from the Project ROW;

(g) Minimize the risk of damage, disturbance, or destruction of third-party property during the performance of Maintenance Work;

(h) Coordinate with and enable TxDOT and others with statutory duties or functions in relation to the Project or related transportation facilities to perform such duties and functions;

(i) Perform Maintenance Work including inspections, Incident response, traffic control, and routine maintenance in accordance with the MMP and the Contract Documents; and

(j) Promptly investigate reports or complaints received from all sources.

19.1.2 Scope of Maintenance Work and Interfaces with TxDOT and Third Parties

The Maintenance Work shall apply to all Elements as identified in Attachment 19-1. TxDOT will retain maintenance responsibilities for Elements in place or operating prior to the Proposal Due Date within the Maintenance Limits (the “existing Elements”) until NTP2.

TxDOT’s maintenance responsibilities between the Proposal Due Date and NTP2 will be limited to routine maintenance of each existing Element and will not include preventive maintenance or major maintenance as such items are defined in TxDOT’s *Maintenance Management Manual*.

DB Contractor shall coordinate with TxDOT to achieve a smooth transition of maintenance activities from TxDOT in the period between NTP1 and NTP2. Starting at NTP2, DB Contractor shall perform all necessary Maintenance Work to comply with the Performance Requirements.

DB Contractor shall coordinate Maintenance Work with TxDOT and other Governmental Entities having adjacent maintenance responsibilities to minimize disruption to Users. DB Contractor shall coordinate with TxDOT to ensure a smooth transition to Maintenance Services performed by DB Contractor after Substantial Completion under the CMA.

19.1.3 Maintenance Limits

The initial Maintenance Limits are provided in Attachment 19-3. DB Contractor shall prepare and submit updated Maintenance Limits consistent with DB Contractor's Final Design as part of the MMP. DB Contractor shall periodically validate that the Maintenance Limits are correctly and clearly identified in the field and shall coordinate with TxDOT and Governmental Entities at least annually to review the Maintenance Limits, identify any jurisdictional gaps or inefficiencies and recommend solutions. Within the Maintenance Limits, DB Contractor shall allow adjacent landowners to cross under bridges at breaks in control of access.

19.2 Maintenance Management

19.2.1 Maintenance Management Plan

The MMP is an umbrella document that describes DB Contractor's managerial approach, strategy, and quality procedures for the Maintenance Work to achieve all requirements of the Contract Documents. The MMP shall be consistent with the general maintenance obligations described in Section 19.1.1. The requirements for the MMP are set forth in Attachment 19-4. Version 1 of the MMP is applicable to the Maintenance Work and shall come into effect upon issuance of NTP2 and shall remain in force until Substantial Completion. Refer to Section 1.2.1 of the CMA for the requirements for development of Version 2 of the MMP governing the Maintenance Services after Substantial Completion.

DB Contractor shall submit the MMP for TxDOT's sole discretion approval. DB Contractor shall update the MMP as required, or at least annually and shall submit for TxDOT's sole discretion approval.

19.2.2 Maintenance Quality Management Plan

As part of the MMP, DB Contractor shall develop, implement and maintain a quality management system that fulfills all requirements for Maintenance Work. The quality management system shall be described in a Maintenance Quality Management Plan (MQMP), which shall be in effect until Substantial Completion.

The MQMP shall comply with the requirements for the QMP set forth in Section 2.2 and shall follow the requirements for the MQMP described in Attachment 19-4.

19.2.3 Maintenance Manager

DB Contractor shall assign a Maintenance Manager who shall be responsible for:

(a) Implementing the maintenance obligations in this Section 19 and the MMP;

(b) Ensuring that the Final Design is consistent with the Renewal Work Schedule;

(c) Causing the Maintenance Work to be performed in accordance with the Contract Documents;

(d) Causing all maintenance personnel and resources performing Maintenance Work to be available and properly trained;

(e) The health and safety of personnel delivering the Maintenance Work and the general public affected by the Project; and

(f) Coordinating with TxDOT and other entities during Incidents and Emergencies

The minimum required qualifications and experience for the Maintenance Manager shall be established by reference to the Proposal Commitments (Exhibit 2 of the Agreement).

The Maintenance Manager shall have an active role in the review of Design Work to ensure that maintenance activities can be safely and efficiently performed for the Project and that necessary life cycle activities have been taken into consideration. The Maintenance Manager shall be available whenever Maintenance Work is performed.

19.3 Performance Requirements

19.3.1 Performance and Measurement Table

DB Contractor's performance of the Maintenance Work shall be governed by the Performance and Measurement Table (Attachment 19-1) as may be updated in accordance with Section 19.3.4. The Performance and Measurement Table shows for each Element:

(a) A performance objective;

(b) The Defect Remedy Periods for each category of Defect;

(c) Inspection and measurement methods;

(d) Measurement records; and

(e) Targets.

For each measurement record, DB Contractor is required to achieve or exceed the stated Target. Otherwise, a Defect exists that shall be remedied or repaired as further described below in Section 19.3.5 and Section 19.3.6 in these Technical Provisions.

19.3.2 Defect Identification, Recording and Categorization

19.3.2.1 Definitions

In this Section 19 and as shown in the Performance and Measurement Table:

(a) Hazard mitigation is an action taken by DB Contractor to mitigate a hazard to Users or imminent risk of damage or deterioration to property or the environment such that the Category 1 Defect no longer exists;

(b) Permanent remedy is an action taken by DB Contractor to restore the condition of an Element following hazard mitigation of a Category 1 Defect; and

(c) Permanent repair is an action taken by DB Contractor to restore the condition of an Element for which a Category 2 Defect has been recorded.

19.3.2.2 Sources of Defects and Status

DB Contractor shall identify and record Defects through inspections described in Section 19.5 and reports or complaints by third parties. DB Contractor shall accurately and promptly record the status of Defects from all sources in the Maintenance Management System (MMS). Where multiple instances of Defects arise from the failure to achieve a given Target (for example simultaneous failure to repair damaged guardrail in multiple locations), a separate Defect shall be recorded for each Performance Section within which the Target is not achieved.

19.3.2.3 Defects Identified by DB Contractor or Third Party

Whenever DB Contractor identifies, becomes aware of, or is notified by a third party of a Defect, DB Contractor shall create within the MMS a Maintenance Record containing details of the associated Element, the nature and categorization of the Defect, and the proposed timing and details of hazard mitigation, permanent remedy, and permanent repair of the Defect.

DB Contractor shall categorize each Defect based upon its determination as to whether it represents:

(a) an immediate or imminent health or safety hazard to Users or road workers;

(b) a risk of immediate or imminent structural failure or deterioration;

(c) an immediate or imminent risk of damage to a third party's property; or

(d) an immediate or imminent risk of damage to the environment.

Should a Defect meet any of the above criteria, DB Contractor shall record it as a Category 1 Defect. Any other Defect not meeting the foregoing criteria shall be assigned as a Category 2 Defect. DB Contractor shall provide training to all relevant personnel on the categorization of Defects. DB Contractor shall maintain a record of the circumstances of the Defect and how it was categorized. DB Contractor shall facilitate the review by TxDOT of Maintenance Records in the MMS associated with DB Contractor-identified Defects and shall enable TxDOT to flag any such Defect where TxDOT disagrees with any attribute or categorization assigned by DB Contractor.

19.3.2.4 Defect Identified by TxDOT

DB Contractor shall record and act upon Defects identified by TxDOT in the same way as self-identified Defects. TxDOT may provide notification of a Defect verbally, in writing, or during the course of a joint inspection. For TxDOT-identified Defects, DB Contractor shall promptly create a Maintenance Record and take the other actions described in Section 19.3.2.3 for DB Contractor-identified Defects. For each such Defect, DB Contractor shall show within the MMS the timing of hazard mitigation, permanent remedy and permanent repair of the Defect.

19.3.3 Baseline Inspections and Performance and Measurement Table

19.3.3.1 Baseline Inspections

DB Contractor shall cause the performance of inspections and/or tests to determine the condition of each Element (the "Baseline Inspections") and the preparation of the Baseline Element Condition Report (BECR).

DB Contractor shall submit to TxDOT for approval the proposed scope of Baseline Inspections, the methodology proposed for the inspections and/or tests, and the name, relevant qualifications, and experience of an organization financially independent of DB Contractor that DB Contractor proposes to undertake the Baseline Inspections and the BECR. Performance of baseline inspections shall be in accordance with Attachment 19-2.

Upon TxDOT's approval of the scope of the Baseline Inspections and the organization proposed by DB Contractor to perform them, DB Contractor shall provide to TxDOT notice to witness the inspections and/or tests.

19.3.3.2 Baseline Element Condition Report

DB Contractor shall cause the testing organization to prepare the BECR and shall submit to TxDOT for approval as part of the MMP. The BECR shall include the following:

(a) A record of the condition of each Element shown in Attachment 19-2;

(b) Each photographic record and/or measurement shall be associated with a location accurate to the nearest 10 feet;

(c) The condition of each Element shall be recorded such that there is a minimum of one record for each Performance Section within which the Element is represented; and

(d) Where the condition of an Element varies within a Performance Section, the BECR shall include sufficient records to demonstrate the range of conditions and a reference condition for the Element shall be recorded for each Performance Section.

DB Contractor shall cause the BECR to include the results of the most recent Specialist Inspections undertaken by TxDOT including the results of the annual survey of pavement condition for the entire Project, including main lanes, ramps, and frontage roads, undertaken using automated condition survey equipment.

19.3.3.3 Use of BECR to Establish Performance and Measurement Table Targets

The results of the BECR shall be used to establish the Targets to be achieved in Attachment 19-1 as demonstrated in the following example. Referring to Element Ref. 1.7 "edge drop-off", the performance objective is that "all roadways are free from edge drop-offs exceeding measurement record thresholds". The Target for measurement record 1.7.1 requires "no edge drop-off greater than the reference condition (on a location-specific basis) in the BECR". If within a given Performance Section the maximum edge drop-off recorded in the BECR is 2.7" and an edge drop-off of 3.0" is measured within the same Performance Section after NTP2, the Target would not be achieved, resulting in a Defect. If a Category 2 Defect, this would trigger a 28 day permanent repair period. If a Category 1 Defect this would trigger a 24 hour hazard mitigation period and a 28 day permanent remedy period.

TxDOT will not require performance of an Element during the Construction Period to exceed the performance required for the same Element after Substantial Completion as governed by the CMA. For example, if within a given Performance Section the maximum edge drop-off recorded within the BECR is 1.0", and an edge drop-off of 1.5" is recorded within the same Performance Section after NTP2 this would not be a Defect, because (per measurement record 1.7.1 of CMA Exhibit 2 Attachment 1) the requirement after Substantial Completion is: "No edge drop-off greater than 2.0". However, if the edge drop-off recorded within the same Performance Section

after NTP2 is 2.5" this would be a Defect, triggering the permanent repair, hazard mitigation and permanent remedy periods described in the preceding paragraph.

19.3.3.4 Defects between Baseline Inspections and NTP2

No later than 14 days after NTP2, DB Contractor shall submit details of any instances of damage or deterioration that, in the opinion of the DB Contractor, occurred between the completion of the Baseline Inspections and NTP2. DB Contractor shall identify the Maintenance Work required to cause each such Element to be in compliance with the applicable Target, including DB Contractor's estimate of the cost of performing such Maintenance Work. TxDOT may implement one or more of the following: (a) cause Elements to be in compliance with Targets using its own forces; (b) instruct DB Contractor to perform Maintenance Work that would enable Elements to be in compliance with applicable Targets by means of a Change Order; and (c) agree to a revision to certain Target(s) or measurement records in Attachment 19-1.

19.3.4 Updates of the Performance and Measurement Table

DB Contractor shall propose changes to the Performance and Measurement Table for TxDOT approval. In its annual update of the MMP, DB Contractor shall propose for TxDOT's approval such amendments to the "Inspection and Measurement Method" and "Measurement Record" as are necessary to cause these to comply with Good Industry Practice and these Technical Provisions. TxDOT may, at any time, require DB Contractor to adopt amendments to the columns with the headings "Measurement Record" and "Inspection and Measurement Method" in Attachment 19-1 where such updates are required to comply with Good Industry Practice and this Section 19. TxDOT shall require the adoption of a new Target only when this is required because the "Inspection and Measurement Method" or "Measurement Record" no longer complies with Good Industry Practice. In this case, the new Target shall be determined using the principle that it shall achieve no less than the standard of maintenance that would have been achieved through DB Contractor's compliance with the original "Inspection and Measurement Method", "Measurement Record", and Target.

19.3.5 Permanent Remedy and Permanent Repair of Defects

Where action is proposed to remedy or repair any Defect, DB Contractor shall promptly create a Maintenance Record that identifies the nature of the proposed remedy or repair.

The Defect Remedy Period set forth in the Performance and Measurement Table shall commence upon the earlier of: (i) the date and time DB Contractor became aware of the Defect; or (ii) the date and time DB Contractor should have known of the Defect. DB Contractor shall take necessary action to avoid any Category 2 Defect from becoming a Category 1 Defect. DB Contractor shall monitor Category 2 Defects to verify the condition of the affected Element prior to permanent repair and shall inform TxDOT immediately should any such Defect deteriorate to a Category 1 Defect.

For Category 2 Defects, DB Contractor shall complete the permanent repair within the period specified in the column with the heading "Category 2 Permanent Repair" in the Performance and Measurement Table unless an earlier repair is required to prevent deterioration to a Category 1 Defect.

19.3.6 Hazard Mitigation of Category 1 Defects

DB Contractor shall immediately implement hazard mitigation of any Category 1 Defect in an Element of which it is aware through its own inspections, from a third party or through

notification by TxDOT to DB Contractor that TxDOT requires DB Contractor to perform hazard mitigation for a Category 1 Defect.

For Category 1 Defects, DB Contractor shall take necessary action such that any hazard to Users is mitigated within the Defect Remedy Period specified in the column with the heading "Category 1 Hazard Mitigation" in the Performance and Measurement Table and shall permanently remedy the Defect within the period identified in the column with the heading "Category 1 Permanent Remedy" in the Performance and Measurement Table. DB Contractor shall continue hazard mitigation until a permanent remedy or permanent repair has been completed.

19.4 Inspections

19.4.1 General Inspections by DB Contractor

DB Contractor shall establish inspection procedures and frequency as well as a plan to implement a program of inspections necessary for the Maintenance Work. Inspection procedures shall ensure:

(a) The Project is safe for Users;

(b) Category 1 Defects are identified and repaired such that the hazard to Users is mitigated within the period given in the column entitled "Cat. 1 Hazard Mitigation" in the Performance and Measurement Table;

(c) Category 1 Defects are identified and permanently remedied within the period given in the column entitled "Cat. 1 Permanent Remedy" in the Performance and Measurement Table; and

(d) Category 2 Defects are identified and permanently repaired within the period given in the column entitled "Cat. 2 Permanent Repair" in the Performance and Measurement Table.

In performing inspections to identify Category 1 Defects and Category 2 Defects, DB Contractor shall, for any maintained Element, conform at a minimum to the inspection standards set forth for that maintained Element in the column entitled "Inspection and Measurement Method" in the Performance and Measurement Table.

DB Contractor shall cause personnel performing or attending inspections to be certified as inspectors and/or raters in accordance with TxDOT's PMIS program or applicable certifying agency for the type of inspection being performed, capable of accurately identifying, categorizing and recording Defects in accordance with the requirements of Section 19.3.

DB Contractor shall perform General Inspections in accordance with the MMP so that the repairs of all Defects are included in planned programs of work.

DB Contractor shall record details of the manner of inspection (e.g. center Lane Closure or shoulder), the weather conditions, and any other unusual features of the inspection on inspection records in respect of General Inspections.

DB Contractor shall submit to TxDOT non-conformance reports and shall notify TxDOT of Nonconforming Work within the timeframes stated in Table 19-3. TxDOT will issue a non-

conformance report if TxDOT discovers any Nonconforming Work. DB Contractor's responsibility to correct Nonconforming Work is set forth in Section 5.6 of the Agreement.

19.4.2 Performance Sections

As part of the MMP, DB Contractor shall prepare drawings identifying the Performance Sections and shall submit and update these plans with the applicable part of the MMP. The drawings shall identify the boundaries of each Performance Section and shall cross reference to an inventory describing each Element of the Project contained within each Performance Section. Where Performance Sections need to be revised to take into consideration the progression from an existing facility to the Final Design, DB Contractor shall phase in the new Performance Sections in a logical manner so that new Performance Sections are in place by the time of issue of Version 2 of the MMP.

DB Contractor shall implement the Texas Reference Marker (TRM) System used by TxDOT to establish Performance Sections for inspection and Maintenance Records in accordance with the MMP. DB Contractor shall use the existing TRM System established on existing sections of the Project. DB Contractor shall coordinate with TxDOT to establish the TRM System on newly constructed sections of roadway.

19.4.3 Inspections by TxDOT

TxDOT may undertake Specialist Inspections as follows during the Term and if such inspections are performed will make the results available to DB Contractor.

(a) Annual survey of pavement condition for the entire Project, including main lanes, ramps, and frontage roads, undertaken using automated condition survey equipment to measure all necessary criteria including: ruts, skid resistance and ride quality according to the "Inspection and Measurement Method" set forth in the Performance and Measurement Table.

(b) Routine biennial inspections, to the extent required, for all structures within the Maintenance Limits in compliance with the latest FHWA / NBIS and TxDOT requirements.

Upon receipt of TxDOT Specialist Inspections, DB Contractor shall use the results of Specialist Inspections to prioritize Maintenance Work and immediately identify all Defects within each Performance Section established by the inspections and enter these Defects in the MMS with the appropriate Defect Remedy Period.

19.5 Maintenance Management System

19.5.1 MMS Attributes

DB Contractor shall implement a computer-based Maintenance Management System (MMS) to store all Maintenance Records and record the following attributes of all Elements:

(a) Asset inventory, description, location, condition date of installation and repair history;

(b) Description, date-time of identification and categorization of Defects;

(c) Planned actions and date-time for the hazard mitigation and permanent remedy of Category 1 Defects;

(d) Planned actions and date-time for the permanent repair of Category 2 Defects; and

(e) Date-time and types of inspections performed.

Horizontal and vertical locational accuracy of Maintenance Records shall meet or exceed Good Industry Practice. Maintenance Records shall be located using the posted TRM reference marker number, Geographic Information System (GIS) data and control number for bridge class structures.

19.5.2 Recording of Complaints within MMS

DB Contractor shall record within the MMS all complaints and reports from third parties to include:

(a) The date and time of the complaint;

(b) The location and nature of the problem;

(c) Who made the complaint; and

(d) Date and action taken to address the complaint.

19.5.3 Recording of Accidents and Incidents within Maintenance Limits

DB Contractor shall record within the MMS the following information on accidents/Incidents:

(a) Accidents involving DB Contractor or any Subcontractor personnel, equipment, barricades or tools; and

(b) Any Incident or accident within the Maintenance Limits.

With respect to any accident/Incident, the information provided shall include as a minimum:

1. Date and time of the accident/Incident;

2. Location of the Incident;

3. Nature of the Incident;

4. All parties involved in the Incident, including names, addresses, telephone numbers and their involvement (including witnesses);

5. Responsible party and insurance information;

6. Action taken to address the Incident; and

7. Documentation of traffic control in place at location.

19.5.4 MMS Functional and Timeliness Requirements

The MMS shall facilitate the direct upload by DB Contractor personnel from handheld devices in the field of all applicable Defect information and attributes including description, date-time of identification and categorization. Any such upload of Defect information with Category 1 Defect

status shall trigger immediate automatic e-mail notification of TxDOT and the Maintenance Manager.

When an Element is constructed, installed, maintained, inspected, modified, replaced or removed, DB Contractor shall update the MMS. Category 1 Defects shall be recorded in the MMS immediately upon DB Contractor becoming aware of the Defect either by direct upload to the MMS by DB Contractor's inspection personnel in the field or by automated upload of the information to the MMS when Category 1 Defects are notified by TxDOT or a third party. Category 2 Defects and all other recording requirements shall be recorded in the MMS within the timeframes state in Table 19-3.

19.5.5 MMS Interfaces with TxDOT

Prior to NTP2, the MMS shall be fully populated and operational, and DB Contractor shall demonstrate to TxDOT the functionality and use of the MMS and that it is fully compliant with the requirements of the Contract Documents. The MMS shall be kept updated and operational throughout the Term and shall be used as the basis for the MMS to be implemented under the CMA after Substantial Completion.

From the date of the demonstration and throughout the Term, DB Contractor shall provide equipment, facilities and training necessary to permit remote, real-time, dedicated high-speed access to the MMS, via one terminal each, for up to three TxDOT employees. DB Contractor shall repeat the training and demonstration annually and whenever system changes are implemented.

19.6 Maintenance Obligations

19.6.1 Incident and Emergency Management

As part of the MMP for Maintenance Work, DB Contractor shall prepare and implement an Incident Management Plan (IMP). Refer to Attachment 19-4 for the required contents of the IMP.

Where an Incident or Emergency has an effect on the operation of the Project, DB Contractor shall clear obstructions and repair damage to the Project under the supervision of the relevant Emergency Services if necessary, such that the Project is returned to normal operating standards and safe conditions as quickly as possible in accordance with the requirements of Section 2.4.6.

Where liquid or soluble material spills are involved, DB Contractor shall take all necessary measures to minimize pollution of watercourses or groundwater. Where structural damage to structures is suspected, DB Contractor shall cause that a suitably qualified bridge engineer or specialist inspector is available to evaluate the structure and to advise on temporary repairs and shoring needed to provide safe clearance of the Incident or Emergency. Where such an Incident or Emergency involves a personal injury, DB Contractor shall not remove any vehicle or other item that may assist a potential investigation by Emergency Services until authorized to do so by such agency or agencies.

19.6.2 Snow and Ice Control

DB Contractor shall report to TxDOT information on weather-related events which may cause unsafe driving conditions such as ice, sleet, snow, floods or high winds and shall use available resources to maintain the roadway in as safe a condition as possible during winter events.

DB Contractor shall maintain the travel way free of snow and ice in compliance with the Performance Requirements and shall implement the requirements of the Snow and Ice Control Plan (SICP). Requirements for the SICP are contained in Attachment 19-4. The presence or forecast of snow or ice shall be assessed as a Category 1 Defect (Hazard Mitigation) and shall be addressed immediately by DB Contractor upon detection or upon being informed of the condition(s).

19.6.3 Severe Weather Evacuation

DB Contractor shall prepare and train its staff for evacuation and shall assist TxDOT in the event that an evacuation is implemented, in accordance with the Severe Weather Evacuation Plan (SWEP). Requirements for the SWEP are contained in Attachment 19-4.

19.6.4 Maintenance Document Management

For all Maintenance Records, DB Contractor shall follow the document storage and retrieval requirements set forth in Section 2.1.4.1 of the Technical Provisions. DB Contractor's document management system shall be compatible with SharePoint ®.

DB Contractor shall cause all Maintenance Records and Project-related documents to be stored along with accurate information on the location consistent with reference markers in accordance with the TRM, so that all data and records can be retrieved by reference marker and Performance Section.

Maintenance Records shall be kept throughout the Maintenance Period and, where applicable, shall be incorporated into the Records stored and used by DB Contractor under the CMA Documents. Such records shall be provided to TxDOT at the time the Project is delivered to TxDOT, at either the expiration of the Maintenance Period or earlier termination of the CMA. All records obtained during the Warranty Terms shall be kept and provided to TxDOT at the end of the last Warranty Term.

Unless otherwise directed by TxDOT, record retention shall comply with the requirements of the Texas State Records Retention Schedule.

19.6.5 Safety

DB Contractor shall establish and implement safety and health procedures for Maintenance Work in compliance with Section 2.4 and in accordance with the Maintenance Safety Plan. Refer to Attachment 19-4 for the required contents of the Maintenance Safety Plan.

19.6.6 Communication

DB Contractor shall establish and implement communication procedures for Maintenance Work in compliance with Section 2.8 and Section 3 of the Agreement.

19.6.7 Hazardous Materials Management

DB Contractor shall establish and implement Hazardous Materials Management procedures for Maintenance Work in compliance with Section 4.3.5 and in accordance with the HMMP. Refer to Attachment 19-4 for the required contents of the HMMP.

19.6.8 Environmental Compliance and Mitigation

DB Contractor shall establish and implement environmental compliance and mitigation procedures for Maintenance Work in compliance with Section 4.3.2 and shall follow the requirements described in Attachment 19-4.

19.6.9 Traffic Management

DB Contractor shall establish and implement traffic management procedures for Maintenance Work in compliance with Section 18 and shall follow the requirements described in Attachment 19-4.

19.7 Reporting

DB Contractor shall submit a monthly report to TxDOT for Maintenance Work. This monthly report shall include the sections and reporting requirements in Table 19-2.

Table 19-2: Requirements for Monthly Report

Report Sections	Reporting Requirements/Description
Project Status	Report a high level summary of Project condition and operational status, which shall include at a minimum: i) Tracking log of accident statistics; ii) Tracking log of number of Lane Closures; iii) Tracking log of public inquiries/complaints; and iv) Tracking log of public contact/outreach activities.
Operational Status	Report a summary of Project condition and operational status, which shall include at a minimum: i) Defects including the location, the nature and cause of the Defect, and the steps that will be, or have been, taken to address the Defects per Section 19.4.2; ii) Inspection results per Section 19.5; iii) Accidents, Incidents and Emergencies per Section 19.6.6; and iv) Workforce injuries and OSHA related accidents per Section 2.7.
Organizational Status	Report a summary of DB Contractor's organizational status (or reference to the appropriate sections/attachments in the latest MMP for the information) for the items below. i) List of key personnel; ii) Log of all training activities undertaken and planned; iii) List of major equipment; and iv) Subcontractors.
Progress Report	Report a summary of DB Contractor's activity, which shall include at a minimum from the previous month: i) A tracking log of completed action items, with start and end dates, and documentation supporting resolution; ii) A summary of Maintenance Work; iii) A summary of quality control activities and results; iv) List of any Nonconforming Work, with explanation of non-conformance and associated risks; and v) Meetings/correspondence logs.

Report Sections	Reporting Requirements/Description
Planned Activities	Report a summary of DB Contractor's planned activity, which shall include at a minimum: i) A tracking log of action items in progress, with start and projected end dates, with a description of proposed solutions; ii) Schedule of planned Maintenance Work for the upcoming month; iii) Future Lane Closures including location, duration, and reason of each; and iv) A three-month look ahead schedule of planned Maintenance Work.

19.8 Submittals

Submittals described in Section 19 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 19-3. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 19-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Section 19			
Updated Maintenance Limits drawings consistent with the Final Design	As part of the MMP	Approval	19.1.3
PMP – Maintenance Management Plan (MMP) (Version 1)	Within 30 days after NTP1	Approval prior to issuance of NTP2	19.2.1 and Attachment 19-4
MMP updates (Version 1)	As required or at least annually 60 days prior to each anniversary of NTP2	Approval	19.2.1 and Attachment 19-4
MMP (Version 2)	Refer to CMA	Approval	19.2.1 and Attachment 19-4
Maintenance Quality Management Plan (MQMP)	As part of the MMP	Approval	19.2.2 and Attachment 19-4
DB Contractor proposed: • Scope, • Methodology, and • Qualifications of organization for Baseline Inspections and BECR	30 days prior to the Baseline Inspections	Approval	19.3.3.1
Notice of scheduled Baseline Inspections	After approval of proposed scope, methodology, and organization and at a minimum 14 days prior to the inspection	For Information	19.3.3.1

Table 19-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Baseline Element Condition Reports (BECR)	As part of the MMP updates; 60 days prior to NTP2	Approval	19.3.3.2
Description of the Work required for Elements to meet the applicable Targets in Attachment 19-1	30 days prior to NTP2	For Information	19.3.3.3
Updates to Performance and Measurement Table	As required or at least annually 60 days prior to each anniversary of NTP2	Approval	19.3.4
Maintenance Record of proposed remedy	Promptly where action is proposed	Approval	19.3.5
Non-conformance reports	Within 7 days of notification issuance	For Information	19.4.1
Notification of Nonconforming Work	Within 2 days of discovery	For Information	19.4.1
Drawings depicting Performance Section locations	As part of the MMP	Approval	19.4.2
All relevant information regarding a maintenance Element populated in the MMS	Within three days of completion of construction, installation, maintenance, inspection, modification, replacement, or removal	For Information	19.5.4
All relevant information concerning Category 1 Defects populated in the MMS	Immediately upon DB Contractor's knowledge of the Defect	For Information	19.5.4
All relevant information concerning Category 2 Defects populated in the MMS	Within three days of them coming to the attention of DB Contractor	For Information	19.5.4
All other relevant MMS information	Within 15 days of completion or occurrence of the relevant activity	For Information	19.5.4
Demonstration of the populated and operational MMS	Prior to NTP2	For Information	19.5.5
MMS training	As part of the MMS demonstration, annually thereafter prior to each anniversary of NTP2, and whenever system changes are implemented	For Information	19.5.5
Incident Management Plan (IMP)	As part of the MMP	Approval prior to NTP2	19.6.1 and Attachment 19-4
Snow and Ice Control Plan (SICP)	As part of the MMP	Approval prior to NTP2	19.6.2 and Attachment 19-4

Table 19-3: Submittals to TxDOT

Submittals	Submittal Schedule	Department Action	Reference Section
Severe Weather Evacuation Plan (SWEP)	As part of the MMP	Approval prior to NTP2	19.6.3 and Attachment 19-4
Maintenance Safety Plan	As part of the MMP	Approval prior to NTP2	19.6.5 and Attachment 19-4
Hazardous Materials Management Plan (HMMP)	As part of the MMP	Approval prior to NTP2	19.6.7 and Attachment 19-4
Maintenance Work monthly report	Monthly	For Information	19.7

SECTION 20.0 BICYCLE AND PEDESTRIAN FACILITIES

Design and construction of bicycle and pedestrian facilities are not proposed as part of the Work. DB Contractor's design shall accommodate the design and construction of future bicycle and pedestrian facilities on the cross streets. The cross street typical section widths shown in Attachment 11-2 accommodate future bicycle and pedestrian facilities.

20.1 General Requirements

This Section 20 includes requirements with which DB Contractor shall design and construct all bicycle and pedestrian facilities for the Project. DB Contractor shall ensure that bicycle and pedestrian facilities are consistent with TxDOT policies and guidelines. DB Contractor shall coordinate the Elements of this Project with the existing and planned trails and other facilities of local and county administrations for pedestrians and cyclists.

20.2 Administrative Requirements

DB Contractor shall maintain and keep operational all bicycle and pedestrian facilities during construction and throughout the Term of the Agreement.

20.3 Design Requirements

20.3.1 Bicycle Facilities

DB Contractor's facilities shall be consistent with the region's bicycle and pedestrian plan and accommodate existing bicycle paths and crossings, and on-street bicycle facilities. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure consistency with existing and proposed bicycle facilities.

DB Contractor's facilities shall meet the requirements of the *AASHTO Guide for the Development of Bicycle Facilities* and shall incorporate the following Elements relating to bicycle facilities into the Design:

(a) Alignment, profile, cross-section, and materials;

(b) Points of connection to existing and proposed bicycle facilities;

(c) Signing, signalization, and pavement markings;

(d) Separation between bicycle facilities and the nearest travel lane;

(e) Methods of illumination, where applicable;

(f) Requirements of the Aesthetics and Landscaping Plans; and

(g) Requirements of *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* and approved TxDOT Houston and Bryan District Standards.

20.3.2 Pedestrian Facilities

DB Contractor shall design, construct, and maintain pedestrian facilities where required by State and federal regulations. Sidewalks and pedestrian facilities shall comply with ADA, the *Texas Accessibility Standards* and TDLR. DB Contractor shall install pedestrian signals and curb

ramps at all existing and proposed signalized intersections. All pedestrian facilities shall be designed to incorporate ambulatory, visibility, and auditory needs of all users. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure consistency with existing and proposed bicycle facilities.

DB Contractor's facilities shall meet the requirements of the *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities*, and shall include the following Elements relating to pedestrian facilities:

(a) Alignment, profile, cross-section, and materials;

(b) Points of connection to existing and proposed pedestrian facilities;

(c) Signing, signalization, and pavement markings;

(d) Separation between pedestrian facilities and the nearest travel lane;

(e) Methods of illumination, where applicable;

(f) Requirements of the Aesthetics and Landscaping Plans; and

(g) Requirements of *Green Ribbon Project Houston District Design Guidelines for the Construction of Highways, Streets & Bridges* and approved TxDOT Houston and Bryan District Standards.

DB Contractor is responsible for obtaining TDLR reviews and approvals of pedestrian facility design and construction.

SECTION 21.0 TOLLING

21.1 General Requirements

TxDOT will enter into a separate contract with a tolling Systems Integrator to provide the Electronic Toll Collection System (ETCS) for the Project. DB Contractor shall support the installation of the ETCS as described herein. DB Contractor shall coordinate with TxDOT Toll Operations Division (TOD) and the Systems Integrator during the design phase to finalize the design of all ETCS-related civil Elements. DB Contractor shall provide access to the Project and coordinate construction activities for the Systems Integrator to construct Systems Integrator's civil infrastructure, as defined in Section 21.4, for the Toll Zones concurrent with DB Contractor's Work.

A listing of DB Contractor/TxDOT/Systems Integrator responsibilities is provided in Attachment 21-1.

21.2 Administrative Requirements

DB Contractor shall meet regularly with TxDOT TOD to coordinate design and construction of Toll Zone infrastructure.

21.3 Design Requirements

DB Contractor shall coordinate Design Work in the Toll Zones with TxDOT TOD to determine design requirements specific to the Toll Zones.

DB Contractor shall be responsible for designing general roadway items through each Toll Zone, at locations to be determined by TxDOT in coordination with DB Contractor, including pavement design (toll zone pavement and transition areas), striping, MBGF, concrete traffic barrier and foundation, end treatments, general grading, earthwork, flexible base, embankment, retaining walls, drainage, SW3P, and other typical roadway items included in DB Contractor's Work, to support TxDOT's design of the Systems Integrator's toll infrastructure at each Toll Zone, including gantry structures, conduit, Toll Zone maintenance driveways, and concrete pads for the roadside equipment cabinets, generators, and fuel tanks. DB Contractor shall design and provide a prepared finished grade roadside area for Systems Integrator's placement of concrete pads for the tolling infrastructure and the maintenance driveway. The finished grade roadside area shall allow for a maintenance driveway that permits safe use by maintenance personnel and their vehicles. The finished grade roadside area shall be free of ditches or other obstructions which could damage or diminish the function of the tolling equipment. For general guidance, details, and responsibilities, see Attachment 21-2. Geometric constraints may dictate that the design deviates from the general guidance. In these instances, DB Contractor final design shall be coordinated with TxDOT TOD to ensure design meets the Systems Integrator's needs. DB Contractor shall coordinate and provide any changes in design within the Toll Zones with TxDOT TOD during the design and construction phases of the Project.

TxDOT TOD shall be responsible for civil design of the toll infrastructure related to the Systems Integrator's work. TxDOT TOD shall design and provide Systems Integrator's Toll Zone layouts to DB Contractor during design and work closely with DB Contractor to coordinate design. TxDOT TOD shall provide design for the Systems Integrator's toll gantries, including foundations and lightning protection. For the DB Contractor's drainage and earthwork design, TxDOT shall provide design for the maintenance driveways, concrete pads for roadside equipment cabinets, generators and fuel tanks, and conduit.

TxDOT TOD shall be responsible for the design of static toll rate signs and toll entrance signs. DB Contractor shall provide to TxDOT cross sections and any additional design data (e.g. surrounding utilities and signs, ditches) that is necessary for TxDOT's toll rate sign design.

21.3.1 Pavement

Attachment 21-3 shall be utilized as a basis for DB Contractor pavement design in the 110' Toll Zone. All reinforcing steel within the 110-foot Toll Zone shall be epoxy-coated; this includes the Toll Zone pavement and other items such as barriers, retaining wall, ties, chairs, etc. DB Contractor shall include conduit stub-ups in the pavement and loop sensor conduit meeting the Systems Integrator's specifications. TxDOT TOD will provide Systems Integrator's loop layout with stub-up locations for DB Contractor to incorporate into Toll Zone pavement design. Pavement joint locations in the Toll Zone pavement need to be coordinated with TxDOT TOD and Systems Integrator and shall not interfere with sensor loops.

21.3.2 Fiber

DB Contractor shall design concrete encased duct banks for the length of the corridor in conformance with applicable TxDOT Statewide and District-wide Standards and Specifications, and include a minimum of two 3-inch dedicated conduits for tolling. DB Contractor shall provide a minimum of 4 strands of single mode communication fiber per Toll Zone (e.g., 24 Toll Zones would require 96 fiber strands). In order to access the existing HOU District communications network, the DB Contractor shall coordinate with TxDOT, and provide a connection of the proposed tolling fiber to TxDOT hub buildings, existing or new, throughout the Project. Daisy-chaining, defined as having the same fibers going into multiple Toll Zones and carrying the data for multiple Toll Zones, of fiber will not be allowed. DB Contractor shall provide conduit with 4 strands of dedicated single mode communication fiber from the duct bank to each Toll Zone, with the fiber backbone to be terminated inside a DB Contractor provided termination cabinet with an appropriately sized fiber optic patch panel adjacent to Systems Integrator's equipment cabinet. The TxDOT TOD approved termination cabinet should be mounted on a DB contractor provided concrete pad and sized to accommodate the fiber trunk line, slack and a splice termination count for twice the trunk line fiber count (i.e. 48 count fiber trunk would require 96 splice terminations). The connectors shall be FC type. All fiber, conduit and termination cabinets designed by DB Contractor for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems. This shall also include pull boxes and pull strings, fiber optic markers, test stations, and tracer wire. The fiber optic cable shall be tested end to end and bi-directional by OTDR and light meter. Test results shall be provided to TxDOT TOD.

21.3.3 Electrical Service

DB Contractor shall design and provide electric service connections at each Toll Zone, meeting the Systems Integrator's specifications. Systems Integrator power requirements are 120/240VAC single phase, 60 Hz power and power requirement of 10 kVA for each Toll Zone. DB Contractor shall verify Systems Integrator power requirements prior to design. At the Toll Zones, DB Contractor shall provide toll power ground boxes adjacent to the Systems Integrator's roadside equipment cabinet pad, in accordance with Systems Integrator's specifications. At the Toll Zones, DB Contractor shall be responsible for designing the electrical conductor between the electrical service connection and the designated DB Contractor provided toll power ground boxes adjacent to the Systems Integrator's roadside equipment cabinet pad, in accordance with Systems Integrator's specifications. A minimum of 25 feet of conductor shall be coiled in the junction boxes.

21.3.4 ETCS Infrastructure Requirements

21.3.4.1 Main Lane Tolling

Main lane tolling shall consist of tolled lanes with ETCS at the main lane toll gantry locations indicated in Sections 1.2.1.6, 1.2.2.5 and 1.2.3.9.

21.3.4.2 Ramp Tolling

Ramp Tolling will consist of ETCS at the ramp toll gantry locations indicated in Sections 1.2.1.6, 1.2.2.5, and 1.2.3.9.

21.3.4.3 Utility and Personnel Access-way

DB Contractor shall furnish and install electric utility power drops, sized per TxDOT design criteria with voltage and load information provided by the Systems Integrator at each Toll Zone location in accordance with Sections 21.3.3 and 21.4.3.

21.4 Construction Requirements

DB Contractor shall coordinate Construction Work in the Toll Zones with TxDOT TOD and Systems Integrator to determine construction requirements specific to the Toll Zones. DB Contractor shall provide continuous and useable access and coordinate with the Systems Integrator during construction to allow for Systems Integrator's civil construction work to occur concurrently with DB Contractor's Work, in accordance with Section 23.4 of the Agreement.

DB Contractor shall be responsible for constructing general roadway items through each Toll Zone including pavement section, striping, MBGF, concrete traffic barrier and foundation, end treatments, general grading, earthwork, flexible base, embankment, retaining walls, drainage, SW3P, and other typical roadway items included in DB Contractor's Work, to support the construction of Systems Integrator's toll civil infrastructure at each Toll Zone, which includes gantry structures and foundations, lightning protection, conduit, maintenance driveway surfacing, and concrete pads for the roadside equipment cabinets, generators, and fuel tanks. DB Contractor shall provide a finished grade roadside area for Systems Integrator's placement of concrete pads for the tolling infrastructure and the maintenance driveway. The finished grade roadside area shall allow for a maintenance driveway that permits safe use by maintenance personnel and their vehicles. The finished grade roadside area shall provide positive drainage and be free of ditches or other obstructions which could damage or diminish the function of the tolling equipment. For general guidance, details, and responsibilities, see Attachment 21-2. DB Contractor shall coordinate and provide any changes in design within the Toll Zones with TxDOT TOD during the design and construction phases of the Project.

DB Contractor shall coordinate construction schedules with TxDOT TOD and the Systems Integrator for Work taking place within the Toll Zones with specific regard for conduit and grounding under structures and in-pavement loop sensors.

Systems Integrator shall be responsible for installing power and communication conduit and lines from the roadside equipment cabinets at each Toll Zone to the Systems Integrator's toll systems.

Systems Integrator shall be responsible for fabrication and installation of static toll rate signs and toll entrance signs. DB Contractor shall construct and provide finished grades for the Systems Integrator's installation of static toll rate signs and toll entrance signs.

DB Contractor shall coordinate with Systems Integrator to ensure that there are no power lines or radio frequency (RF) elements in the Toll Zone that could cause interference to the toll systems. Additionally, DB Contractor shall coordinate with Systems Integrator to ensure that the following do not exist in the areas reserved for loop detection systems:

(a) Drains or grates placed to interfere with loop placement or within six feet (6') of sensors;

(b) Buried drains, water pipes in the area reserved for sensors to a depth of six feet (6');

(c) No underground power lines or buried utilities beneath the Toll Zone that could cause interference to the toll systems; and

(d) No continually reinforced rebar in Toll Zone pavement.

21.4.1 Pavement

DB Contractor shall construct the Toll Zone pavement sections in accordance with Attachment 21-3, and shall install conduit stub-ups in the pavement and loop conduit under the pavement, meeting the Systems Integrator's specification. All reinforcing steel in the Toll Zone pavement and other items such as barrier, retaining walls, ties, chairs, etc. shall be epoxy coated. DB Contractor shall install conduit stub-ups in the pavement and loop sensor conduit meeting the Systems Integrator's specifications. TxDOT TOD will provide Systems Integrator's loop layout with stub-up locations for DB Contractor to incorporate into Toll Zone pavement construction. Pavement joint locations in the Toll Zone pavement need to be coordinated with TxDOT and Systems Integrator and shall not interfere with sensor loops.

DB Contractor shall provide exclusive unobstructed access to Systems Integrator at each Toll Zone during Systems Integrator's pavement sensor installation and toll systems testing. To allow for Systems Integrator's testing of the toll systems, the area designated for unobstructed access shall be a minimum of 500 feet from each end of the special Toll Zone pavement section. For the main lane Toll Zones, DB Contractor shall provide a minimum of 1,110 feet unobstructed access. For Toll Zones on ramps, access shall be provided for the entire length of the ramp. These 500-foot sections are not required to be constructed using the special Toll Zone pavement section.

21.4.2 Fiber

DB Contractor shall construct concrete encased duct banks the length of the corridor in accordance with TxDOT Houston District Standards, and include a minimum of two (2), 3-inch dedicated conduits for tolling with a minimum of four (4) strands of single mode communication fiber per Toll Zone (e.g., 24 Toll Zones would require 96 fiber strands). In order to access the existing HOU District communications network, the DB Contractor shall coordinate with TxDOT, and provide a connection of the proposed tolling fiber to TxDOT hub buildings, existing or new, throughout the Project. Daisy-chaining, defined as having the same fibers going into multiple Toll Zones and carrying the data for multiple Toll Zones, of fiber will not be allowed. DB Contractor shall provide conduit with four (4) strands of dedicated single mode communication fiber to each Toll Zone with the fiber backbone to be inside a DB Contractor provided cabinet with appropriately sized fiber optic patch panel adjacent to Systems Integrator's equipment cabinet. The cabinet must be large enough to handle the termination of all fibers brought into the cabinet (e.g. two 48 strand fibers brought into the cabinet from opposite directions would require 96 terminations). The connectors shall be FC type. All fiber, conduit, and termination

cabinets constructed by DB Contractor for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems. This shall also include pull boxes and pull strings, fiber optic markers, test stations, and tracer wire. The fiber optic cable shall be tested end to end and bi-directional by Optical Time Domain Reflectometer (OTDR) and light meter. DB Contractor shall provide testing results to TxDOT TOD.

21.4.3 Electrical Service

At the Toll Zones, DB Contractor shall be responsible for constructing electrical conductor to designated DB Contractor provided toll ground boxes adjacent to the Systems Integrator's roadside equipment cabinet pad at each Toll Zone, in accordance with Systems Integrator's specifications. A minimum of 25 feet of conductor shall be coiled in the ground boxes. At the AVI and toll rate DMS sites, DB Contractor shall be responsible for constructing electrical conductor to designated DB Contractor concrete pads with stub ups for Systems Integrator's controller cabinet.

DB Contractor shall construct and provide electric services providing 120/240VAC single phase, 60 Hz power and power requirement of 10 kVA for each Toll Zone, meeting the Systems Integrator's specifications. DB Contractor shall be responsible for the installation and access to power required to operate the Toll devices including all utility costs until Substantial Completion of the Project and Final Acceptance by TxDOT. DB Contractor shall verify Systems Integrator power requirements prior to construction. At each Toll Zone, DB Contractor shall be responsible for constructing electrical conductor to designated DB Contractor provided toll ground boxes adjacent to the Systems Integrator's roadside equipment cabinet pad, in accordance with Systems Integrator's specifications. A minimum of 25 feet of conductor shall be coiled in the junction boxes.