Texas Department of Transportation

DESIGN-BUILD SPECIFICATIONS Items 10-30

September 17, 2021

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Item 10
General

10.1 **Offices, Equipment, and Vehicles**

Except where noted elsewhere in the Contract Documents, 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 is office space meeting the conditions of these Design-Build Specifications that are within one mile of the Project ROW, or as approved by TxDOT. In addition to colocation requirements for specified personnel and Key Personnel elsewhere in these Design-Build Specifications, the following DB Contractor's personnel shall be co-located with TxDOT:

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

ROW AM during ROW acquisition phase.

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

10.1.1 **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 DBA. DB Contractor shall provide office space for TxDOT's design and Project management staff. 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. (i.e., available for occupancy) within 90 days following issuance of NTP1, and prior to NTP2. 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 no later than 30 days after NTP1. TxDOT will promptly review and comment on required modifications to the layout within 10 days. DB Contractor shall submit a final facility layout plan within 10 days of receipt of TxDOT comments.

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 good faith discretion.

10.1.1.1 **Core 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.

10.1.1.2 **Core Office Loss or Damage**

If office spaces, related facilities, or fixtures are destroyed, damaged, or stolen during the Term 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 10 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.

10.1.1.3 **Core Office Facilities and Equipment**

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

- General. Secure facility space, obtain all permits, install and pay for all utility services, and maintain the facilities as part of the Work;
- 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;
- Lighting and Electricity. Include with all interior spaces overhead lighting meeting OSHA, building, electrical, and energy code requirements for similar office space (provide nominal 30 foot candles of light at 30 inches above finished 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 (VA) uninterruptible power supply (UPS). All LAN, telephone system equipment, and appurtenances shall have a UPS sized properly to be capable of providing up to one hour of battery run time;
- 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;
- Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;
- Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, ADA Accessibility Guidelines, as amended (42 USC § 12101, et seq.), and the applicable building code. Facility design plans shall be submitted to the TDLR for review and approval as required by 16 TAC § 68;
- 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. 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;
- HVAC. Provide electrical, 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;
- Code Requirements. Meet all applicable building and fire code requirements; and
- 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.

10.1.1.4 **Core Office 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:

- Offices. Enclosed offices for TxDOT's management staff (nominal 150 SF each, unless otherwise approved by TxDOT), six total with keyed door hardware, desk, desk chair, bookcase, file cabinet, credenza, and guest desk chair;
- Cubicles. Cubicle area spaces for administration staff (nominal 64 SF each), 10 total with desk, desk chair, file cabinet; (power supply and data and communication lines to cubicles may be provided through power pole drops);
- Conference Rooms. Two conference rooms (enclosed), one with a minimum at nominal 12 feet x 20 feet (240 SF) and one with a minimum at nominal 12 feet x 30 feet (360 SF). All shall have dimmable lighting; conference rooms shall have a 60-inch minimum flat panel monitor with VGA/HDMI accessibility or a high definition overhead projector and screen with a minimum 120-inch diagonal projected image 1024 by 768 resolution; 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;
- 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;
- Work Room. Work room (nominal 150 SF) with 30-inch high plastic laminate wall-mounted counters (15 linear feet of counter). Work room shall be located near the center of the facility, and in close proximity to the receptionist space;
- Storage and Filing. One lockable space for storage and filing, nominal 15 feet by 20 feet (300 SF);
- 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 by 19-inch rack, and a minimum of six duplex receptacles with 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;
- Parking Area. Parking area for at least 30 vehicles 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;
- 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
- Corridors. Corridors within the TxDOT facility shall have a nominal width of 54 inches.

10.1.1.5 **Core Office Miscellaneous Requirements and Features**

The following shall be provided as noted:

- Flooring. Carpeted flooring (carpet not required in server / network/telecommunications room);
- Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with UPS on locks (fail closed);
- Electrical Outlets. All data/voice outlets shall be installed next to power outlets;
- Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;
- Power Circuits. Provide dedicated electrical power circuits for copiers;
- Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction;
- 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;
- Vending Area. DB Contractor shall provide access to general building vending area;

- Utilities. Initial installation and monthly expense of all utilities paid by DB Contractor except long-distance telephone service;
- Monthly Services. DB Contractor shall procure and pay directly to the vendor for janitorial, trash, recycling, and secure document shredding services;
- Emergency Contacts. 24-hour emergency contact to DB Contractor;
- Furniture. DB Contractor-provided allowance of $15,000 in the Price for additional furniture not listed in the requirements of this Section 10.1.1, 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; and
- Cable Television. Provide cable television connections and service to each flat screen television.

10.1.2 **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 may be combined with the core office described in Section 10.1.1 as long as the combined offices meet the requirements of Sections 10.1.1 and 10.1.2.

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 NTP2.

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

10.1.2.1 **Field Office Condition**

The field office shall be in good and serviceable condition meeting all ADA and local government regulatory criteria for a safe 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.

10.1.2.2 **Field Office 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 Term, except as a direct result of willful misconduct of TxDOT or its personnel, DB Contractor shall, at its cost and within 10 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.

10.1.2.3 **Field Office Facilities and Equipment**

For the facilities it provides, DB Contractor shall:

- 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;
- Access and Security. Provide separate buildings or trailers for TxDOT staff that include at least two entrances/exits, providing an 8 foot by 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;
- 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;
- 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;
- Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas;
- Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, ADA Accessibility Guidelines, as amended (42 USC § 12101, et seq.), and the applicable building code. Facility design plans shall be submitted to the TDLR for review and approval as required by 16 TAC § 68;
- Utility Service. Provide potable water, sewer service, and electricity to the field office facility;
- 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 or network/telecommunications room, as applicable, 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;
- Code Requirements. Meet all local building and fire code requirements; and
- Disposal and Removal. Be responsible for disposal or removal of all DB Contractor-provided facilities and any site restoration Work as required.

10.1.2.4 **Field Office 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:

- Offices. Enclosed offices with lockable doors for TxDOT's construction representative, TxDOT-designated construction manager and three other TxDOT or contract employees (five 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;
- Offices/Cubicles. Offices or cubicles for up to five field engineer/inspection/ administration staff (60-80 SF each); Field office furniture shall include L-shaped desk, chairs and filing cabinet;
- Conference Rooms. One enclosed conference room of not less than (350 SF) and access to another common conference room (350 SF);
- Server room \ Network/Telecommunications Room. One Server room \ Network/Telecommunications Room, matching the requirements of the Core Office server room.
- Storage and Filing. Two lockable spaces for storage and filing at each field office (a combined space of 200 SF);
- Surveying Equipment Storage. Clean inside storage space for surveying equipment (80 SF);
- Tool Shed. Outside shed for small tools and equipment (outside) (200 SF);

- 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;
- Staff Parking Area. A parking area for at least fifteen vehicles that is reasonably level (all-weather surface and all-weather access) within the boundaries of a security fence;
- 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);
- Security. A 24-hour security service or silent watchmen-type security system;
- 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;
- Window Security. Security bars on all exterior windows;
- Laboratory Facility. A completed facility suitable to accommodate a functioning portable lab (approximately 2,500 SF) including a separate cure room (approximately 850 SF) and a large trash container adequately sized for disposal of laboratory generated waste materials, located immediately adjacent to the Independent Quality Firm (IQF) laboratory required in Section 4.4 of the TxDOT QAP for Design-Build Projects;
- 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;
- Restrooms. Two restrooms including toilets and sinks; and
- First Aid Supplies. Provide emergency first aid supplies in accordance with DB Contractor's Safety Plan.

10.1.2.5 **Field Office Miscellaneous Requirements and Features**

The following shall be provided:

- Flooring. Carpeted flooring for offices (nonstatic in server room). All other rooms shall be tiled;
- Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with UPS on locks (fail closed);
- 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;
- HVAC. 24/7/365 HVAC as previously described;
- Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window;
- Power Circuits. Provide dedicated electrical power circuits for copiers;
- Fire Extinguishers. DB Contractor shall provide fire extinguishers, per fire code and fire marshal with jurisdiction;
- 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;
- Utilities. Initial installation and monthly expense of all utilities paid by DB Contractor except long distance telephone service;
- Emergency Contacts. 24-hour emergency contact to DB Contractor; and
- Furniture. DB Contractor-provided allowance of $15,000 in the Price for additional furniture not listed in the requirements of this Section 10.1.2, 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.

10.1.3 **Office Network and Systems**

DB Contractor shall, for each TxDOT representative, provide, furnish, install, operate, and maintain the following for the TxDOT office spaces described in Item 10, Section 10.1:

- A local area network (LAN) with a minimum two 1 gigabits per second (Gbps) network drops for each personal office area and a minimum of four 1 Gbps 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 WPA2 secured wireless (wi-fi) in accordance with IEEE 802.11n standards. Coverage shall be provided for the entire office utilizing dual band radios capable of operating at both 2.4 and 5 gigahertz (GHz);
- A touch-tone telephone system (with voicemail) 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;
- Access to DB Contractor's electronic document management system (EDMS) systems for file sharing, collaboration, reviews, and responses at each personal office area and within each conference room;
- One laptop docking station compatible with TxDOT staff's computers with two flat panel monitors, including all necessary peripherals for each personnel office area and the reception area in the Project office;
- Peripherals shall include at minimum, monitor stand, docking station for laptop computers, mouse, keyboard, 16 GB thumb drive, extra battery for laptop computers, wireless internet for laptop computers, and carry bag for laptop computers; the 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;
- 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 4 GB internal ram, 500 GB hard drive, 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; / specifications, operating systems and software shall generally be the same as those used by technical staff on DB Contractor's team;
- One laptop computer, to be connected to the flat panel monitor or the overhead projector for each conference room in the core office and field office;
- The computers, monitors and peripherals shall be at least equal to the ones used by DB Contractor's staff;
- 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 the DB Contractor's contract, or issuance of the first Notice to Proceed, whichever is later:
    - Windows 10 or latest edition of operating system;
    - Microsoft Office Professional latest edition (Office, PowerPoint, Outlook, Excel);
    - Adobe Acrobat reader (latest version);
    - Google Earth (free version);
    - Internet Explorer and Google Chrome;
    - Anti-virus software with latest updates;
    - DVD software driver compatible with the shared external DVD drive;
    - Software driver and backup software compatible with the shared external hard drive; and

- Document management software required to access the DB Contractor's client facing document library (as applicable);

- High speed, highly reliable internet service(s) capable of providing a minimum download speed of 300 Mbps and a minimum upload speed of 20 Mbps per network drop, with a minimum of three concurrent download connections and a minimum of two concurrent upload connections;
- The ability to print to any printer listed in this Section 10.1.3 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 10.1.3 from any network drop);
- 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 Design-Build Specifications;
- All hardware and software shall meet applicable industry standards and protocols;
- Provide on-site technical support eight hours per day, five days per week until the completion and close out of the Project;
- Provide the office equipment meeting the following requirements, or multipurpose piece of equipment capable of meeting multiple parts of the following requirements:
    - One high-speed laser computer printer capable of handling 11 inches by 17 inches prints for core office and one for field office;
    - One color plotter capable of handling 36-inch roll plots, 36 inches x 24 inches plots for core office only;
    - One high-speed color photocopy machine capable of handling 11 inches by 17 inches prints for core office; and
    - One high-speed color scanner capable of handling 11 inches by 17 inches prints for core office and one for field office;
- One paper shredder or secure paper shredding service for core office;
- One commercial grade three-hole punch for core office and one for field office;
- One commercial grade GBC binder (or equal) for core office;
- All office supplies, including copier paper, toners, pens, pencils, notepads, and other miscellaneous office supplies; and
- One hard copy of all TxDOT and AASHTO design manuals and standards as specified in the Agreement for core office.

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.

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

- Four copies of Bentley's MicroStation latest version with three-dimensional corridor modeling;
- Four copies of GeoPak;
- Four copies of Adobe Acrobat Professional latest version; and
- Four copies of Bentley OpenRoads Navigator.

The DB Contractor shall provide the following additional items for TxDOT's use:

- Six 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;
- One global positioning system (GPS) cameras (to include compass/GPS module, minimum 4 GB secure digital (SD) card, camera bag, additional battery, universal serial bus (USB) cable,

neck strap, rechargeable lithium-ion battery, battery charger, instruction manuals, and warranty card); and

- One GoPro Hero4 Black Edition (latest version available), or equal.

10.2 **Three Dimensional (3-D) Design**

DB Contractor shall design the Project utilizing 3-D methodologies and techniques, and submit its 3-D design files to TxDOT for use during the design and construction process.

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 utilize design software and versions currently in use by TxDOT to develop the 3-D design, unless DB Contractor receives advanced written approval from TxDOT in accordance with Section 5.2.7 of the General Conditions.

10.2.1 **3-D Design Requirements**

DB Contractor shall submit proposed 3-D design file naming conventions to TxDOT for review and approval.

DB Contractor shall incorporate the Schematic Design into DB Contractor's Project design files utilizing 3-D methodologies and techniques.

DB Contractor shall create an integrated 3-D model of the existing condition including existing ground surface and subsurface elements and infrastructure (including, but not limited to, drainage structures, utilities, bridges and wall foundations), utilizing data from light detection and ranging (LiDAR), SUE, field surveys, and existing plans (as-built) data collection; including currently available LiDAR or other existing ground surface data (digital terrain model (DTM) or triangulated irregular network (TIN) formats) provided in the RID.

DB Contractor shall utilize 3-D methodologies and techniques to develop the geometric design, as well as the 3-D design model for each proposed roadway and incorporate it into the Project's integrated design models. All geometric design shall be prepared in accordance with these Design-Build Specifications.

- Refine and finalize 3-D horizontal and vertical alignments for all Managed Lanes, high-occupancy vehicle lanes, exclusive lanes, general purpose lanes, ramps, direct connectors, collector-distributors, crossing and parallel roadways, pavement transitions, and tie-ins to existing lanes;
- Determine horizontal and vertical clearances at grade separations, underpasses and overpasses; and
- Develop superelevation and superelevation transition designs for each roadway. Verify rollover constraints are adequately addressed, including ramp, collector-distributor, and direct connector gore locations.

DB Contractor shall include existing and proposed 3-D design features for the following Elements of Work in accordance with these Design-Build Specifications:

- Roadway: pavement structures, metal beam guard fence (MBGF), pedestrian facilities, existing and proposed ROW;
- Drainage: storm sewers (inlets, manholes), culverts, and channel grading;
- Structures: sufficient detail to show top of deck surface, structure type, bottom of beam surface, bent cap, piers, foundations (size and length), abutment, and retaining wall locations including straps, nails and footings;
- Utilities: relocated and existing Utilities to remain in place (existing Utilities to be abandoned in place are not required to be included);
- Signing: overhead span or cantilever sign structure locations and structure type, foundations (size and length); and
- Toll Infrastructure: structure type (overhead span and cantilever), foundations (size and length) (detailed elements related to toll gantries or elements inside buildings are not required to be included); and

- Temporary structures: including, but not limited to, temporary shoring, soil nails, and temporary retaining walls.

10.2.2 **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 participants. Review meetings shall occur prior to any design Submittals to TxDOT.

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

- View the model and manipulate view settings to interactively change data display on the screen (e.g. pan, rotate, walk, fly, zoom, etc.);
- Measure distances and areas throughout all areas of the model;
- Reference baseline geometry, stationing, and existing and proposed ROW; and
- Dynamically visualize key existing and proposed design features and detect conflicts/clashes amongst the following disciplines:
  - Roadway;
  - Drainage;
  - Structures (bridges, retaining walls);
  - Utilities (existing and proposed);
  - Signing (overhead span or cantilever sign structure locations and structure type);
  - Toll infrastructure;
  - Lighting (pole and foundation locations);
  - Signals (controller, pole, and foundation locations); and
  - Temporary structures.

DB Contractor shall submit the following before every review meeting:

- Adobe PDF file of Project 3-D model which shall include proposed striping;
- All CADD and other electronic files used to develop the 3-D model along with all associated files required to duplicate the model; and
- Updated Utility Adjustment Concept Plan.

10.2.3 **3-D Design Deliverables**

DB Contractor shall prepare and submit to TxDOT for review and comment an integrated 3-D design model with the following Submittal packages:

- Preliminary Design;
- Final Design;
- Released for Construction;
- Early Start of Construction; and
- Record Documents.

The integrated 3-D design model 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 stage of design development of the Submittal package.

DB Contractor shall submit a final 3-D model consisting of a compilation of 3-D design models submitted with previous design submittal packages.

Additional electronic design files to be submitted to TxDOT by DB Contractor include:

- OpenRoads: 3-D MicroStation design files containing civil data of alignments, profiles, pertinent geometry, terrain surfaces, civil cells, corridor models and final surface. In addition to

other MicroStation elements used in the creation of the corridor model such as point controls, corridor references, GPK files, etc.;

- InRoads template library (ITL): OpenRoads Template Libraries;
- XML: Output files of alignments, profiles, pertinent geometry, DTM for terrain surface and final surfaces;
- Drawing exchange format (DXF): Output files of DTM for terrain surfaces and final surfaces;
- Image color matching (ICM): Output files (infrastructure consensus model) in a rich data exchange format using Bentley i-model standards. The ICMs will be used to transfer the 3-D model information to construction equipment;
- DTM data:
  - GEOPAK original ground TIN file;
  - Preliminary design surface: A comprehensive model of existing terrain. Progression through detailed design will advance the preliminary design surface to a final design surface; and
  - Final design surface: Proposed project in final condition; and
- Electronic construction i-models compatible with DB Contractor's construction equipment to be utilized by TxDOT and IQFM to verify grading operations of subgrade and the final pavement surface, as well as construction of storm sewer systems and culverts.

10.3 **Required Software during Construction Activities**

DB Contractor shall utilize a mobile based, web hosted, collaborative design-construction productivity software solution (such as PlanGrid or an equivalent) allowing real-time access to and management of construction documents. The DB Contractor must purchase and provide licenses to DB Contractor staff (including subconsultants, as appropriate), and 20 copies for TxDOT staff and TxDOT's consultants from the commencement of Construction Work through Final Acceptance. Utilization will cover the course of the Construction Work. This software application will be used to view drawings, specs and documents in the field and facilitate collaboration between project stakeholders. The software solution must meet the following technical requirements:

- All features and Project documents uploaded in the system must be available offline in the event that there is no wireless connection;
- The solution must be compatible with iOS, Windows and Androids operating systems and devices;
- The solution must be able to export an as-built set. This as-built must be complete with documents, photos and hyperlinks embedded in the set;
- The solution must be capable of being used during post construction operations and maintenance phases.
- After Final Acceptance, the solution should be handed to the operations and maintenance team for post construction coordination.
- The solution must be able to provide a detailed audit trail of all parties collaborating in the application. This includes date/time stamp of any mark-ups, photos, issues, RFIs and punch list items.
- The solution must auto-tag sheet disciplines to distinguish different trade drawings.
- Vendor must be able to support each project and customer with a dedicated sales representative for rollout.
- Vendor must offer training/consulting on the software solution as needed during the project.

10.4 **Design Visualization**

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

DB Contractor shall provide accurate three-dimensional models that depict the Project if requested by TxDOT. Completed models shall represent realism and aesthetic attributes of the existing conditions and the

proposed Project based on the Final Design. DB Contractor shall add roadway design details to the model based on Final Design Submittal of the Project.

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 the DB Contractor and TxDOT.

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.

All CADD data and associated files, in native form, shall be submitted by the DB Contractor to TxDOT as part of their final deliverable.

10.4.1 **Design Visualization Services – Photo Rendering and Exhibits**

DB Contractor shall provide animation renderings video and create a fly-over video for the Project's existing condition and the future condition based on the Final Design, if requested by TxDOT. The animation renderings shall accurately depict the geometric design of the proposed improvements.

DB Contractor shall provide photographs and fly-over videos periodically throughout the construction for documentation purposes.

10.5 **Submittals**

All Submittals described in this Item 10 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on 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	TxDOT Action	Reference Section
Preliminary TxDOT facility area layout plan	After NTP1	Review and comment	10.1.1
Final TxDOT facility layout plan	10 days after receipt of TxDOT comments.	For information	10.1.1
Final wiring and circuitry plans, office furniture and equipment layout, a field office floor plan, a lighting plan, and a parking plan	Prior to commencing construction of TxDOT's field office	Approval	10.1.2
3-D design files	Upon request and with the Submittal packages identified in Section 10.2.3	Review and comment	10.2
Proposed 3-D design file naming conventions	Prior to implementation	Approval	10.2.1
Project 3-D Model with proposed striping, all CADD files associated with the Model, and updated Utility Adjustment Concept Plans	Prior to every 3-D milestone review meeting and with the Submittal packages identified in Section 10.2.3	Review and comment	10.2.2, 10.2.3
Additional OpenRoads, ITL, XML, DXF, ICM and DTM design files	As necessary	For information	10.2.3
Electronic construction i-models	Upon request	For information	10.2.3
Design Visualizations (3-D design files/models, photos, rendering, layouts, animations, videos, native files and exhibits)	As requested by TxDOT during design and construction	Review and comment	10.4

Item 11
Public Information and Communications

11.1 **General Requirements**

In coordination with TxDOT, DB Contractor shall be responsible for developing and implementing a public information and communication program in order to maintain a high level of two-way communication by informing and engaging local Governmental Entities, special interest groups, businesses, communities, and the general public about the Project status throughout the design and construction period.

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.

11.2 **Administrative Requirements**

On a schedule mutually agreed upon between DB Contractor and TxDOT's public information officer, DB Contractor shall meet regularly with TxDOT's public information officer and Customer Groups to coordinate efforts.

DB Contractor shall provide to TxDOT complete copies of all materials to be presented to the public or the media at least three Business Days prior to dissemination.

DB Contractor shall use, but not be limited to, the implementation strategies described in Sections 11.2.1 through 11.2.3.

11.2.1 **Public Information and Communication**

- Develop a forum to coordinate on-going dialogue among Customer Groups, TxDOT, and DB Contractor.
- 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 apps, hotlines, HCRs, dynamic message boards, web alerts, public opinion polls/surveys, videos, display booths, presentations, public access information kiosks, open houses, milestone events, and special events.
- 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.
- 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.
- Notify Customer Groups in advance of Work being performed, including key Project ROW acquisition, construction, operations, and maintenance activities, and communicate the potential impacts of these activities.
- 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.
- 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.
- As requested by TxDOT, coordinate and perform tours of the Project.
- Comply with the latest requirements of the TxDOT Guidelines for Analysis and Abatement of Roadway Traffic Noise.

- Develop materials and make arrangements for multi-lingual groups when it can be reasonably anticipated that material will be presented to multi-lingual Customer Groups.
- Communicate impacts and Project design for accommodation of pedestrians and bicyclists throughout the Project.
- Develop 3-D drive-thru videos and renderings of the Project, as directed by TxDOT, to accurately depict the proposed Project to interested Customer Groups.
- Compile database of all Customer Group contacts and make readily available to TxDOT in an easily accessible format.

11.2.2 **Media**

- Utilize existing TxDOT media resources if available to create and develop advertising messages, including graphics, logos, and slogans.
- Place Project-related messages in the appropriate media.
- Develop and distribute public service announcements, paid advertising, news reports, and other communication materials as appropriate.
- Manage media relations with key transportation and business reporters and prepare and distribute news releases and media kits.
- Develop and implement communications plans that anticipate and minimize traffic impacts on the Project from public, special, and seasonal events.
- Monitor local, state, and national media coverage for accuracy and to gauge local opinion. Coordinate with TxDOT regarding any 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 after discovery of the inaccurate information.
- Document and make available Project-specific media clips to the entire Project team.
- Employ the use of an internet-based communications, 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.

11.2.3 **Public Information Coordinator**

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

- Serve as the primary point of contact between DB Contractor and Customer Groups, be responsible for the dissemination of Project information, and serve as the clearinghouse for the receipt of and response to written or verbal comments or complaints regarding the Project.
- Coordinate all interactions with elected officials or their representatives with TxDOT's Public Information Office and its Government Relations Office.
- Lead the production, implementation, quality control, and update of the PICP.
- Coordinate and supervise day-to-day activities of DB Contractor's personnel in performing the public information activities described in the PICP.
- Facilitate communication among DB Contractor, TxDOT personnel (including TxDOT's public information officers), and Customer Groups.
- Interact with Customer Groups and represent the interests of the Project at meetings and other formal and informal events.
- Develop a clear understanding for Customer Groups' concerns and reactions regarding the Project and public information program and incorporate that knowledge into improving the PICP.
- 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.
- 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.

- Create and manage a Customer Group database. Allow TxDOT access to the database as requested.
- Speak fluent English and speak fluent Spanish or have a Spanish translator available at all times.

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

11.2.4 **Public Information Office**

DB Contractor shall maintain a public information office for the Term. 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 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 two conference rooms capable of hosting meetings with Customer Groups. 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. One of these rooms shall accommodate at least 50 persons and another shall accommodate at least 15 persons. 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 as follows:

- Monday-Friday 8 a.m. to 5 p.m. and by appointment
- Saturday by appointment
- Sunday closed

DB Contractor shall 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 48 hours of receiving the voicemail message. DB Contractor's Public Information Coordinator shall log the messages, responses, day and time of message, and day and time of response.

11.2.5 **Meetings with the Public and Customer Groups**

DB Contractor shall organize and manage meetings with the general public and Customer Groups during the Term and will develop with TxDOT the list of meeting and event invitations.

The frequency of such meetings is addressed in the PICP. This frequency must be increased or decreased as needs arise to better inform and engage the Customer Groups. From time to time, upon TxDOT's request, 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 a minimum of 30 days in advance. Advertisement shall include utilization of e-alerts, social media, and the Project 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 is solely responsible for creating all meeting advertisements.

During such meetings, DB Contractor shall inform 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:

- Design and construction issues affecting adjacent residential areas, frontage roads, local streets, and utilities (including such issues as the Project ROW definition, the Project ROW acquisition process, grading, drainage, access, lighting, aesthetics, and noise, and retaining walls);
- Street and roadway detour design and implementation;

- Scheduling and duration of Work, including hours of construction;
- Haul routes;
- Methods to minimize noise and dust;
- Environmental mitigation measures, including noise wall meetings; and
- Other environmental issues.

DB Contractor shall notify TxDOT a minimum of 15 Business Days in advance of any meetings with the public. 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 scheduled and conducted by TxDOT. When TxDOT decides to conduct such meetings, DB Contractor shall share, in a form that is easy to manipulate, all necessary information regarding potential Customer Groups at TxDOT's request.

11.2.6 Meeting Summaries

For all meetings 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 on SharePoint upon request. 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 each meeting summary:

- A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses);
- Documentation of the exhibits, presentations and handouts available at the meeting;
- Documentation of the issues discussed and any associated solutions; and
- 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 oral transcripts in the summary.

11.2.7 Emergency Communications

For all Emergencies, including major vehicle collisions, severe weather conditions, and Hazardous Materials spills, the Public Information Coordinator shall timely notify and take 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 HCR, email/web (if applicable)/text alerts, telephone notification, 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 Emergency, "timely notify" 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 notification when an 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 notify" 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.

11.2.8 Disseminating Public Information

DB Contractor shall prepare and distribute public information using all appropriate methods, including materials for meetings, news releases, telephone correspondence, newsletters, emails, text messages, mobile device applications, hotlines, HCR, DMS, web alerts (if applicable), maps, displays, renderings, presentations, milestone events, business owner taskforce meetings, open houses, brochures, pamphlets, highway advisory radio, video news releases, and other social media services as directed by TxDOT. Copies of draft public information materials shall be submitted to TxDOT. TxDOT shall have a period of five Business Days to review and comment in advance of final editing. After incorporation of TxDOT comments to the satisfaction of TxDOT, DB Contractor shall provide complete copies of all final materials to TxDOT at least three Business Days prior to dissemination.

All written materials produced for Customer Groups shall follow TxDOT *Brand Guidelines* and other appropriate spelling/writing guidelines.

DB Contractor shall create a public website to convey Project-related information, including:

- DB Contractor contact information;
- Project maps;
- Frequently asked questions (FAQs);
- Current Project activities addressing design, construction, and maintenance;
- Timing of street and ramp closures and openings;
- Recommended route alternatives during closures;
- Newsletter and meeting materials;
- Meetings and special events announcements and calendar;
- Links to TxDOT Highway Conditions Reports;
- Links to other related sites as deemed appropriate by TxDOT;
- Job opportunities;
- Subcontractor information;
- Comment form;
- Mailing list request form;
- Historical archive of photos taken during construction;
- Renderings or video animations of the Project, as appropriate; and
- Published materials in Spanish and other languages as needs warrant and in consultation with TxDOT.

Website design and creative development shall be coordinated with TxDOT's Communications Division to ensure content is consistent with 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.

DB Contractor, working collaboratively with TxDOT, shall assess the need for multi-lingual communications and, where appropriate, also furnish Project-related materials in Spanish or other demographic adaptations.

DB Contractor shall track all incoming comments, inquiries, and requests for information related to the Project. The following information shall be collected with each contact, and a summary of all contacts (after removing information obtained in response to items (a) through (d) below) shall be reported to TxDOT on a monthly basis:

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
h) Response given

DB Contractor shall track requests for language assistance services and provide information to TxDOT each quarter for TxDOT's use, including for its inclusion in the Office of Civil Rights' Limited English Proficiency Report.

11.2.9 **Third Party Claims**

11.2.9.1 **Claims against Third Parties by DB Contractor**

As part of the PICP, DB Contractor shall prepare policies related to its pursuit of claims against third party for damage caused to the Project, including procedures for sensitive handling of claims in which there is death or injury, and process to keep TxDOT informed of the status of such claims against third parties.

11.2.9.2 **Third Party Claims against DB Contractor**

Other than the case of a Third Party Claim that DB Contractor has notified TxDOT to be, and TxDOT has accepted, as a shared liability in accordance with Section 7.12.2.8 of the General Conditions, in no case will TxDOT accept any liability for Third Party Claims in connection with damage to persons or property in connection with the Project.

In accordance with Section 7.12.2.8 of the General Conditions, TxDOT will forward to DB Contractor any claims or complaints it receives from the public in connection with the Project. DB Contractor shall be responsible for resolving all claims and complaints, whether received directly or forwarded by TxDOT, appropriately and in a timely manner and shall retain a record of the actions DB Contractor has taken with respect to each such claim or complaint.

If DB Contractor determines that neither DB Contractor nor any DB Contractor-Related Entity is responsible for the damage, DB Contractor shall notify the complainant of this position promptly by certified mail and shall retain a copy of all correspondence. All documentation, including a copy of logs and claims, shall be available for inspection by TxDOT upon request.

11.3 **Submittals**

All Submittals described in this Item 11 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 11-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 11-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Media responses as listed in Section 11.2.2	Within one day of release	Approval	11.2.2
Draft meeting summaries	Upon request	Review and comment	11.2.6
Final meeting summaries (to TxDOT and meeting attendees)	Upon request	For information	11.2.6
Drafts of all materials to be presented to the public/media	At least five Business Days prior to final editing	Review and comment	11.2.8
Final copies of all materials to be presented to the public/media	At least three Business Days prior to dissemination	For information	11.2.8
Public comment/inquiry log	Monthly	For information	11.2.8
Language assistance log	Quarterly	For information	11.2.8
Copy of claims and complaints documentation, logs, and record of the actions	Upon request	For information	11.2.9

Item 12
Environmental

12.1 **General Requirements**

DB Contractor shall deliver the Environmental Commitments required by the Contract Documents, Governmental Entities, Environmental Approvals (including all TxDOT-Provided Approvals), all other Governmental Approvals, the CEPP and all applicable Laws and regulations, including, Environmental Laws.

The Work shall comply with Environmental Approvals and compliance requirements for any additional actions throughout the Term. DB Contractor shall monitor and document Work activities so that documents providing evidence for compliance are available to TxDOT for inspection at any time.

12.1.1 **CEPP**

DB Contractor shall develop, implement and, as necessary, update a CEPP for the Work to ensure compliance with all applicable Environmental Laws, Environmental Approvals and Environmental Commitments. The CEPP shall obligate DB Contractor to protect the environment and document the measures to be 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. The requirements for the CEPP are contained in Section 4.2.4 of the General Conditions.

The CEPP shall effectively demonstrate in detail DB Contractor's knowledge of all applicable Environmental Approvals, environmental issues on the Project, Environmental Commitments, and applicable Environmental Laws, including those set forth in these Design-Build Specifications, and shall describe the processes that will be followed during the course of the Work to comply with those Environmental Approvals, environmental issues, Environmental Commitments, and Laws, as well as the documentation required to validate compliance. All monitoring and reporting activities shall be:

- concise and consistent throughout the Term;
- applicable to the activities being performed; and
- in accordance with the requirements set forth in the DBA, the Environmental Approvals and applicable Environmental Laws.

The CEPP shall also effectively describe the quality control and assurance measures that DB Contractor will implement to verify the compliance of the program with all applicable Environmental Laws.

The CEPP shall define procedures for obtaining Environmental Approvals and implementing procedures, and Environmental Commitments consistent with the Environmental Approvals, including New Environmental Approvals, and TxDOT environmental policies. 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.

12.2 **Environmental Approvals**

12.2.1 **TxDOT-Provided Approvals**

For TxDOT-Provided Approvals, see Section 3.1 of the DBA.

NEPA commitments and mitigation measures are provided in the folder labeled "Environmental" located in the RIDs.

12.2.2 **New Environmental Approvals Including Amended TxDOT-Provided Approvals**

TxDOT-Provided Approvals are based on the design features illustrated therein. Such approvals may require re-evaluation, amendment, supplement or additional studies and reports as the Work progresses in order to accommodate actions not identified in the TxDOT Provided Approvals or covered specifically by existing resource agency coordination. Changes to the Schematic Design or incorporation of Additional Properties into the Project shall require the validity of existing Environmental Approvals to be reassessed and may require New Environmental Approvals.

DB Contractor is responsible for any coordination with Governmental Entities necessary to obtain New Environmental Approvals except where TxDOT has agreements with Governmental Entities to perform such coordination. DB Contractor shall extend an invitation to TxDOT five Business Days in advance for any meetings it has with Governmental Entities to discuss changes to the NEPA Approvals and any other TxDOT-Provided Approvals.

DB Contractor is responsible for ensuring compliance with the conditions and schedules set forth in amendments to any TxDOT-Provided Approvals or New Environmental Approvals.

12.2.3 **Responsibilities Regarding Environmental Studies**

DB Contractor is responsible for conducting continuing environmental studies based on the NEPA Approvals and the Schematic Design.

DB Contractor is 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 is responsible for all coordination of environmental studies with appropriate Governmental Entities, except where TxDOT has agreements with Governmental Entities to perform such coordination.

12.2.4 **TxDOT Review and Approval of DB Contractor Submissions**

TxDOT reserves the right to review, comment on, require revisions to and reject for resubmission documentation that is submitted for environmental compliance or Environmental Approvals. Documentation shall conform to current TxDOT submission standards and the requirements of all applicable Governmental Entities and applicable Laws. TxDOT shall return approved documentation to DB Contractor for submittal to the appropriate Governmental Entity in cases where DB Contractor performs coordination. Those submissions for which TxDOT signature or other approval is required shall be subject to TxDOT approval, provided TxDOT approvals of such submissions are not subject to the review time limitations in the Contract Documents. 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.

12.2.5 **Responsibilities Regarding Commitments within Environmental Approvals**

DB Contractor is responsible for ensuring all commitments identified in the Environmental Approvals are met.

12.2.5.1 **Clean Water Act – Sections 404 and 401: Waters and Wetlands of the United States**

TxDOT-Provided Approvals may identify Section 404 impacts associated with Project improvements. Based on the NEPA Approvals, the temporary and permanent Section 404 impacts are anticipated to be authorized by Nationwide Permit 14 – Linear Transportation Projects with a Preconstruction Notification.

DB Contractor shall, based on Final Design, assess impacts to each potentially jurisdictional feature. Based on results of the assessment, and if required, DB Contractor shall update the related Section 404 impacts associated with the Project and perform all Work required to procure the necessary Section 404 permits and Section 401 certifications from the U.S. Army Corps of Engineers (USACE) and Texas Commission on Environmental Quality (TCEQ). DB Contractor shall determine Project mitigation requirements, prepare a mitigation plan per 33 CFR Part 332, and deliver all required mitigation.

DB Contractor is responsible for the maintenance and monitoring of any permittee-responsible mitigation sites for the term stipulated within the USACE approved mitigation plan. Project mitigation options shall be provided in accordance with the TxDOT Mitigation SOP 320-01 dated August 2019 regarding TxDOT's mitigation procurement policy. All coordination with the USACE regarding Section 404 permitting and mitigation shall be disclosed to TxDOT for review and comment before submission to USACE.

DB Contractor shall document how they will identify Section 404 impacts, obtain required Section 404 permits, and comply with the terms and conditions of the Section 404 permits and 401 certifications issued to DB Contractor during the life of the Project in accordance with the TxDOT *Environmental Handbook for Water Resources*. At a minimum, the documentation shall include:

- Process for training personnel to recognize Waters of the U.S. that fall under the jurisdiction of the USACE;
- Process for identifying Section 404 impacts associated with the Project;

- Process for obtaining required Section 404 permits;
- Process for communicating the terms and conditions of all Section 404 permits and TCEQ 401 certifications and other permits as necessary;
- Procedures for carrying out any required Environmental Commitments and mitigation; and
- Procedures for incorporating additional properties outside the original NEPA approved Schematic Design and any off-right-of-way Project Specific Locations (PSL) as required by all Section 404 permit(s) issued to either TxDOT or DB Contractor by the USACE.

DB Contractor shall comply with all general and regional conditions set forth by authorized Section 404 nationwide permits as described in TxDOT-Provided Approvals.

12.2.5.2 **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. DB Contractor shall maintain access to adjacent properties during construction and ensure that visibility of businesses is maintained.

12.2.5.3 **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.

Dust control measures shall include a combination of watering, chemical stabilization, and construction vehicle speed reduction (not to exceed 20 mph).

DB Contractor shall identify and discontinue all dust creating construction activities when winds reach a constant velocity of 25 mph or more.

DB Contractor shall keep concrete traffic barriers and any other elements that can cause accumulation of dust, sand and debris (such as retaining walls, bridge columns, and drainage walls) within the Project limits clean of dust, sand and debris during construction.

DB Contractor shall prevent, control, and mitigate fugitive noxious or toxic vapors or particulate matter (dust) during disturbance of noxious or hazardous materials and media.

12.2.5.4 **Asbestos Containing Material/Lead Base Paint**

If testing is not provided by TxDOT, DB Contractor shall test for asbestos containing material (ACM) and lead base paint (LBP) on any existing structures that require any work to be done, including, but not limited to, removals (including building structures), rehabilitations, and widenings.

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, buildings, rails, girders, and retaining walls, 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).

DB Contractor shall notify the Texas Department of State Health Services of bridge demolitions or building structures 10 working days prior to the scheduled demolition.

12.2.5.5 **Other Hazardous Materials**

DB Contractor shall test, identify, inspect, notify, amend notifications as necessary, pay notification fees, and abate for any other hazardous materials encountered within the project limits, in accordance with appropriate or relevant regulations or guidance.

DB Contractor shall take appropriate measures to prevent the spillage of Hazardous Materials in the construction areas. All construction materials used for the Project shall be removed as soon as the work schedule permits. DB Contractor shall initiate early regulatory agency coordination during Project development.

12.3 Environmental Team (ET)

DB Contractor, acting through the ECM, shall designate an ET, as detailed in this Section 12.3, to prevent, minimize, and/or correct any violation of or noncompliance with Environmental Approvals. The ET shall include staff meeting the qualification requirements as indicated in this Section 12.3 below. All of the ET shall be deemed other principal personnel.

In the CEPP, DB Contractor shall establish a detailed approach, procedures and methods for:

- staffing and availability of ECM and all ET personnel; and
- ET staff response times during the Work.

12.3.1 ECM

DB Contractor shall designate an ECM for the Work in accordance with Section 4.2.4.1.1 of the General Conditions.

12.3.2 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 4.2.4.3 of the General Conditions. Environmental Training Staff members shall have at least one year of experience providing environmental compliance inspection for freeway construction.

12.3.3 Environmental Compliance Inspectors (ECIs)

The ECM shall designate as needed ECIs, who shall conduct on-site environmental monitoring, prepare documentation, and report to the ECM daily all violations, compliance, and non-compliance with Environmental Approvals.

The ECIs 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.

The ECIs shall have at least one-year operational control experience of SW3P activities.

12.3.4 Hazardous Materials Manager

The ECM shall designate a Hazardous Materials Manager to provide expertise, as needed, in the safe handling of Hazardous Materials required to perform the Work and those that may be discovered/impacted during the Term. The Hazardous Materials Manager shall conduct appropriate activities such as the following:

- Schedule and/or conduct training for DB Contractor's employees;
- Verify all employees have required certifications prior to the handling of Hazardous Materials; and
- Maintain records of all incidents involving Hazardous Materials and notify the ECM, TxDOT and appropriate authorities in writing of any such incidents in accordance with the Contract Documents.

The Hazardous Materials Manager shall be a qualified professional with 40-hour HAZWOPER certification and at least five years of experience in similar projects in the following areas:

- 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
- Experienced in TCEQ guidance for the investigation and remediation of Hazardous Materials under the TCEQ Voluntary Cleanup Program, Texas Risk Reduction Program, and the TCEQ Petroleum Storage Tank Rule.

The Hazardous Materials Manager shall meet the certification requirements of TxDOT Work Category 2.13.1, "Hazardous Materials Initial Site Assessment."

12.3.5 **Cultural Resource Management Personnel**

If applicable, the ECM shall designate an Archeologist, Architectural Historian, Historian and Historical Architect 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 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.

12.3.6 **Natural Resource Biologist**

If applicable, 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 Work Category 2.6.1, "Protected Species Determination (Habitat)" and 2.6.3, "Biological Surveys."

12.3.7 **Water Quality Specialist**

If applicable, the ECM shall designate a Water Quality Specialist to provide expertise in permitting, delineation, stormwater pollution prevention, and the protection of jurisdictional waters during the course of the Work.

The Water Quality Specialist shall have verifiable experience implementing Storm Water Pollution Prevention Plans and be able to demonstrate a working knowledge of the Texas Pollutant Discharge Elimination System and MS4 permit requirements applicable to the Project.

The Water Quality Specialist shall meet the certification requirements of TxDOT Work Category 2.4.1, "Nationwide Permit" and TxDOT Work Category 2.3.1, "Wetland Delineation."

12.4 **Submittals**

All Submittals described in this Item 12 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 12-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 12-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
PMP – CEPP	Prior to NTP2	Approval prior to commencement of Design Work	12.1.1 4.2.4
Environmental Monitoring Reports	Upon Request	Review and comment	4.2.4.1 4.2.4.6
Investigative Work Plans	As necessary	Review and comment	4.2.4.1 4.2.4.4 4.2.4.4.1
SIRs	As necessary	Review and comment	4.2.4.1 4.2.4.4 4.2.4.4.1
Remedial Action Plans	As necessary	Review and comment	4.2.4.1 4.2.4.4
Wetland Delineations	Prior to construction	Review and comment	4.2.4.1 4.2.4.2.2
Section 404 Permit Application	As necessary/prior to construction	Review and comment	4.2.4.1 4.2.4.2.2
Mitigation/Resource Monitoring Reports	As necessary	Review and comment	4.2.4.1
TPDES CGP/NOI	Prior to construction	Review and comment	4.2.4.1 4.2.4.2.3

Table 12-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
TPDES CGP NOT	Upon Substantial Completion	Review and comment	4.2.4.1 4.2.4.2.3
SW3P	Upon request	Review and comment	4.2.4.1 4.2.4.2.3
Pre-construction Inspection Report	Prior to construction	Review and comment	4.2.4.1
Final Noise Analyses	As necessary	Approval	4.2.4.1 4.2.4.2.7
EPIC sheets	Prior to construction	Approval	4.2.4.2.1
Federal, state, and local correspondence	As necessary	For information	4.2.4.1
Environmental Protection Training Plan Course outlines as listed in Section 4.2.4.3.1	Prior to NTP2	For information	4.2.4.3.1
Final HMMP	Prior to NTP2	Approval	4.2.4.4
ACM/LBP inspection reports, proposed abatement plan, and report documenting abatement	As necessary	Review and comment	12.2.5.4

Item 13
Third-Party Coordination

13.1 **General Requirements**

TxDOT has existing and draft agreements with certain local, state and federal Governmental Entities with respect to the Project. These agreements define additional requirements for the design, construction, operations, and maintenance of the Project. TxDOT anticipates the need for additional agreements with local Governmental Entities for the operation of traffic signals, illumination, and roadway maintenance along the corridor. These agreements do and will specify the local Governmental Entities' responsibilities and TxDOT's responsibilities with respect to the requirements.

DB Contractor shall assume and execute TxDOT's responsibilities and duties stated in Third Party Agreements to the extent set forth in the DBC. DB Contractor is responsible for providing TxDOT and Governmental Entities with all information necessary to fulfill TxDOT's responsibilities stated in such agreements. In the case that the local Governmental Entity, under such agreements, will need to be reimbursed by TxDOT for work performed, DB Contractor shall make payment of stated costs to TxDOT within 30 days from receipt of TxDOT's request for payment. TxDOT will reimburse the local Governmental Entity such costs.

13.2 **Traffic Signals**

New construction or modifications to the existing traffic signals are defined in Item 24.

13.3 **Roadway Illumination**

Some local Governmental Entities may request continuous illumination along sections of the Project. 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 designated 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 handled in accordance with terms of the DBC.

For sections of continuous lighting specified by these additional agreements, safety lighting included in those sections is considered a component of the overall system, and responsibilities for safety lighting shall be set forth in in the terms of the additional agreement.

New construction or modifications to the existing illumination are defined in Item 24.

13.4 **Aesthetic and Landscaping Enhancements**

Some local Governmental Entities may request aesthetic and landscaping enhancements along sections of the Project. Should this occur, additional agreements between TxDOT and the Government Entity will be required. TxDOT shall coordinate with and provide reasonable accommodations to the third party designated to carry out the design, installation, and maintenance obligations as specified in such agreements. Design and construction of aesthetic and landscaping enhancements by DB Contractor will be handled in accordance with the terms of the DBC.

Aesthetic and landscaping enhancements are defined in Item 23.

13.5 **Frontage Road Access**

TxDOT shall be solely responsible, at its expense, for handling requests and permitting for adjacent property access to frontage roads of the Project, provided that TxDOT may request DB Contractor to review access permit applications at DB Contractor's expense. DB Contractor shall provide TxDOT with any comments within 10 business days after receipt of the application. Nothing in the Contract Documents shall restrict TxDOT from granting access permits or determining the terms and conditions of such permits. TxDOT will keep DB Contractor regularly informed of access permit applications and will deliver to DB Contractor a copy of each issued access permit within five days after it is issued. DB Contractor shall have no claim for a Change Order by reason of TxDOT's grant of access permits, the terms and conditions thereof, or the actions of permit holders or their employees, agents, representatives and invitees. DB Contractor at its

expense shall cooperate and coordinate with permit holders to enable them to safely construct, repair and maintain access improvements allowed under their access permits.

13.6 **Other Affected Third Parties**

DB Contractor is responsible for coordination and cooperation with all third parties affected by the Work, except as specifically provided otherwise.

Item 14
Utility Adjustments

14.1 **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 Item 14 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 Item 14 references certain TxDOT forms for DB Contractor's use in Utility Adjustments. Copies of those forms are included in Attachment 14-1 (Utility Adjustment Forms). Except as otherwise provided in this Item 14 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 agreed to by DB Contractor and the Utility Owner 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 representatives (i.e., Owner-Managed); all others shall be performed by DB Contractor with its own employees and/or Subcontractors and representatives (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 14.1.3.

The Project will be subject to 23 CFR Part 645, Subpart A, 23 CFR § 635.410 (Buy America) and FHWA's associated policies. DB Contractor shall comply (and shall require the Utility Owners to comply) with 23 CFR Pat 645, Subpart A and 23 CFR § 635.410. TxDOT Form 1818 Material Statement is required for all work performed for the Utility Owner prior to the installation of the materials to document compliance with Buy America requirements, 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 service commencement date, are set forth in this Item 14 and Section 4.5 of the General Conditions.

This Item 14 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.

14.1.1 **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 14.2.1, 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 14.2.4.2 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 14.2.1 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 that are not in physical conflict with the project that cross a roadway centerline at approximately 90 degrees may remain in the existing alignment. The existing Utilities may remain, be relocated in place, or be protected in place in these areas only if all other conditions of the UAR are met and the affected Utility Owners agree and approve all corresponding Utility Adjustment plans.

14.1.2 Certain Components of the Utility Adjustment Work

14.1.2.1 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 and the Utility Owner) of all necessary Utility Agreements.

All Utility Agreements must be approved by TxDOT prior to taking effect and prior to the commencement of any Utility Adjustment construction related activity.

14.1.2.2 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 4.5.2 of the General Conditions. DB Contractor shall perform all coordination necessary for Betterments.

14.1.2.3 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 14.2.1. 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.

14.1.2.4 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 14.2.1, 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 and shall require approval by TxDOT. 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 ROW are prohibited and only allowed at TxDOT's sole 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.

14.1.2.5 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.

14.1.2.6 Early Adjustments

At TxDOT's sole discretion, there may be early Utility Adjustment Work managed 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.

14.1.3 **Agreements Between DB Contractor and Utility Owners**

Except as otherwise stated in this Item 14 or in the DBC, DB Contractor shall address each Utility Adjustment in a PUAA or in a UAAA, as described elsewhere in this Item 14. DB Contractor is responsible for preparing, negotiating (to the extent allowed by this Item 14) 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 UJUA or Utility Installation Request, Form 1082, as described in Section 14.2.4.5 and plans detailing UAR compliance are 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.

14.1.3.1 **PUAA**

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 UAAA.

DB Contractor shall prepare each PUAA using the TxDOT form DB-ROW-U-PUAA-OM (Owner-Managed) or DB-ROW-U-PUAA-DM (DB Contractor-Managed), included in Attachment 14-1 (Utility Adjustment Forms). 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. 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 change. 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.

14.1.3.2 **UAAA**

Except where UAFM are permitted pursuant to Section 14.4.7, 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 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 14-1 (Utility Adjustment Forms). 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.

14.1.4 **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).

14.2 Administrative Requirements

14.2.1 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, UAR), requirements within the Contract Documents, including the UAR, the Dallas District Utility Specifications, the TxDOT *ROW Utilities Manual*, Section 4.5 of the General Conditions, and the requirements specified in this Item 14.

14.2.2 Communications

14.2.2.1 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 Item 14, 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.

14.2.2.2 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 complete list of attendees (including their affiliations, telephone numbers and e-mail addresses)
- Documentation of the issues discussed and any associated solutions or resolutions
- 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.

14.2.3 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 UM and a 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 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 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 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.

14.2.4 **Real Property Matters**

DB Contractor shall provide the services described below in connection with the existing and future occupancy of property by Utilities.

14.2.4.1 **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 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 14-1 (Utility Adjustment Forms).

14.2.4.2 **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:

- 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; and
- 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:
  - The files and records must be kept separate and apart from all acquisition files and records for the Project ROW;
  - 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
  - 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 4.5.6 of the General Conditions. The Utility Owner is responsible for utilizing its authority for condemnation proceedings for all Replacement Utility Property Interests.

14.2.4.3 **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.

14.2.4.4 **Quitclaim Deeds**

Except as otherwise directed by TxDOT, DB Contractor shall prepare and record in the appropriate jurisdiction a Quitclaim Deed for each relinquishment of an Existing Utility Property Interest using the TxDOT form included in Attachment 14-1 (Utility Adjustment Forms). Each Quitclaim Deed is subject to TxDOT 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.

14.2.4.5 **UJUAs and Utility Installation Request, Form 1082 Requirements**

DB Contractor shall prepare a 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 14-1 (Utility Adjustment Forms). 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.

14.2.4.6 **Documentation Requirements**

DB Contractor shall prepare, negotiate (to the extent permitted by this Section 14.2.4), and obtain execution by the Utility Owner of (and record in the appropriate jurisdiction, if applicable) all agreements and deeds described in this Section 14.2.4, 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.

14.2.5 **Utility Management Plan**

DB Contractor shall prepare and submit a Utility Management Plan in accordance with the requirements in Section 4.2.8 of the General Conditions.

14.3 **Design**

14.3.1 **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, prior to the first Utility Assembly submission, a DB Contractor Utility Strip Map showing the information obtained and confirmed pursuant to this Section 14.3.1. The DB Contractor Utility Strip Map shall show in plan view all Utilities within the Project ROW and those outside of the Project 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 the DB Contractor Utility Strip Map shall be 1 inch = 100 feet. DB Contractor shall verify and update the information provided in the Utility Strip Map with SUE data obtained by DB Contractor and incorporate into the DB Contractor Utility Strip Map.

14.3.2 **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 applicable requirements of the Contract Documents, including Section 14.2.1;
- the Project design;
- any existing and proposed Utility facility;
- all applicable Governmental Approvals; and
- approvals of all private sector third parties necessary for such Work.

14.3.3 **Utility Adjustment Concept Plans**

DB Contractor shall prepare and submit to TxDOT, 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

14.3.1, 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.

14.3.4 **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 PE unless such requirement is waived by TxDOT at its sole discretion and as allowed by governmental regulations and industry practice.

14.3.4.1 **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 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 approval.

14.3.4.2 **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 14.2.1. 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 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 approval.

14.3.4.3 **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.

14.3.4.4 **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, including multiple conduits, that cross the roadway, including side roads, shall be encased in Schedule 80 PVC or SDR 11 HDPE pipe as long as it is one continuous piece.

Refer to Item 22 for design requirements for underground Utilities within the potential railroad corridor.

There are several large water lines belonging to Dallas Water Utilities (DWU) and the City of Irving located north of Sandy Lake Road. Below are the requirements for encasement and/or relocation in relation to each line based on the Schematic Design:

- The DWU 96" water line located at approximate STA 824+00 is approximately 20' deep, believed to not be in conflict with the Project, and extension of the current encasement is not required as part of the Utility Adjustment Work.
- The DWU 2 - 72" water lines located at approximate STA 824+50 are approximately 20' deep, believed to not be in conflict with the Project, and extension of the current encasement is not required as part of the Utility Adjustment Work.
- The DWU 54" water line located at approximate STA 815+30 is actually two 16" sludge lines within a 54" line that is acting as encasement and is believed to not be in conflict with the Project. Extension of the current encasement or addition of encasement is not required as part of the Utility Adjustment Work.
- The DWU 60" water line located at approximate STA 825+10 is approximately 6' to 8' deep and will require encasement as part of the Utility Adjustment Work to remain in compliance with the UAR. The City of Irving 60" water line located at approximate STA 825+60 will require encasement as part of the Utility Adjustment Work to remain in compliance with the UAR.
- The DWU 60" water line and City of Irving 60" water line requiring encasement work as part of the Utility Adjustment Work will require shutdowns according to the utility shutdown windows. The two water lines cannot be shut down at the same time. DWU shutdown window is between October and April. City of Irving shutdown window is between November and February.

The Farmers Branch lift station access manhole located at the Valwood Pkwy Intersection of I-35E cannot remain in pavement after project completion. If in conflict with construction and requiring relocation, the City of Farmers Branch would like to eliminate the lift station by replacing with a gravity sanitary sewer line east to west across I-35E and connecting into the gravity sanitary sewer line on the west side of I-35E. This will not be considered a Betterment.

14.3.4.5 **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 approval of any items for which this Item 14 requires TxDOT approval. Temporary Adjustments that are installed within the Project ROW must also be included with an assembly for TxDOT prior approval, unless TxDOT waives such requirement 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 UAAA 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 receipt 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 14.5.

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 the roadway centerline or baseline(s);

(v) Show an offset distance from the Project ROW line to all longitudinal Utilities within the Project ROW;

(vi) 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

(vii) Are folded to 8.5-inch by 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 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; and

(j) All Utility No Conflict Sign-Off Forms.

14.3.4.5.1 **UAAAs**

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 (j) as identified in this Section 14.3.4.5.

14.3.4.5.2 **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 14.1.1. 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 UJUA(s) or Utility Installation Request, Form 1082 as required by Section 14.2.4.5 and Affidavit(s) of Property Interest, if applicable. Each of the foregoing items shall comply with the requirements for same described in Attachment 14-1 (Utility Adjustment Forms).

14.4 **Construction Requirements**

14.4.1 **Reserved**.

14.4.2 **General Construction Criteria**

All Utility Adjustment construction performed by DB Contractor shall conform to the requirements listed below. DB Contractor shall conduct all Work necessary to meet the requirements for this Item 14 in accordance with the requirements of this Item 14 and TxDOT Standard Specifications.

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:

- All criteria identified in Section 14.3.2;
- The Utility Adjustment Plans included in the Utility Agreement approved by TxDOT (other than UAFM complying with Section 14.4.7;
- All Project safety and environmental requirements;
- All pre-construction meeting requirements;
- The ROW acquisition schedule described in Item 15, and
- Utility(ies) standards provided in the Utility Agreement.

14.4.2.1 **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.

14.4.3 **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 14.4.2. DB Contractor is responsible for quality control and quality assurance for all Work performed by the Utility Owners and its contractors.

14.4.4 **Scheduling Utility Adjustment Work**

The Utility Adjustment Work (other than construction) may begin at any time following issuance of NTP1. Refer to Section 8.1.2 of the General Conditions 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:

- 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);
- Pre-construction meeting, in accordance with Section 14.2.2.2, shall be required after execution of the Utility Agreement and prior to commencement of any construction activities, unless otherwise approved by TxDOT;
- Availability and access to affected Replacement Utility Property Interests have been obtained by the Utility Owner (and provided to DB Contractor, if applicable);
- 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;
- 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;
- The review and comment process has been completed and required approvals have been obtained for the Utility Assembly covering the Utility Adjustment;
- 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
- All other conditions to that Work stated in the Contract Documents have been satisfied.

14.4.5 **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.

14.4.6 **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.

14.4.7 **UAFM**

DB Contractor shall establish a procedure in the Utility Management Plan to address a 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:

- 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 PE, unless otherwise permitted by TxDOT in its sole discretion;
- Transmittal of UAFMs to the appropriate construction field personnel; and
- 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.

14.4.8 **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.

14.4.9 **Utility Record Drawings**

DB Contractor shall provide Utility Record Drawings to each Utility Owner for its adjusted Utilities where the Utility Adjustment Work was performed by DB Contractor. For the purpose of this Item 14, Utility Record Drawings means construction drawings and related documentation revised to show approved changes made during the construction process, usually based on marked-up Released for Construction Documents furnished by DB Contractor.

DB Contractor shall provide Utility 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). Utility Record 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 Item 4 of the General Conditions. DB Contractor shall provide the Utility Record Drawings for each Adjustment to TxDOT prior to Final Acceptance.

Prior to Final Acceptance, DB Contractor shall provide to TxDOT an overall inventory set of utility plans 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 set 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.

14.4.10 **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 the Utility Owner and approved by TxDOT.

14.4.11 **Traffic Control**

DB Contractor shall be responsible for the 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 Item 26.

14.5 **Utility Assembly Submittals**

DB Contractor shall time all Submittals described in this Section 14.5 to meet the Project Schedule, taking into account the maximum number of Submittals set forth in this Section 14.5 or, if not stated therein, then as stated in Section 5.2.1 of the General Conditions. All Submittals shall conform to the standards required in the PMP. Any deliverable submitted by DB Contractor to TxDOT for review after 11:59 a.m. will be considered as submitted on the next business day.

All Submittals described in this Item 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, and Adobe Acrobat files, unless otherwise indicated.

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Any proposed changes to the provided TxDOT ROW Utility forms	As necessary	Approval	14.1.3.1 14.1.3.2
Form-1818 Material Statement, if applicable	Prior to the installation of materials and products	For information	14.1
Project Utility Adjustment Agreement	After NTP1, based on DB Contractor schedule	Approval	14.1.3.1
Modification to a PUAA	As necessary	Approval	14.1.3.1
Utility Adjustment Agreement Amendments	Prior to execution by the Utility Owner	Approval	14.1.3.2 14.3.4.5
Any mass mailings to Utility Owners	21 days in advance of distribution	Review and comment	14.2.2.1
Meeting agendas	At least 3 Business Days in advance of each scheduled meeting	For information	14.2.2.2
Meeting minutes	After attendee comment and after the conclusion of the meeting and prior to final distribution	Review and comment	14.2.2.2
Names, contact details, etc. for the Utility coordination team	Prior to NTP2, in the applicable chapter of the PMP	Approval	14.2.3
Affidavit of Property Interest	In the applicable Utility Assembly	Approval	14.2.4.1
Draft Quitclaim Deeds	Prior to submission of Utility Assembly	Approval	14.2.4.4
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	14.2.4.4

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
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	For information	14.2.4.4
Utility Joint Use Acknowledgments	In the applicable Utility Assembly	Approval	14.2.4.5
Utility Installation Request, Form 1082	In the applicable Utility Assembly	Approval	14.2.4.5
DB Contractor's Utility Strip Map	(i) After NTP2 or (ii) before the first assembly package submission	For information	14.3.1
Utility Adjustment Concept Plan(s)	(i) After NTP2 or (ii) 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 comment	14.3.3
Utility Adjustment Plans	In the applicable Utility Assembly	Approval	14.3.4.1, 14.3.4.2
Utility Assemblies	Prior to start of the affected Utility Adjustment Work	Approval	14.3.4.5, 14.5
Temporary Adjustments	In the applicable Utility Assembly, if applicable, unless TxDOT waives/allows other method	Approval	14.3.4.5
Abbreviated Utility Assemblies	As necessary	Approval	14.3.4.5.2, 14.5.3
Set of Record Drawings and overall plan view maps of final Utility locations	Prior to Final Acceptance	Approval	14.4.9
Individual Record Drawing plans	Prior to Final Acceptance	Approval	14.4.9
Utility Tracking Report (UTR)	Monthly	For information	14.5.2
Utility Assembly Submittal log	With each Submittal or group of Submittals	For information	14.5.3
Closeout information and documentation	After each Utility has been relocated, fully reimbursed and accepted by the Utility Owner	For information	14.5.3
Alternate Procedure List	Prior to commencement of any demolition, removal or other construction work for any Utility Adjustment	Approval	14.5.4

14.5.1 **Maximum Number of Submittals**

DB Contractor shall coordinate all Submittals required pursuant to this Section 14.5. In each 10 Business Day period, DB Contractor shall not submit more than:

- Five Utility Assemblies (excluding Abbreviated Utility Assemblies); and
- Five of any other Submittals required under this Item 14 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 10 Business Day period, as necessary.

14.5.2 **DB Contractor's UTR**

DB Contractor shall maintain a 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:

- The name of the Utility Owner and the Utility Assembly Number;
- Utility size and type;
- Location of the Utility based upon station and offset;
- The proposed method of treatment;
- State whether the Adjustment will be Owner or DB Contractor-Managed;
- Dates on which the PUAA/UAAA was executed by TxDOT, the Utility Owner and DB Contractor;
- Dates on which the UJUA or Utility Installation Request, Form 1082, was executed by the Utility Owner and TxDOT;
- The Utility Owner's existing right of occupancy of the ROW for each Utility (e.g., UJUA, permit, easement or combination);
- Whether any Replacement Utility Property Interest will be necessary;
- Estimated cost approved in the PUAA/UAAA;
- 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);
- Scheduled start and completion date for construction of each Adjustment;
- Percent complete of construction;
- Whether any Betterment is included in the Adjustment; and
- Whether TxDOT form 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.

14.5.3 **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:

- Before submitting a Utility Assembly to TxDOT, DB Contractor shall:
  - Verify that each subject Utility (or the Utility Owner) is on the approved Alternate Procedure List, if applicable;
  - 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
  - Resolve all comments made by the quality control/quality assurance entity, coordinating with the Utility Owner as appropriate.
- 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 review and comment, except for any components of the Utility Assembly for which TxDOT approval is required by this Section 14.5.

- 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.
- TxDOT will review the Utility Assembly for compliance with the requirements of this Section 14.5.3, and within 10 Business Days will return the Utility Assembly to DB Contractor with the appropriate notations pursuant to Section 5.2.1 of the General Conditions 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 approval, as applicable. Upon (a) TxDOT approval of any Utility Assembly components for which TxDOT 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 Item 14 requires TxDOT signature.
- 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:
  - The Utility Agreement form (PUAA, UAAA, et al);
  - Record Drawings ("as-built") plans;
  - UJUA or Form 1082/UIR;
  - Quitclaim form (D-15-30);
  - Actual cost and summary of the Adjustment; and
  - TxDOT form 1818 Material Statement.

DB Contractor shall address conditions of approval, if any, for each Utility Assembly prior to completing the final closeout procedure.

14.5.4 **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.

Item 15
Right of Way (ROW)

15.1 **General Requirements**

DB Contractor's obligations in respect of the acquisition of Project ROW are set forth in Section 4.4.1 of the General Conditions.

This Item 15 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 15.1 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 DBA, 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 PUA, a deed, or an award, unless otherwise approved by TxDOT.

15.2 **Administrative Requirements**

15.2.1 **Standards**

DB Contractor shall acquire all Project ROW in accordance with State and Federal Law and the practices, guidelines, procedures, and methods and contained in the following available at http://onlinemanuals.txdot.gov/manuals:

- All TxDOT ROW Manuals;
- TxDOT *Access Management Manual*; and
- TxDOT *Survey 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 ROW Manuals; (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 ROW Manuals, TxDOT *Access Management Manual*, and a current approved Project ROW map for public use. DB Contractor's complete set of ROW Manuals shall be current as of the Effective Date. Any TxDOT forms referenced in this Section 15.2.1 may be found in the TxDOT ROW Manuals 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 Part 710 governing the use of Federal funds for acquisition, management and disposal of real property.

15.2.2 **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 database that incorporates the fields and information required by TxDOT's ROW tracking system: TxDOTConnect. 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.

15.2.3 **ROW Acquisition Management Plan**

DB Contractor shall prepare a ROW Acquisition Management Plan in accordance with the requirements contained in Section 4.2.9 of the General Conditions.

15.2.4 **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 Project Schedule Update required by Item 8 of the General Conditions 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 10 Business Days for Acquisition Packages and Condemnation Packages (collectively) that DB Contractor submits as final and complete in accordance with Section 15.3.6 and Section 15.4.4, up to a maximum of five Acquisition Packages and Condemnation Packages (collectively), unless otherwise directed by TxDOT. Any Submittals that would require TxDOT to review more than five Acquisition Packages and Condemnation Packages (collectively) within any given 10 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 10 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 10 Business Days after receipt. The balance of Acquisition Packages and Condemnation Packages (collectively) in excess of five will be rolled over to the next 10 Business Day period and added to the Acquisition Package Submittals and Condemnation Package Submittals made by DB Contractor in that period. When DB Contractor submits more than five Acquisition Packages and Condemnation Packages (collectively) at any given time, DB Contractor shall indicate the priority of review.

DB Contractor shall also assume that the reviews performed by TxDOT will require 10 Business Days for the following Submittals: payment Submittals, relocation Submittals, administrative settlement Submittals, and closing Submittals, up to a maximum of five submissions for each type of Submittal noted above, in addition to the Acquisition Packages and Condemnation Packages. With the combination of the above, DB Contractor shall not submit more than 25 total Submittals, in any given 10 Business Day period.

If TxDOT notifies DB Contractor that any submitted Acquisition Package or Condemnation Package has a deficiency, DB Contractor shall correct such deficiency and resubmit the package to TxDOT. Resubmissions shall be treated as a new Acquisition Package or Condemnation Package, as applicable, for purposes of the limitations on the number of Submittals that may be submitted in a 10 Business Day period. An Acquisition Package 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 15.2.4 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 shall have the right to undertake additional review and extend the review time for an additional 10 Business Days on Acquisition Packages and Condemnation Packages that contain or identify facts or issues of an unusual nature or which do not clearly fit within TxDOT Standards. In such event, TxDOT will notify DB Contractor in writing that the review period will be extended by an additional 10 Business Days before rendering a decision regarding approval of the package 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. There will be no time limits associated with these preliminary reviews.

15.2.5 **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. For such Project ROW acquisition documentation, TxDOT will (a) approve and return the Submittal, (b) provide review comments for incorporation by DB Contractor in accordance with Section 15.2.4, 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 prior to resubmission in accordance with Section 15.2.4. 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 the owner of a parcel, and TxDOT will not begin eminent domain procedures with respect to the parcel until after the 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 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 and until all requirements under the Uniform Act have been met (including relocation assistance in accordance with Section 15.4.2) and (i) property rights for the parcel have been conveyed and recorded in favor of TxDOT, (ii) possession has been obtained through eminent domain or any other method provided for by the standards set forth in Section 15.2.1, or (iii) a PUA has been executed and delivered by all necessary parties in accordance with Section 15.4.1.

15.2.6 **Acquisition Process Summary**

DB Contractor's major activities with respect to the acquisition of the Project ROW include:

- Project ROW surveying and mapping;
- Project ROW and Utility cost estimates and updates;
- Title services;
- Appraisal services;
- Appraisal review;
- Negotiations;
- Closing services;
- Relocation assistance;
- Condemnation support services;
- Clearance and demolition of Project ROW;
- Environmental due diligence;
- Documentation and document control;
- Progress reports;
- Project ROW administration and management;
- Project ROW quality management;
- 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; and
- Obtaining ROEs, as necessary.

15.2.7 **ROW Personnel Qualifications**

DB Contractor's 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 TREC, be familiar with appraisal and appraisal report review pursuant to the 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 deliverables 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 their selection for this Project in appraisal work primarily in the county(ies) where the Project is located, and as approved and pre-certified 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 pre-certified 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 pre-certified 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 TREC, 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 ROW 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 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 be 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.

15.2.8 **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 Effective Date, such disclosure shall be made within 10 days after the Effective Date.

In the event that DB Contractor, or any subsidiary, sister, 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 15.2.1.

15.2.9 **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 upon request. 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.

15.2.10 **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):

- County;
- CSJ number;
- ROW CSJ (RCSJ) number;
- Federal Project Number (if applicable);
- Highway designation;
- Project limits;
- Parcel number; and
- Name of record owner(s).

DB Contractor shall utilize TxDOT's approved naming convention for all electronic files and reporting fields.

In administering and managing its Project ROW acquisition activities, DB Contractor shall:

- 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.
- 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.
- 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 (unless directed otherwise) updates to TxDOT.

- Evaluate and report to TxDOT, Subcontractor status and performance on a monthly basis or more frequently as requested.
- 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 TxDOTConnect tracking software program or as directed by TxDOT.
- Input and update parcel status on a monthly basis in TxDOT approved web-based tracking system or as directed by TxDOT.

15.2.11 **Responsibilities of DB Contractor**

As set forth in Section 4.4 of the General Conditions and as more fully described in this Section 15.2.11, DB Contractor shall be responsible for 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 or the Office of the Attorney General for all condemnation proceedings. 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.

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 subject to 18.2 it has incorporated the value of saleable improvements into DB Contractor's Project ROW acquisition 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 Price. DB Contractor shall not be entitled to a credit for any improvements retained by a property owner or TxDOT. 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 as described in Section 15.4.6 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 for which TxDOT is responsible for such costs.

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 Project ROW in accordance with Section 4.4.2 of the General Conditions.

DB Contractor's cost for Project ROW shall include all costs not paid by TxDOT.

DB Contractor shall be responsible for submitting to TxDOT 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:

- Appraisal report(s) (initial appraisal and all other issued appraisal reports, approved and not approved, with most recent appraisal report on top);
- Original conveyance document(s) (PUA(s), deed(s), easement(s), judgment(s), Award of Commissioners);
- Original Title Insurance Policy or Attorney's Certificate;
- MOA; and
- Negotiator's Certificate.

For relocation and general correspondence, the following shall be included:

- Relocation files (in chronological order);
- Offer Letters;
- Negotiator Reports and Contact Sheets;
- General correspondence; and
- All other documentation regarding the parcel.

15.2.12 **Responsibilities of TxDOT**

TxDOT will have the following responsibilities in connection with acquisition of Project ROW:

- Except as otherwise set forth in this Item 15, provide final approval for all Acquisition Packages, Condemnation Packages, 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 15.2.4.
- After receiving a complete Condemnation Package from DB Contractor in accordance with Section 15.2.4 and Section 15.4.4, 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 10 Business Days before the Commission's required deadline for eminent domain minute order requests.
- After receiving a complete payment Submittal from DB Contractor in accordance with Section 15.2.4 and Section 15.4.6, 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.
- 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 10 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 ROW Manuals.
- 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 ROW Manuals.
- TxDOT will provide all coordination services between DB Contractor and the Office of the Attorney General for prosecution of jury trials.
- 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)(7).
- TxDOT will review and approve the completed, final closeout files in accordance with the closeout procedures.

15.2.13 **TxDOT Project Monitor/Reviewer**

In addition to its review and approval authority as expressly set forth in other provisions of this Item 15, TxDOT may audit and monitor the ROW activities and services performed by DB Contractor. TxDOT may

contract with independent entities to assist it in fulfilling the audit/monitoring function provided that the audit authority is not delegated. In addition to any Submittal 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.

15.2.14 **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:

- Represent TxDOT as the State's Attorney of Record;
- Preparation of complete petitions for condemnation with the appropriate court for a cause number to be assigned;
- If applicable, e-file condemnation documents and coordinate delivery of filed documents with TxDOT;
- Coordination with TxDOT on all legal matters concerning acquisition processes, including negotiated settlements;
- Analysis of recommended parcel values and/or appraisal issues;
- Additional legal advice and opinions as needed by TxDOT;
- Special Commissioners' hearings;
- Jury trials including determination of expert witnesses and all appeals; and
- Preparation, obtaining, and filing of all necessary legal documentation for eviction of property owners or tenants.

15.3 **Pre-Acquisition Activities**

15.3.1 **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 ROW Manuals and the TxDOT *Survey Manual*. DB Contractor shall refer to the current *Manual of Practice* by the Texas Society of Professional Land Surveyors and the *U.S. National Map and Accuracy Standards*. DB Contractor shall refer to Item 17 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 10 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 10 Business Day period shall be considered excess, and TxDOT may defer its review of any such excess parcels to a subsequent 10 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:

- Three half size ROW maps on paper, Scale 1 inch = 100 feet (11 inches by 17 inches);
- One separate set of originals signed and sealed by a 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;
- A USB 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;
- One full size ROW map on paper, Scale 1 inch = 50 feet (22 inches by 34 inches);
- 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;

- Three copies (signed and sealed) of each legal and sketch;
- One separate set (copies) of legal and sketch of each parcel for TxDOT records;
- One separate set (copies) of legal and sketch of each parcel for Title Company; and
- One separate set of originals legal and sketch signed and sealed by a RPLS to be kept in mapping files.

In addition to the foregoing, DB Contractor shall prepare all Project ROW surveying and mapping in accordance with the following:

- 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 8-1/2-inch by 11-inch bond paper. The Project ROW map sheets shall be on 22-inch by 34-inch 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.
- The ROW map sheet and plat shall show all areas of denied access for the parcel according to the current TxDOT *Access Management Manual* and amendments.
- The 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.
- The 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.
- 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 PC, PT, PI, PCC, and PRC, and for property line intersections (PLI) with the Project ROW line, and for any other monumentation points on the Project ROW line.
- 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.
- 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.
- Any existing ROW lines being incorporated into the proposed Project ROW, including intersecting ROW, shall be surveyed and monumented (if not previously monumented).
- 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 17.3).
- 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.
- All Project ROW maps shall include a control sheet(s), to show the primary survey control points with their location relative to the Project.
- 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" and the parcel plat is denoted "Page 3 of 3."

- Improvements within 100 feet outside of all proposed Project ROW shall be depicted on the Project ROW map sheets. All improvements shall be current as of the date of the on-the-ground property survey.
- 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.
- Calculated points shall be shown by a symbol on the drawing, with their relationship to the found reference points.
- 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.
- 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 TBPELS, 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).
- 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 the TxDOT ROW Manuals and TxDOT *Survey Manual*), unless otherwise directed by TxDOT.
- 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 otherwise 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.
- 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.
- Documents shall contain deed references (survey name, abstract number, volume and page or document number, grantee, and area) for all existing public ROW 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 ROW as shown hereon."
- 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.
- 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.
- 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 a Governmental Entity, shall be included on the Project ROW map.

- 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.
- 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 Design-Build Specifications 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).
- Parcel numbering shall follow the TxDOT ROW Manuals. 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.
- 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.
- 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.
- 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.
- 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.
- DB Contractor, at the request of the property owner or TxDOT, shall re-stake the proposed ROW with a flagged wooden stake.

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 are cost prohibitive.

15.3.2 Additional Reporting Requirements

In addition to the Project ROW map, parcel description, and parcel plats, DB Contractor shall submit the following reports and electronic files:

- Monthly Parcel Report: a report, prior to the first of the month, listing all parcel deletions, parcel additions, and parcel splits;
- Monthly Progress Report: a report, prior to the first of the month, of all survey activity that occurred during the previous month, including a two-week look ahead of anticipated survey activity; and
- CADD files: digital CADD 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 CADD files prior to submitting the first Acquisition Package and provide updates as needed.

15.3.3 Title Services

With respect to title services, DB Contractor shall comply with the applicable standards identified in Section 15.2.1, including the following requirements:

- Select and contract with one or more title companies approved by TxDOT and submit with the Acquisition Package for each parcel 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 deliverables 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.
- 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.
- 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.
- 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."

15.3.4 **Introduction to Property Owners**

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 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. DB Contractor shall provide translation for property owners or displacees unable to read or understand the notices.

DB Contractor shall furnish a copy of the State of Texas Landowner's Bill of Rights for each property owner for inclusion with the letter of introduction. The copy of the Bill of Rights shall be the latest version as shown on the Office of Attorney General website: http://www.texasattorneygeneral.gov/agency/Landowners_billofrights.pdf.

15.3.5 **Appraisals**

15.3.5.1 **Appraisal Services**

DB Contractor shall submit to TxDOT 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:

- Select appraisers from TxDOT's list of pre-certified fee appraisers meeting the requirements specified in Section 15.2.7. 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 TxDOT approval of the appraiser who will be responsible for the appraisal work product and who will be signing the reports.
- Establish personal pre-appraisal contact with each owner of record title and each occupant, and document all contacts utilizing forms provided by TxDOT.
- 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 (an "ROE Agreement"). DB Contractor may, at its sole discretion and expense, offer to pay reasonable compensation for any required ROE Agreements. If DB Contractor, after best efforts, is unable to secure a ROE Agreement from the property owner, DB Contractor shall provide documentation acceptable to TxDOT indicating conversations, correspondence, and efforts used to attempt to secure the ROE Agreement.
- 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.
- 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 15.3.5 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 ROW-A-5 – Real Estate Appraisal Report, except for outdoor advertising signs which shall utilize TxDOT form ROW-A-5 OAS – 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 ROW-A-6 for less complicated parcels. All appraisals must be performed utilizing guidance from the TxDOT ROW Manuals.

All appraisals for condemnation proceedings shall utilize TxDOT form ROW-A-5 – Real Estate Appraisal Report.

- 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.
- Perform an evaluation of all outdoor advertising signs, as required, utilizing the appropriate forms as instructed by TxDOT. 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:

- Completed and executed appropriate TxDOT forms; and
- Except in the event the owner of the sign structure has elected to relocate the sign structure as personal property, 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.

DB Contractor shall:

- 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 ROW Manuals and USPAP. DB Contractor shall also provide administrative and/or technical support for such proceedings as requested by TxDOT.
- Coordinate with the review appraiser regarding corrections and additional information that may be required for a particular appraisal.
- 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. 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 Submittal 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 Phase II and/or III, DB Contractor may submit the Acquisition Package and Condemnation Package without the Environmental Site Assessment reports. However, DB Contractor shall be responsible for performing and receiving approval from TxDOT for all required Environmental Site Assessments after possession of the property has been obtained through condemnation before commencement of construction.
- 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, in which event TxDOT will determine to what degree land planner services will be utilized by DB Contractor.

- 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:
  - 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.
  - An updated Page 1 from TxDOT form ROW-A-5 – Real Estate Appraisal Report and TxDOT form ROW-A-5 OAS – 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.
  - Any qualifying and limiting conditions or general assumptions by the appraiser shall be clearly stated and attached.
  - 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 ROW-A-5 – Real Estate Appraisal Report and TxDOT form ROW-A-5 OAS – 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.
- Prepare and deliver to TxDOT, upon request, a copy of all file documents, as formally requested in discovery motions or request for production.
- Complete with the property owner and furnish, to the appraiser and Relocation Agent, TxDOT form ROW-A-9 – Property Classification Agreement, before appraisal is completed.

15.3.5.2 **Appraisal Review**

In connection with appraisal review, DB Contractor shall:

- Select review appraisers from TxDOT's list of pre-certified fee appraisers meeting the requirements of Section 15.2.7. The review appraiser selected must follow the appraisal guidelines and procedures found in the TxDOT *ROW Appraisal and Review Manual*.
- Determine, in consultation with TxDOT, if additional appraisal reports or technical expert reports are required. Initiate, review, and reconcile each report required.
- 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 15.3.5.1 and this Section 15.3.5.2, 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.
- Inspect the subject properties and the sale properties used in direct comparison for each appraisal being reviewed.

- 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 ROW-A-5 – Real Estate Appraisal Report and TxDOT form ROW-A-5 OAS – Real Estate Appraisal Report, in the block provided. The review appraiser will also complete TxDOT form ROW-A-10 – Tabulation of Values, to accompany each appraisal.
- 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 ROW-A-10 – Tabulation of Values, will be required for each updated appraisal or new assignment.
- DB Contractor's Quality Control Specialist(s) as referred to in Section 15.2.7, shall ensure that appraisal consistency and quality for the entire Project is monitored for Project-wide controls and consistency.

15.3.6 **Project ROW Acquisition Package Approval**

Acquisition Packages submitted by DB Contractor for TxDOT approval shall include the following items, prepared for each parcel in accordance with the requirements of this Section 15.3.6:

- A cover sheet setting forth the following information for each parcel:
  - Parcel number and number of parts;
  - Station number;
  - CSJ number;
  - Federal Identification Number (if applicable);
  - Location of parcel;
  - Name of owner;
  - County and/or other jurisdiction;
  - Extent of acquisition (partial or whole acquisition); and
  - Type of conveyance (fee, easement, etc.).
- 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 are 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.
- The parcel plat, as prepared by the RPLS, and a half-size (11 inches by 17 inches) copy of the ROW map sheet(s) pertaining to the parcel, such plat to include control of access designations.
- 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.
- A copy of the appraisal report with an effective date no earlier than 180 days prior to the date of submission of the Acquisition Package.
- A copy of the Environmental Site Assessment and all amendments as described in Section 15.3.5.1.
- A real/personal property report (TxDOT form ROW-A-9 – Property Classification Agreement) detailing the items making up each parcel that are classified as real estate, tenant-owned improvements or personal property. Particular attention shall be paid to items that have questionable classifications.
- 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. The calculations and

replacement housing benefit package shall be prepared and reviewed by a qualified specialist, in conformance with TxDOT's standard relocation procedures and applicable State and federal Laws.

- The proposed initial offer letter, MOA, 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 15.3.6 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.
- 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 prepared or submitted by appraisers or agents not previously approved by TxDOT for this Project.

Upon TxDOT's written approval of the Acquisition Package, DB Contractor may proceed with the offer to the property owner.

15.4 Acquisition Activities

15.4.1 ROW Negotiations

DB Contractor shall conduct all negotiations in accordance with the requirements of applicable Law. In conjunction with negotiations, DB Contractor shall:

- Within 10 Business Days of TxDOT 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 10 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.
- 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: http://www.texasattorneygeneral.gov/agency/Landowners_billofrights.pdf.
- 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.
- 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 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 15.2.1. 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.
- 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.
- 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.

- 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 consent prior to acceptance of any settlement.
- Provide timely (i.e., not more than 10 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.
- 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 ROW-N-94 – Negotiator's Report. Contact reports shall also be prepared for unsuccessful attempts to contact such persons.
- Maintain a complete parcel file for each parcel. All original documentation related to the purchase of the real property interests shall be maintained (housed separately from the relocation files) in conformance with TxDOT Standards, manuals, and procedures, as defined in Section 15.2.1. All original Project ROW documents shall be retained and properly secured in DB Contractor's Project office or as otherwise approved by TxDOT. During the acquisition process, signed original documents shall be forwarded to TxDOT with a transmittal form periodically or as requested by TxDOT; provided, however, that all remaining original documents shall be forwarded upon completion of the acquisition of Project ROW for the Project.
- 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 State Laws.
- Pursue and obtain a PUA concurrently with the parcel negotiations. Except as otherwise set forth in this paragraph, each PUA shall include an incentive in the form of market rental consideration for the advance possession and use of the property and shall be in the form of Form ROW-N-PUAIC included in Attachment 15-1 (Form ROW-N-PUAIC). The amount of the market rental consideration shall be 10% of the approved value of the property, provided the minimum amount of the incentive shall be $3,000 per parcel and the maximum amount shall be $25,000 per parcel. For properties for which the Special Commissioners' hearing is within 30 days of the date of the PUA, the PUA shall not include market rental consideration and shall be in the form of Form ROW-N-PUA included in Attachment 15-2 (Form ROW-N-PUA). 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 uses a TxDOT PUA, DB Contractor shall obtain a deed or commence action on condemnation proceedings by submitting a Condemnation Package 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.
- Consider all reasonable settlement requests (that comply with the regulations as outlined in this Section 15.4.1) 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.

- 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 AM. 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.

15.4.2 **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 permitted 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 the DBA and these Design-Build Specifications.

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:

- Prepare a Relocation Plan in accordance with the TxDOT ROW Manuals within 90 days after receipt of NTP1, as part of an updated ROW Acquisition Management Plan.
- Monitor relocation assistance activities and provide advisory services.
- Prevent fraud, waste and mismanagement.
- 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:

- 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.
- 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 ROW Administrator.
- Contact and provide relocation assistance to those parties affected by the Project ROW acquisition and complete forms for all displacees, as required.
- Locate, evaluate and maintain files on comparable available housing, commercial, retail and industrial sites.
- Calculate replacement supplement benefits.
- 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.
- Perform a DSS inspection for each replacement housing comparable, photograph the comparable and complete the DSS inspection form, TxDOT form ROW-R-116 – Replacement Housing Inspection.
- Obtain at least two moving estimates from moving companies to effect relocation of personal property or consistent with the Uniform Act.

- Prepare moving plan with appropriate photos, sketches and inventory of personal property to be moved.
- Coordinate moves with displacees and moving companies in accordance with TxDOT Standards and the Uniform Act.
- Maintain relocation contact logs on a TxDOT form ROW-R-96 – Relocation Advisory Assistance – Parcel Record.
- Attend all closings on replacement properties, if requested by any party involved, and assure supplemental payments, if any, are properly distributed.
- Process and compute increased interest payments on the mortgage of owner-occupied dwellings, as required.
- 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.
- Deliver a 30-day notice to displacees and property owners upon Possession of Project ROW.
- 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.
- Notify TxDOT 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.
- Be available for any appeals or hearings.
- Prepare relocation payment claim submissions for all displacees and all relocation assistance benefits.
- Verify DSS dwelling criteria on all replacement housing as selected by the displacees.
- Secure dwellings and structures no later than 10 days after vacancy and protect the Project ROW following acquisition and relocation. It is DB Contractor's responsibility to ensure that all occupied and vacated improvements maintain insurance coverage or assume liability through completion of demolition.
- Maintain a complete file, separate from acquisition files, on each displacee and make available for inspection.
- 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.
- 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.
- Deliver to each displacee the relocation assistance payments according to the TxDOT ROW Manuals.
- 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.

15.4.3 Closing Services

For purposes of closing services, DB Contractor shall:

- Submit a closing Submittal to TxDOT for review a minimum of 24 hours prior to closing. Closing Submittals shall include the following:

- A reference to the disposition of any environmental matters;
- Updated title commitment, no more than 15 days prior, with notations indicating the disposition of all schedule "B" and "C" items;
- A copy of the executed warranty deed to be delivered;
- A proposed closing statement indicating disposition of all proceeds;
- A copy of any and all release(s) of liens;
- A copy of any miscellaneous documents and other curative matters required to be delivered at closing; and
- A copy of the closing memorandum outlined in item (b) below.

- 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.
- 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.
- Obtain and submit 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.

15.4.4 **Condemnation Support**

DB Contractor shall support condemnation efforts as directed by TxDOT and further delineated as follows:

- Conduct all applicable eminent domain-condemnation activities in accordance with the policies and procedures as described in the TxDOT ROW Manuals; in Chapter 21 of the Texas Property Code; and Senate Bill 18.
- Communicate with TxDOT as to the parcel status on a monthly basis or as requested by TxDOT.
- Notify TxDOT of any potential condemnation and document the reason(s) for condemnation including recommendations for property closure.

15.4.4.1 **Condemnation Package Preparation**

DB Contractor shall support condemnation efforts as directed by TxDOT and further delineated as follows:

- 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.
- Provide to TxDOT, within 10 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.
- 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.
- Upon completion of TxDOT form 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, the owner of the compensable interest or any of their 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 ROW Administrator for review and approval.

15.4.4.2 **Condemnation Support Upon Approval of a Condemnation Package**

DB Contractor shall support condemnation efforts as directed by TxDOT and further delineated as follows:

- 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.
- 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 of the petition and lis pendens to TxDOT.
- 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.
- 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.
- Depending on the market conditions or if over six months have elapsed since the date of the initial offer, notify TxDOT. 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 15.3.5.1. DB Contractor must also undertake appraisal review as described in Section 15.3.5.2.
- 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.
- 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.
- Schedule all court reporter services, transcription services, expert witnesses, exhibits, and exhibit workbooks as directed by TxDOT.
- 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.
- 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 ROW Administrator concerning hearing dates.
- Upon completion of the hearing, prepare TxDOT form 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.
- Timely file and provide proper service of citations if objections are filed after completion of the Special Commissioner’s hearing and promptly submit evidence of filing and copies of all filed documents to TxDOT. As directed by TxDOT and the Office of the Attorney General, DB Contractor, at its cost, shall order transcripts of such hearing.
- Coordinate and provide support to TxDOT counsel, and facilitate distribution of copies of award, prepare request for payment, and file notice of deposit.

15.4.4.3 **Condemnation Support by an Expert Witness**

DB Contractor shall support condemnation efforts as directed by TxDOT and further delineated as follows:

- 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 or individuals are 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.
- 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 all necessary expert witnesses including: engineering, land planners, real estate specialists, cost estimators, outdoor advertising sign experts, and environmental specialists, 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 until 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.
- DB Contractor shall require expert witnesses with all exhibits and documents to be present at a pre-hearing meeting.
- Coordinate with TxDOT on behalf of the Office of the Attorney General as to expert witnesses as required by the Office of the Attorney General. DB Contractor shall provide the expert witnesses at the request of TxDOT or the Office of the Attorney General. The expert witness report, if required, shall be completed and forwarded to the appraiser before the updated appraisal is completed.
- 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.

15.4.5 **Clearance/Demolition of Project ROW**

Prior to demolition of any improvements, DB Contractor shall provide to TxDOT photographs of the subject property and all improvements. If legal proceedings are initiated, all photos of personal property and any other items in 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:

- Within 10 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.
- Coordinate with the owner and occupants to assure the clearance of personal property from the Project ROW, as applicable.
- Provide for any insect and rodent control and initiate extermination as required to protect the adjacent properties and rid the Project ROW from infestations.
- 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.
- To the extent required by Section 15.2.11, prepare necessary documentation for disposal of improvements, fixtures and buildings in accordance with applicable Laws and submit the same to TxDOT.
- Provide written notification to TxDOT of any abandoned personal property remaining on the Project ROW.
- Terminate all utility service(s) when appropriate.

- 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.
- Demolish and/or remove all improvements.
- Notify TxDOT upon completion of the demolition and clearance of the Project ROW, as applicable.

15.4.6 **Payment Submittal**

DB Contractor must submit a payment Submittal for any item that is a TxDOT payment responsibility as outlined in this Item 15. A payment Submittal shall consist of:

- completed payment request forms for each type of payment;
- all required appropriate documents as shown on each payment request form; and
- Form AP-152 (Texas Identification Number).

The State's warrant will be returned to DB Contractor's ROW AM.

15.4.7 **Property Fence**

In connection with fences, DB Contractor shall comply with the policies and procedures of the TxDOT ROW Manuals, as well as TxDOT Standard Specifications. Fencing standards for DB Contractor-provided fencing shall conform to the overall aesthetics requirements in the Contract Documents and referenced standards.

15.4.8 **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.

15.4.9 **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 MOA 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 30 days from the date of closing.

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.

15.4.10 **Right of Entry and Temporary Easement Construction**

DB Contractor shall replace all permanent objects, including but not limited to property fence, mailbox, signs, etc., that are temporarily relocated or demolished within the area where a ROE or temporary easement is

obtained due to construction. DB Contractor shall restore the ROE or temporary easement construction area to its existing condition.

15.5 **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 NTP2. TxDOT will update DB Contractor regularly on the status of the acquisition process for each parcel.

DB Contractor shall complete the acquisition process for Project ROW parcels not acquired by TxDOT, including early acquisition parcels, and coordinate the scheduling of all remaining Project ROW acquisitions.

DB Contractor shall not obtain TxDOT's ROW completed appraisal package for the Project ROW parcels acquired by TxDOT.

15.6 **Submittals**

All Submittals described in this Item 15 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 15-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 15-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Copies of all property agreements	Upon Request	For information	15.1
Three samples of previous appraisal work for each appraiser	Prior to beginning appraisal process	For information	15.2.7
Meeting Agendas	Prior to each meeting	For information	15.2.9
Meeting Minutes	After the date of the meeting	Review and comment	15.2.9
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	15.2.10
Project ROW Acquisition and Relocation Cost Summaries	Monthly	For information	15.2.10
Project ROW Status Reports	Monthly	For information	15.2.10
Project ROW Status Updates	Weekly or as requested	For information	15.2.10
Parcel Status	Monthly or as requested	For information	15.2.10
Subcontractor Status Report	Monthly or as requested	For information	15.2.10
TxDOTConnect compatible spreadsheet of Project ROW data	Monthly	For information	15.2.10
Completed closeout files	Within 90 days of the completed ROW parcel activity	Approval	15.2.11
Project ROW map	Part of the Acquisition Survey Document	Approval	15.3.1

Table 15-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Acquisition Survey Document	As part of any Acquisition Package	Approval	15.3.1
Design certification	As part of any Acquisition Package	For information	15.3.1
Monthly Parcel Report	Monthly	For information	15.3.2
Monthly Progress Report	Monthly	For information	15.3.2
ROW CAD Files	Prior to submission of the first Acquisition Package	For information	15.3.2
Title Reports	As part of Acquisition Packages	Approval	15.3.3
Title Policies	As part of Acquisition Packages	Approval	15.3.3, 15.4.3
Project ROW Property Owner List	After ROW Acquisition Management Plan approval	For information	15.3.4
TxDOT Introduction letter	After ROW Acquisition Management Plan approval but prior to ROW acquisition	Approval	15.3.4
Appraisal Reports	Prior to submission of the first Acquisition Package, and as requested	Approval	15.3.5
Environmental Site Assessment Reports	As part of Acquisition Packages	Approval	15.3.5.1
Acquisition Packages	Prior to delivering the offer to each property owner	Approval	15.3.6
Administrative Settlement Submittals	As necessary, within 15 Business Days following receipt of the administrative settlement request	Approval	15.4.1
Final offer letter	Within 2 days of delivery to the property owner	For information	15.4.1
Relocation Assistance Submittals	As part of the respective parcel's Acquisition Package or separately	Approval	15.4.2
Relocation Plan	Within 90 days after NTP1, as part of a ROW Acquisition Management Plan update	Approval	15.4.2
Closing Submittals	Minimum of 24 hours prior to closing	Approval	15.4.3
Condemnation Packages	Prior to TxDOT submission to TTC for a minute order	Approval	15.4.4.1
Updated Appraisals	As requested	Approval	15.4.4.2
Condemnation Support Submittals	Upon approval of condemnation package	For information	15.4.4.2
Photographs of properties/improvements to be demolished	Following acquisition or possession of any parcel and prior to demolition	For information	15.4.5
Documentation for disposal of improvements	Following acquisition or possession of any parcel	For information	15.4.5

Table 15-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notification of abandoned personal property remaining in Project ROW	Following acquisition or possession of any parcel	For information	15.4.5
Notification of completion of demolition and clearance of Project ROW	Upon completion	For information	15.4.5
Payment Submittals	As necessary	Approval	15.4.6

Item 16
Geotechnical & Pavement

16.1 **General Requirements**

DB Contractor shall perform all investigations, testing, research, and analyses 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, retaining walls, embankments, excavations, slopes, temporary special shoring, foundation design for toll gantry and other toll infrastructure if applicable, 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 latest versions of the TxDOT *Geotechnical Manual* and the TxDOT *Pavement Manual*.

DB Contractor shall comply with the TxDOT *Pavement Manual* and this Item 16 for the pavement design and quality acceptance process. Where there is a conflict between the requirements of these documents, the requirements in these Design-Build Specifications shall take precedence.

16.2 **Geotechnical Investigation**

16.2.1 **Geotechnical Investigation for Pavement Design**

DB Contractor shall determine the specific locations, frequency, and scope of all subsurface investigations, testing, research, and analyses necessary to design a safe and reliable pavement foundation for the Project in accordance with TxDOT geotechnical requirements in the TxDOT *Pavement Manual* and this Item 16. DB Contractor shall take all soil borings within and along the proposed roadbed alignment. DB Contractor shall submit boring locations and traffic control plans prior to commencing any subsurface pavement investigations for review and approval. Traffic control plans shall be prepared in accordance with Item 26.

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 with the applicable Design Work.

DB Contractor shall submit the final Geotechnical Engineering Report and the Pavement Design Report to TxDOT for approval with the Released for Construction Documents. Each report shall be signed and sealed by a PE.

16.2.1.1 **Soil Testing Requirements**

DB Contractor shall use the TxDOT *Pavement Manual* and web soil survey maps 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 the proposed untreated subgrade elevation, and sampling shall 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 16-1 to characterize the subgrade soils or borrow material for pavement design:

Table 16-1: Soil Exploration & Testing

Testing	Properties
Dynamic Cone Penetrometer (DCP) (ASTM D6951)	Stiffness, estimated back calculated subgrade modulus
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 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

16.2.1.2 **PVR Requirements for Rigid and Flexible Pavement**

DB Contractor shall design the new pavement to have a PVR no greater than 1.5 inches for main lanes, tolled managed lanes, and ramps and 2.0 inches for frontage roads and cross streets as calculated in accordance with TEX-124-E.

DB Contractor shall calculate PVR using the Excel workbook in Tex-124-E. DB Contractor shall calculate PVR for using a soil column of 8 feet deep as measured from the proposed finished grade (concrete paving and bond breaker may not be used in the soil column calculations, meaning a PI of zero may not be utilized in the soil column calculations, the Tex-124-E spreadsheet must assume the pavement layers within the concrete paving and bond breaker are the same soil values as if starting at the proposed finished grade of subgrade) when assuming dry soil conditions in all layers and use 100.0 percent soil binder (minus No. 40 material) for each layer in Tex-124-E or 16 feet as measured from the proposed finished grade when using in-situ moisture conditions and must test soil and use actual soil binder (minus No. 40 material) for each layer in Tex-124-E in calculation of PVR. In fill situation, assumed soil properties in calculation of PVR by DB Contractor must be verified during construction.

If the PVR of the in-situ conditions or assumed dry 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. A minimum of 6 inches of treated subgrade shall be used for all new or full reconstruction pavements. DB Contractor shall utilize the following mitigation measures which may be used independently or in combination:

- Where chemical soil treatment 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 16.3 shall be used to provide a permanently treated subgrade.
- Undercut, remove and replace expansive soils with select fill subbase.

Adopting mitigation measures does not excuse DB Contractor from meeting Performance Requirements set forth in Section 27.3.

16.2.2 **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.

DB Contractor shall ensure the depth of the test hole is adequate for the anticipated structure foundation type and loading, excavation depths, and scour.

DB Contractor shall ensure that the groundwater monitoring methods and durations are 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:

- The geology of the Project area, including soil and/or rock types, and drainage characteristics.
- 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 RQD for rock cores. TxDOT log form 513 shall be used as required by TxDOT *Geotechnical Manual*.
- 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), and properties in accordance with TxDOT and ASTM geotechnical testing standards. Other field exploration and laboratory testing shall be performed as appropriate.
- A discussion of surface and subsurface site conditions and testing results with reference to specific locations on the Project.
- Design and construction parameters resulting from the geotechnical investigation and analysis.
- 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.
- 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.
- 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 as well as the possibility of rapid drawdown, and specific recommendations shall be provided to minimize their occurrence.
- Evaluation of applicable retaining wall types including design and constructability considerations. Both temporary and permanent retaining walls shall be evaluated. DB Contractor shall ensure the design retaining walls are evaluated in accordance with the TxDOT *Geotechnical Manual* and the associated TxDOT Standards for the wall type considered. Analyses of global stability for each retaining wall shall be performed to ensure the minimum factors of safety for global stability required by the TxDOT *Geotechnical Manual* have been achieved.
- 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.
- 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.
- Plan view of field sampling locations (field test plan), boring logs and other field data, laboratory test results, calculations, and analyses that support design decisions.

The report shall:

- 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.
- Provide design and construction parameters derived from geotechnical investigations for the design of structure foundations, pipes, pavements, slopes, embankments, detention ponds and earth retaining structures
- 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.
- Include Form 2088 as part of flexible pavement design only for determining the appropriate Surface Aggregate Classification (SAC) of the aggregate used for the final HMA riding surface.

Each Geotechnical Engineering Report, upon completion and including any later supplements or amendments shall be submitted to TxDOT for review and comment.

16.3 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. DB Contractor shall conduct all Work in accordance with the requirements of this Item 16 and TxDOT Standard Specifications.

All existing pavement from the beginning and ending limits of proposed pavement reconstruction shall be completely removed or rubblized per TxDOT Special Specifications.

16.3.1 Subgrade Material Composition

DB Contractor shall analyze subgrade material composition and perform necessary construction procedures to address the following subgrade soil limitations.

- **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 *Treatment Guidelines for Soils and Base in Pavement Structures*, web soil survey maps, and Items 260, 265 and 275 of the TxDOT Standard Specifications for testing and detection and integrate applicable procedures with construction practices.
- **Organic Content.** DB Contractor shall evaluate subgrade soils for organic content using Tex-148-E and in accordance with general guidelines given in Chapter 3 of the TxDOT *Pavement Manual*, considering soil variability within the Project limits. If the organic content of the soils is greater than 1%, DB Contractor shall determine the appropriate type and quantity of additives to compensate for these organic levels to obtain minimum subgrade treatment requirements. As a minimum, stabilizer contents shall meet the requirements of Tex-121-E, Part III following a minimum 7-day mellowing period of test samples in the laboratory.
- Density Control. Subgrade layer shall be compacted using density control only.

16.3.2 Treated Subgrade

DB Contractor shall meet the requirements of Tex-121-E, Part I to determine a target lime content to achieve a minimum unconfined compressive strength (UCS) of 50 psi and Part III to verify the target lime content achieves a pH of 12.4. DB Contractor shall meet the requirements of Tex-120-E, Part I to determine a target cement content to achieve a minimum UCS of 50 psi. DB Contractor shall meet the requirements of Tex-127-E to determine a target lime fly ash content. Any subgrade that does not conform to these treatment requirements shall not be included in the pavement design. To use the treated layer as part of the proposed pavement structure DB Contractor shall use the TxDOT *Treatment Guidelines for Soils and Base in Pavement Structures*.

For rigid pavements, the treated subgrade shall extend a minimum 2 feet outside the edge of pavement, including shoulders, on each side to provide a stable area for the paving equipment.

A minimum of 6 inches of treated subgrade shall be used for all new or full reconstruction pavement.

The treated subgrade shall be compacted using density control only.

When swelling soils are present, DB Contractor shall stabilize the moisture conditions in the pavement structure by extending the treated subgrade at least two feet beyond the edge of the pavement on each side for both flexible and rigid pavements.

For fill, at grade, and cut sections, if the proposed structural pavement section exceeds the project PVR requirements in Section 16.2.1.2, then DB Contractor shall stabilize the moisture conditions in the pavement structure by extending the treated subgrade to at least two feet beyond the edge of the pavement on each side.

16.3.3 Treated Base

Treated base may 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 the TxDOT Standard Specification Item 247. Cement treatment (plant-mixed) wet and dry strengths shall meet the strength requirements in Table 16-2. For other stabilizers, DB Contractor shall meet the requirements set forth in the applicable TxDOT Standard Specifications.

When cement is used to treat the base materials, DB Contractor shall determine the target cement content meeting the minimum and maximum UCS and 24-hour submerged strength requirements shown in Table 16-2 when tested in accordance with Tex-120-E, Part I.

Table 16-2: Item 276 of the TxDOT Standard Specifications, Cement Treatment (plant-mixed), Minimum and Maximum Strength Values to be Achieved, 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	No maximum

When lime is used to treat the base materials, DB Contractor shall determine the required lime content using Tex-121-E, Part I to achieve a minimum UCS of 150 psi.

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 Tex-126-E and an approved TxDOT Standard Specification.

For rigid pavements, the treated base shall extend a minimum 2 feet outside the edge of pavement on each side to provide a stable area for the paving equipment.

Treated base layers shall be compacted using density control.

When swelling soils are present, DB Contractor shall stabilize the moisture conditions in the pavement structure by extending the treated base and subbase for at least two feet beyond the edge of pavement on each side.

For fill, at grade, and cut sections, if the proposed structural pavement section exceeds the project PVR requirements in Section 16.2.1.2, then DB Contractor shall stabilize the moisture conditions in the pavement structure by extending the treated base and subbase for at least two feet beyond the edge of pavement on each side.

16.3.4 Tack Coat

For flexible pavements, DB Contractor shall place a non-tracking tack coat (Tracking Resistant Asphalt Interlayer (TRAIL)) between all hot-mix asphalt (HMA) pavement layers and directly beneath the final surface course in accordance with TxDOT Standard Specifications. No tack coat shall be required if HMA pavement is placed 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 CQCM. Tack coat shall meet the requirements

of TxDOT Standard Specification Item 300. TRAIL material used on the Project must be a pre-approved product from the TxDOT Material Producer List.

16.3.5 **Surface Mix Type**

Where flexible pavement structures are used, the surface mix for mainlanes, ramps, direct connectors, and Managed Lanes shall be SMA (except SMA-F), meeting TxDOT Standard Specification Item 346. The minimum compacted thickness of this layer shall be 1.5 inches. SMA-F and TOM meeting Items 346 and 347 of the TxDOT Standard Specifications shall only be used as an overlay over existing pavement that is in good condition. SMA-F and TOM shall not be used for mainlanes, ramps, direct connectors, and Managed Lanes.

DB Contractor shall obtain components for the surface mix material from a vendor listed at http://www.txdot.gov/business/resources/producer-list.html.

The performance-graded asphalt binder in the asphalt mixture directly beneath the surface mixture shall have the same high temperature performance grade as the asphalt surface layer.

No binder substitution is allowed for the final riding surface mix.

16.3.6 **Underseal**

DB Contractor shall place a one course surface treatment as an underseal directly on top of any untreated or treated base layer and prior to all HMA concrete overlays. A prime coat complying with Item 310 of the TxDOT Standard Specifications may be applied to any untreated or treated base layer as an alternative underseal for new HMA paving.

16.3.7 **Final Surface**

When HMA is used, level up shall not be considered part of the final surface course thickness.

16.4 **Design**

16.4.1 **New Pavement**

16.4.1.1 **Design Traffic Considerations**

The corridor traffic data has been provided in the RID traffic data folder and shall be deemed a minimum acceptable traffic volume and composition to be used by DB Contractor for the purpose of pavement design for the mainlanes and ramps. The minimum ESAL values to be used for the I-35E mainlane, Managed Lanes, and ramp pavement design is 116,997,000. The minimum ESAL value to be used for the frontage road and city streets pavement design shall be proportional to the mainlane pavement ESAL by comparing mainlane and frontage road traffic volumes. DB Contractor shall not be entitled to rely on the corridor traffic data in the RID for the purpose of meeting the Performance Requirements of these Design-Build Specifications 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.

16.4.1.2 **Subgrade Considerations**

For flexible pavement, DB Contractor shall be responsible for determining the design back calculated modulus value for subgrade using testing as desired. DB Contractor shall obtain TxDOT's approval of the method prior to commencement of construction.

For rigid pavement, DB Contractor will select the subgrade classification of "CH" for the input in the design program unless otherwise approved by TxDOT. The subgrade K value for the inputted subgrade classification is hard-coded in the design program.

The IQF shall ensure the Final Design subgrade for the flexible pavement is achieved during construction using methods in Section 16.5.

16.4.1.3 **Pavement Type Requirement**

All new full reconstruction pavement shall be a rigid pavement design consisting of continuously reinforced concrete paving.

The following requirements shall be incorporated into the final pavement design:

16.4.1.3.1 **Main Lanes**

The mainlane and Managed Lanes shall have the same pavement sections (materials and depths including treated subgrade) and be consistent throughout the I-35E Project limits.

16.4.1.3.2 **Ramps**

Ramp pavements shall be constructed with the same pavement section (materials and depths including treated subgrade) as the adjacent main lane pavement.

16.4.1.3.3 **Frontage Roads and U-turns**

The frontage road pavement section (materials and depths including treated subgrade) shall be consistent from major cross street to major cross street.

16.4.1.3.4 **Cross Streets**

Cross street pavement sections shall be a rigid pavement design per TxDOT Pavement Manual consisting of continuously reinforced concrete paving. The pavement section of the cross streets may be designed for cross street specific traffic volumes, but the traffic volumes for cross streets pavement section design shall not be less than the connecting frontage road's traffic volumes.

16.4.1.3.5 **Toll Zones**

The toll zones pavement section at each toll zone shall be the same section (materials and depths, including treated subgrade) as the mainlanes and Managed Lanes and be consistent throughout the I-35E Project limits. In addition, all pavement reinforcement within the toll zone shall be epoxy coated or Glass Fiber Reinforced Polymer (GFRP) reinforcement and no construction joints shall be allowed within the toll zone pavement area and crossing pavement loops. The locations of the longitudinal and transverse expansion joints shall be coordinated with the system integrator to ensure conflicts do not exist with the loop pavement sensors in the toll zones.

16.4.1.3.6 **Shoulders**

Pavement for the shoulders of all roadways shall be the same section (materials and depths including treated subgrade) as the adjacent roadway pavement and be consistent throughout the I-35E Project limits.

16.4.1.4 **Required Pavement Design Reports**

The pavement designs developed by DB Contractor shall be signed and sealed by a PE.

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:

- Pavement design details by location, including structural layer materials, general specifications, and thicknesses;
- Basic life-cycle cost considerations as described in Chapter 2 of the TxDOT *Pavement Manual*. Use an LCCA tool that allows for input of essential cost items; at a minimum consider future maintenance, resurfacing, reconstruction and other rehabilitation measures, describing what these activities are likely to entail. Do not include user costs.
- Relevant pavement evaluation data (structural and functional) and condition information on adjacent roads;
- Site conditions which might influence the design and performance of pavements;
- Relevant geotechnical data and drainage requirements, including boring logs, laboratory soil test results, and active or passive drainage system design;
- Design criteria used in determining the pavement design(s), including traffic loads, pavement material characterization, environmental conditions, and pavement design life; and
- Other considerations used in developing the pavement design(s), including subgrade preparations and stabilization procedures.

- Description for selection of material types and grades.

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 Design and shall indicate the applicable roadway and station limits for each pavement design.

16.4.1.5 **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.

16.4.1.5.1 **Minimum Layer Thickness**

Minimum layer thickness for all unbound materials used in flexible pavement designs shall be 6 inches.

16.4.1.5.2 **Pavement Design Life**

DB Contractor shall use 30 years for flexible pavement types.

16.4.1.5.3 **Minimum time to first overlay**

DB Contractor shall use 15 years for main lane design and ramps, and 12 years for all other lanes.

16.4.1.5.4 **Reliability Level**

DB Contractor shall use Level C (95%) for flexible pavement designs.

16.4.1.5.5 **Design Moduli**

Design moduli shall not exceed the maximum values in Table 16-3, as established from methods and criteria stated below, and in accordance with layer thickness specified in Table 16-3.

Table 16-3: Design Structural Values for HMA Pavements

Material Type	TxDOT Standard Specifications	Modulus for TxDOT FPS 21
Dense-Graded HMA	Special Specification (SS) 3076	Combined HMA thickness: ≤ 4.0" use 500 ksi > 4.0" use 650 ksi
PFC	Item 342	300 ksi
Superpave Mixtures	SS 3077	Combined HMA thickness: ≤ 4.0" use 650 ksi 4.0" < T ≤ 6.0" use 750 ksi > 6.0" use 850 ksi
SMA	Item 346	Same as SS 3077
TOM	Item 347	Same as SS 3077 (maximum thickness of 1.0")
Thin Bonded Friction Courses	Item 348	Same as SS 3077
Flexible Base (Unbound Base)	Item 247, Grades 1-2 or 5	*70 ksi (no more than 4X the untreated subgrade modulus)
Treated Base	Item 275	*150 ksi.
	Item 276	*150 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.

16.4.1.6 **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. TxCRCP-ME is the required design procedure for CRCP. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 8, and the applicable TxDOT Standard Specifications for joint and reinforcement design. CRCP design will require a maximum of 10 punch outs per mile. DB Contractor shall select one of the two base layer combinations in the TxDOT *Pavement Manual*, Chapter 8.

DB Contractor shall comply with the requirements in Item 29 for the pavement design at Toll Zones.

Pavement Design Life:

- DB Contractor shall use a 30-year pavement design life for all rigid pavement types and locations.
- Design Inputs in Table 16-4 shall be used for CRCP design: using the TxCRCP-ME design procedure.

Table 16-4: CRCP Design Inputs

Rigid Pavement Input Criteria	Input Value
Design Life (year)	30 years
Number of Punchouts per Mile	10 per mile
Design Traffic	I-35E Mainlanes: 116,997,000
Thickness of Concrete Layer (in)	½ inch increments
28-Day Modulus of Rupture (psi)	570 psi
Soil Classification of Subgrade	CH
Base Layer Selection	HMA or CTB
Base Thickness (in)	4 inches for HMA or 1 inch HMA over 6 inches of cement treated base with Item 276 Class L
Modulus of Base Layer (ksi)	400 ksi for HMA
	500 ksi for CTB

The maximum concrete pavement thickness of 13 inches as specified in TxDOT Pavement Manual, may be increased at the option of the DB Contractor. The DB Contractor must meet the performance requirements prescribed in the CMA regardless of the concrete pavement thickness.

16.4.2 **Existing Pavement Areas**

The Project includes areas of pavement, the maximum extents of which are shown on the Schematic Design within which DB Contractor may:

- Retain the full depth of the existing pavement structural section in place at Substantial Completion; and
- Retain the existing surfacing course (if any) in place as the surfacing course at Substantial Completion (even if the existing surfacing course does not meet the smoothness requirements set forth in Section 16.5.2) provided that:
    - All pavement within the Existing Pavement Areas continues to meet the Performance Requirements in Attachment 27-1 (Baseline Performance and Measurement Table During Construction)
    - The existing pavement structure has not been damaged by the Construction Work.

If either of the conditions above is not met, DB Contractor shall repair any damage and shall perform rehabilitation to restore the pavement within Existing Pavement Areas to meet or exceed the requirements in Item 27.

16.4.3 **Reserved**

16.4.4 **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.

16.4.5 **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. DB Contractor's pavement design of the widened section shall match the existing section, including treated subgrade, treated base, pavement materials and pavement structure thickness.

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 6 inches from the final in-service lane stripe or the center of the lane.

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.

The existing pavement structure to remain in placed shall not be damaged by the Construction Work. Prior to Substantial Completion, full depth concrete repair shall be completed on the existing pavement as needed per Item 27, "Maintenance."

16.5 Construction Quality

The IQF shall perform independent material testing, inspection, and audits of the CQMP.

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 Item 13 and Item 14. For those occurrences involving TxDOT's structures and Utilities, DB Contractor shall coordinate excavation activities with TxDOT.

All testing required in the TxDOT Standard Specifications and the Guide Schedule of Sampling and Testing for DB Projects by the IQF (DB Guide Schedule) shall be conducted for each pavement layer, except where superseded by these Design-Build Specifications. DB Contractor shall also ensure that the design assumptions are met by the testing requirements described in this Section 16.5.

16.5.1 RESERVED

16.5.2 Smoothness Specification

Smoothness of the pavement constructed shall conform to the requirements of Item 585 of the TxDOT Standard Specifications, 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. IRI values will be calculated using the average of both wheel paths using Department software. A Construction Deficiency Report (CDR) and a 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 localized roughness. After making corrections, profile the pavement section to ensure that corrections have achieved the required level of smoothness. It is recommended to conduct profiler measurements when an HMA layer is directly below the final surface to identify need for corrective action prior to final HMA lift in order to obtain desired IRI on final surface.

When diamond grinding is used on concrete pavements, ensure thickness and clear cover requirements are met in conjunction with corresponding specification. For asphalt concrete pavements, diamond grinding to correct IRI will not be allowed.

Article 585.4 Measurement and Payment. The entire section is voided.

All travel lanes constructed within the project limits and areas identified as travel lanes in the facility's ultimate configuration shall be tested in accordance with TxDOT Standard Specifications as travel lanes.

16.6 Uniformity of Support Layers

For both rigid and flexible pavements, DB Contractor shall collect FWD data for information about both the adequacy and uniformity of support layers. FWD testing shall be performed on the outside wheel paths and the data shall be stored in raw format (.FWD files), including GPS coordinates for each drop. DB Contractor shall provide the FWD data in the required format to TxDOT within 48 hours of test completion.

For rigid pavements, FWD testing shall be conducted on top of the asphalt base or asphalt bond breaker, 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 treated 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 shall conform to TxDOT Standard Specifications as described in the TxDOT Pavement Manual (seven sensors at 1-foot spacing). The test load shall be as close as possible to 9000 pounds

After collecting FWD data the IQF shall have a licensed professional engineer review the data to evaluate the results. IQF will report to DB Contractor any areas which need to be re-evaluated based on FWD results and discuss a path forward with TxDOT.

16.7 Submittals

All Submittals described in this Item 16 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 16-4. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 16-4: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Boring plan and traffic control plans associated with subsurface pavement investigations	Prior to performing any investigations	Approval	16.2.1
Preliminary Geotechnical Engineering Reports	With applicable design submittals	Review and comment	16.2.1, 16.2.2
Final Geotechnical Engineering Report	With RFC Documents	Approval	16.2.1, 16.2.2
Preliminary Pavement Design Reports	Prior to inclusion of pavement section in the design submittals	Review and comment	16.2.1, 16.4.1.4
Final Pavement Design Report	With RFC Documents	Approval	16.2.1, 16.4.1.4
FWD data	As part of the daily QC inspection and test reports described is the TxDOT QAP for DB Projects and upon TxDOT request	For information	16.6

Item 17
Land Surveying

17.1 **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 as required to complete its Work. DB Contractor is responsible for the precision, accuracy, and comprehensiveness of all survey and mapping.

17.2 **Administrative Requirements**

17.2.1 **Standards**

DB Contractor shall ensure that all surveying conforms to the TxDOT *Survey Manual,* and the *General Rules of Procedures and Practices* of the TBPELS. DB Contractor shall ensure that any person in charge of a survey field party is proficient in the technical aspects of surveying.

17.2.2 **ROE**

DB Contractor shall secure written permission from the property owner prior to entering any private property outside the Project ROW. It shall be DB Contractor's sole responsibility to negotiate and obtain this permission and DB Contractor shall be responsible for any and all damages and claims resulting from that ingress. DB Contractor shall maintain proper documentation of ROE maintained at all times.

17.2.3 **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 adjoining project regarding planned construction activities. DB Contractor shall notify TxDOT within two Business Days if TxDOT stakes and marks are altered or disturbed.

17.3 **Design Requirements**

17.3.1 **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 CORS vertical control and local monumentation. DB Contractor shall verify owner provided survey control.

DB Contractor shall establish and maintain additional survey control, as needed, and Project ROW monumentation throughout the Term. 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 *Survey Manual* and shall utilize the primary survey control provided by TxDOT.

DB Contractor shall establish and maintain a permanent survey control network. The control network should consist of, at a minimum, monuments set in indivisible 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 during execution of the Work. 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.

17.3.2 **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 Tables 17-1 and 17-2.

17.3.2.1 Horizontal Accuracy Requirements for Conventional Surveys

Horizontal control is to be established (at a minimum) according to the appropriate level of survey as defined below in Table 17-1.

Table 17-1: Horizontal Accuracy Requirements

	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 to be based on the following source: Grid bearing of the Texas Coordinate System of 1983, with the proper zone and epoch specified.

17.3.2.2 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 17-2.

Table 17-2: Vertical Accuracy Requirements

	First Order	Second Order	Third 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	

17.3.3 **ROW Surveys**

DB Contractor shall base all surveys on the horizontal and vertical control network provided by TxDOT.

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. DB Contractor shall provide two sets of all mapping to the TxDOT District office surveyors. DB Contractor shall provide the mapping 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.

In preparing the property description, the following will be required:

- Scanned copies of the deeds on USB flash drive and a graphics file of the abstract map; and
- 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 Preliminary ROW layout to determine if there are any changes to the proposed ROW; and
- An initial copy of the ROW map for review purposes.

17.3.3.1 **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 17-3.

Table 17-3: 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 seconds	15 seconds	Sin α = denominator in error of closure divided into 1 (approximate)
Linear Distance Accuracy	0.1 foot per 1,000 feet	0.05 foot per 1,000 feet	Sin α x 1000 (approximate) where $\pm$ = 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	

NOTE: * TxDOT policy requires all bearings or angles to be based on the following source: Grid bearing of the Texas Coordinate System of 1983, with the proper zone and epoch specified.

17.3.4 **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. The report shall provide control from adjoining, incorporated, or crossed roadway projects that are currently in design, and show a comparison of the horizontal and vertical values. 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 by DB Contractor 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.

17.3.5 **Units**

All survey Work shall be performed in the U.S customary units system of measurement. Work shall conform to Texas State Plane Coordinate System, North American Datum of 1983 (NAD83) U.S. Survey Feet, North Central Zone (4202) Epoch 2012. The surface adjustment factor for the Project is 1.000136506.

17.4 **Construction Requirements**

17.4.1 **Survey Records**

DB Contractor shall deliver to TxDOT 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 prior to Final Acceptance.

17.4.2 **Construction Surveys**

DB Contractor shall perform all construction surveys in accordance with the design requirements set forth in the Contract Documents.

17.4.3 **Reserved.**

17.4.4 **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 TBPELS, all significant points along all ROW lines of the Project including the following:

- PCs;
- PTs;
- PIs;
- PCCs;
- PRCs;
- All intersecting crossroad ROW lines and all property line intersections with the ROW line. These monuments shall be 1/2-inch iron rods, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument); and
- All beginning and ending points of control of access (denied) lines.

DB Contractor shall ensure that 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 the TxDOT ROW Manuals and the TxDOT *Survey Manual*). 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 1/2-inch iron rod with a TxDOT aluminum cap (rod-and-cap monument). DB Contractor shall ensure that the ROW monuments shall be set by a survey crew working under the direction of a RPLS, licensed to practice in Texas.

DB Contractor shall purchase all materials, supplies, and other items necessary for proper survey monumentation.

DB Contractor shall submit updated maps with the ROW monumentation information. (This is for final monumentation set, for example, type II, and type of monuments set, etc.) DB Contractor shall add all deed recording information to the map sheets in the ownership blocks on the map sheets.

17.4.5 **Record Documents**

DB Contractor shall submit the following as part of the Record Documents and as a condition of Final Acceptance:

- A listing of all primary and secondary control coordinate values, original computations and other records, including GPS observations and analysis made by DB Contractor;
- Copies of all survey control network measurements, computations, unadjusted and adjusted coordinates, and evaluation values;
- Survey records and survey reports;
- Parcels for the ROW maps in GPK format;
- Electronic files and paper copies of the ROW maps; and
- The final ROW maps 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) for all existing and revised parcels shall be submitted in ArcGIS 10 format or the version in use by the TxDOT at the time of the submittal, 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 as part of the Record Documents as a condition of Final Acceptance. 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.

17.5 **Submittals**

All Submittals described in this Item 17 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 17-4. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 17-4: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
ROE documentation	Upon request	For information	17.2.2
Verification of owner provided survey control	After NTP2	For information	17.3.1
Interim mapping products	Prior to signing Final ROW maps	Review and comment	17.3.3
A horizontal and vertical control report	Upon request	For information	17.3.4
Survey records and reports	Upon request	For information	17.3.4
Copies of all field notebooks	Upon request	For information	17.3.4
Survey records as listed in Section 17.4.1	Prior to Final Acceptance	For information	17.4.1
Updated mapping with any ROW monumentation information	Upon completion of the ROW acquisition and all Construction Work	For information	17.4.4
Record Documents	As a condition of Final Acceptance	For information	17.4.5

Item 18
Grading

18.1 **General Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for 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 Item18 and TxDOT Standard Specifications.

DB Contractor shall comply with the requirements in Item 29 to ensure that no features are abandoned in place within a Toll Zone pavement area (i.e. areas reserved for loop detection systems).

18.2 **Preparation within Project Limits**

DB Contractor shall develop, implement, and maintain, for the Term, a Demolition and Abandonment Plan that considers types and sizes of Utilities and structures that will be abandoned during the Term. The plan shall ensure that said structures are structurally sound after the abandonment procedure. The plan shall be submitted to TxDOT for approval prior to NTP2.

DB Contractor shall demolish or abandon in place, all existing structures within the Project ROW no longer required for service, including, but not limited to: pavements, bridges, and headwalls. Any features that are abandoned in place shall be removed to an elevation at least the lower of 2 feet below the final finished grade or 1 foot below the pavement subgrade and drainage structures. DB Contractor shall ensure that abandoned structures are structurally sound after abandonment.

All existing pavement from the beginning and ending limits of proposed pavement reconstruction shall be completely removed or rubblized per TxDOT Special Specifications.

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 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.

The existing maintenance area located within the Project limits along the southbound mainlanes north and south of Morgan Pkwy contains existing barrier DB Contractor may use for temporary construction at their discretion. After Substantial Completion, DB Contractor shall remove all existing barrier, clean and provide grass vegetation over the area.

18.3 **Slopes and Topsoil**

DB Contractor shall follow TxDOT *Roadway Design Manual* regarding design limitations and roadside safety guidelines associated with the design of slopes along roadways.

DB Contractor shall perform finished grading and place topsoil to an adequate 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. DB Contractor shall provide stable slopes.

All grading performed within a Toll Zone shall be in accordance with the requirements of Item 29 and shall ensure positive drainage at all Toll Zones and ETCS Elements.

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 prior Final Design Submittal. DB Contractor shall pave slopes steeper than or equal to 2:1 with concrete riprap.

Slopes that are to remain unpaved must accommodate mower access from the frontage road. Where access for mowing and maintenance operations cannot be provided from the frontage road, slopes must be paved with concrete riprap unless DB Contractor receives prior approval from TxDOT for an alternative access point. DB Contractor shall pave areas less than 2-foot in width, shaded areas below structures where vegetation is not easily established, and areas below structures with less than 10-foot vertical clearance with concrete rip rap.

18.4 **Sodding**

All unpaved areas and areas not covered by permanent structures shall be sodded. DB Contractor shall establish and maintain all erosion and sediment controls in accordance with the approved SW3P, and the condition of the erosion and sediment controls shall be in good working order throughout construction of the Project. DB Contractor shall stabilize disturbed areas on which construction activities have ceased temporarily or permanently, within 14 days unless they are scheduled to resume construction within 21 days. The areas adjacent to creeks and drainage ways have priority followed by devices protecting storm sewer inlets.

18.5 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 18 in accordance with the requirements of this Item 18 and the TxDOT Standard Specifications.

18.6 **Submittals**

All Submittals described in this Item 18 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 18-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 18-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Demolition and Abandonment Plan	Prior to NTP2	Approval	18.2
Slope stability analysis	Prior to Final Design Submittal	Approval	18.3

Item 19
Roadways

19.1 **General Requirements**

DB Contractor shall coordinate roadway design, construction, and maintenance with other elements of the Project to achieve the Project objectives. Project objectives include the provision of a safe, reliable, cost-effective, and aesthetically-pleasing corridor for the traveling public. The requirements contained in this Item 19 provide the framework for the design and construction of the roadway improvements to help attain the Project objectives.

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 acquisition services that are necessitated by proposed changes in accordance with the Contract Documents.

19.1.1 **Lead Roadway Design Engineer**

DB Contractor shall employ a Lead Roadway Design Engineer responsible for ensuring the design of the roadway is completed and design criteria requirements are met. The Lead Roadway Design Engineer shall be a PE and be responsible for coordinating interdisciplinary design reviews in cooperation with leaders of other disciplines. The Lead Roadway Design Engineer or a PE reporting directly to the Lead Roadway Design Engineer shall be the engineer of record for the design of the roadway elements.

19.2 **Design Requirements**

DB Contractor shall complete the design of the Project roadways in accordance with the Schematic Design. Deviations from the Schematic Design shall be requested in accordance with Section 5.2.2.2.1 of the General Conditions.

DB Contractor shall design roadways to be consistent with the design of all other Elements 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*.

DB Contractor shall design all Elements in accordance with the TxDOT *Roadway Design Manual,* AASHTO and TxDOT's policies, TxDOT Engineering Standard Sheets, applicable design criteria, and Good Industry Practice based on the Design Speeds as shown in the Contract Documents.

DB Contractor shall design the Project roadways to incorporate roadway appurtenances, including but not limited to fences, barriers, and hazard protections as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

All roadside safety devices and barrier systems used on the Project shall meet current crash test criteria as specified in the AASHTO *Manual for Assessing Safety Hardware (MASH)*, TxDOT *Bridge Railing Manual*, and other safety requirements and in accordance with TxDOT Engineering Standard Sheets. Metal beam guard fence (MBGF) should only be used as protection end treatments for concrete barriers, and shall not be used as the primary barrier system.

DB Contractor shall design the lengths of auxiliary lane, speed change lane and taper for ramps and direct connectors when merging into the general purpose lanes that meet or exceed the lengths shown in the Schematic Design.

19.2.1 **Control of Access**

Unless identified in and shown to be denied in the Schematic Design, DB Contractor shall maintain all existing property accesses, including those not shown on the Schematic Design, and shall not revise control of access without TxDOT review and the written agreement of the affected property owner. DB Contractor shall design new and revised exit and entrance ramps to meet the desirable spacing requirements between

ramps and driveways, side streets, or cross streets listed in TxDOT *Roadway Design Manual* and TxDOT *Access Management Manual*. In locations where the desirable spacing cannot be achieved, channelization methods shall be implemented per TxDOT *Roadway Design Manual* and TxDOT *Access Management Manual*.

DB Contractor shall coordinate with landowner when tying-in to private property; shall replace necessary signs, mailboxes, fences, and landscape features; and shall coordinate all access.

19.2.2 Design Criteria

19.2.2.1 Design Speeds

DB Contractor shall design the elements of the Project to meet or exceed the design criteria shown in Table 19-1 (Design Speeds).

Table 19-1: Design Speeds

Roadway	Roadway Classification	Design Speed
I-35E General Purpose Lane	Urban Freeway	60 MPH
I-35E Managed Lanes	Urban Freeway	60 MPH
I-35E General Purpose Lanes NBGP STA 734+02 to STA 768+98 and SBGP STA 734+02 to STA 769+10	Urban Freeway	50 MPH
I-35E Managed Lanes STA 734+02 to STA 768+23	Urban Freeway	50 MPH
Direct Connectors	Urban Freeway	50 MPH
Collector Distributers	Urban Freeway	50 MPH
Ramps	Urban Freeway	40 MPH
Frontage Roads	Urban Arterial	40 MPH
Cross Streets	Urban Arterial	30 MPH
U-turns	Urban Arterial	15 MPH

19.2.2.2 Geometric Design Criteria

DB Contractor shall design the elements of the Project to meet or exceed the geometric design criteria in Table 19-2 (Geometric Design Criteria), in order to meet the Project objectives.

Table 19-2: Geometric Design Criteria

Item [1]	I-35E General Purpose Lanes	I-35E Managed Lanes	I-35E Managed Lane Ramps Connecting to Collector Distributors	I-35E Managed Lane Ramps Connecting to Frontage Roads	Collector Distributors	Direct Connectors	Ramps	Frontage Roads [10]	Cross Streets[9][11]	U-turn
Roadway Classification	Urban Freeway	Urban Freeway	Urban Freeway Ramp	Urban Freeway Ramp	Urban Freeway Ramp	Urban Freeway Ramp	Urban Freeway Ramp	Urban Arterial	Various	Urban Arterial
Type of Facility	High-Speed	High-Speed	High-Speed	High-Speed	High-Speed	High-Speed	High-Speed	Low-Speed	Low-Speed	Low-Speed
Design Speed (mph)	60 mph	60 mph	50 mph	40 mph	50 mph	50 mph	40 mph	40 mph	30 mph	15 mph
Horizontal Alignment										
Stopping Sight Distance (ft)	570	570	425	305	425	425	305	305	200	80
Min Radius NC (w/o superelevation)	11100	11100	7870	5230	7870	7870	5230	762	333	50
Min Radius RC	8060	8060	5700	3770	5700	5700	3770	593	273	44
Superelevation Rate (%)	e(Max) = 6%	e(Max) = 6%	e(Max) = 6%	e(Max) = 6%	e(Max) = 6%	e(Max) = 6%	e(Max) = 6%	e(Max) = 4%	e(Max) = 4%	e(Max)=4%
Relative Grade for Super Transition	0.45% Relative Gradient	0.45% Relative Gradient	0.50% Relative Gradient	0.58% Relative Gradient	0.50% Relative Gradient	0.50% Relative Gradient	0.58% Relative Gradient	0.58% Relative Gradient	0.66% Relative Gradient	0.78% Relative Gradient
Vertical Alignment										
Type of Terrian	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
Longitudinal Gradient **[2]**	0.50% Min 3% Max	0.50% Min 3% Max	0.50% Min 5% Max	0.50% Min 6% Max	0.50% Min 5% Max	0.50% Min 5% Max	0.50% Min 6% Max	0.35% Min 7% Max	0.35% Min 7% Max	0.35% Min 7% Max
K Value for Crest Curves, Min	151	151	84	44	84	84	44	44	19	3
K Value for Sag Curves, Min **[12]**	136	136	96	64	96	96	64	64	37	10
Grade Change without a Vertical Curve	0.50 % Max	0.50 % Max	0.50 % Max	1.0 % Max	0.50 % Max	0.50 % Max	1.0 % Max	1.0 % Max	1.0 % Max	1.0% Max
Vertical Clearance										
Over Roadways	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 16'-6"	Roadway: 18'-6" over I-35E General Purpose and Managed Lanes, 16'-6" else	Roadway: 16'-6"
Under Roadways	Roadway: 18'-6"	Roadway: 18'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"	Roadway: 16'-6"
Over Railroads	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"
Cross Sectional Elements										
Normal Cross Slope	2.5%	2.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Width of Travel Lanes **[3]**	12'	12'	1-lane:14', 2-lane: 24'	1-lane:14', 2-lane: 24'	12'	1-lane:14', 2-lane: 24'	1-lane:14', 2-lane: 24'	11' Min 14' Outside Shared Use	11' Min, and as shown on Schematic Design	20' Min
Shoulder Width **[4] [13]**										
Inside	10'	4'	2' Rdwy, 4' Str	2' Rdwy, 4' Str	2-lane:4', 3-lane or more:10'	2' Rdwy, 4' Str	2' Rdwy, 4' Str	N/A	N/A	N/A
Outside	10'	10'	8'	8'	2-lane:10', 3-lane or more:10'	8'	6' Min, 8' Des	N/A	N/A	N/A
Width of Speed Change Lane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10' Min	10' Min	N/A
Offset to Face of Curb	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1' Min, 2' Des	1' Min, 2' Des	1' Min; 2' Des
Clear Zone Width	30'	30'	16'	16'	16'	16'	16'	Curb: 4' Min, 6' Des Curb: 6' from face of column Min Uncurbed: 10'	Curb: 4' Min, Curb: 6' from face of column Min Uncurbed: 10'	Curb: 4' Min, Curb: 6' from face of column Min Uncurbed: 10'
Railroad Overpass Horizontal Clearance **[5]**	25' Min	25' Min	25' Min	25' Min	25' Min	25' Min	25' Min	25' Min	25' Min	25' Min
Side Slopes										
Within Clear Zone	4:1 Max	4:1 Max	4:1Max	4:1Max	4:1Max	4:1Max	4:1 Max	4:1 Max	4:1 Max	4:1 Max
Outside Clear Zone	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max
Through guard rail	10:1 Max	N/A	N/A	N/A	10:1 Max	10:1 Max	10:1 Max	10:1 Max	10:1 Max	10:1 Max
Sidewalk Width **[6]**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5' Min (with 4' to 6' buffer) 6' Min (Adjacent to Curb)	5' Min (with 4' to 6' buffer) 6' Min (Adjacent to Curb) 8' (Along cross streets between prop FR Rds.)	N/A
Border Width **[10]**	15' Min, 20' Des	15' Min, 20' Des	N/A	N/A	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	N/A
Intersections [7]										
Major Cross Streets Radii Design Vehichles	N/A	N/A	N/A	N/A	N/A	N/A	N/A	WB-62	WB-62	WB-62
Minor Cross Streets Radii Design Vehicles	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P	P	N/A
Driveways Corner Radii **[8]**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15' Min Residental, 25' - 30' Min Commercial	15' Min Residental, 25' - 30' Min Commercial	N/A
Intersection Sight Distance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Intersection sight distance to be determined by the various cases shown in AASHTO.		

Notes:
[1] References: TxDOT Roadway Design Manual (July 2020); AASHTO A Policy on Geometric Design of Highways and Streets (2004).(December 2012); TxDOT Bridge Project Development Manual (December 2012); AASHTO HOV Manual (2004); AASHTO A Policy on Geometric Design of Highways and Roadways (2011); AASHTO Guide for the Development of Bicycle Facilities (2012).
[2] Per AASHTO, ramp upgrades for design speed of 40 mph should be limited to 6 percent.
[3] If dedicated bicycle lanes are utilized in lieu of shared-use lanes, the bike lane should provide 5 ft clear from face of curb to the nearest travel lane according to AASHTO Guide for the Development of Bicycle Facilities. The 14-foot outside share use lane is measured from the longitudinal joint of the gutter pan to lane stripe. The gutter pan/curb offset is not included as part of the usable width.
[4] On mainlane ramps, if sight distance restrictions are present due to horizontal curvature, the shoulder width on the inside of the curve may be increased to 8 ft and the shoulder width on the outside of the curve decreased to 2 ft (RDWY) or 4 ft (STR).
[5] Railroad overpass horizontal clearance is measured from the centerline of tracks to face of column or other obstruction. Horizontal clearances less than 25 ft require pier protection or crash wall. DART requires a minimum of 6-foot crash wall along columns immediate adjacent to existing and future railroad track regardless of meeting minimum horizontal clearance requirement as shown in DART Preliminary Exhibit A.
[6] Sidewalk designs including street and driveway crossing should be ADA compliant.
[7] Criteria are minimum guidelines. Intersection design should be based on expected driver/vehicle usage, constraints, and geometrics.
[8] Driveway Corner Radii shall not be less than the existing radii.
[9] Proposed sidewalk width along all cross streets crossing I-35E between the proposed frontage road shall be designed to a minimum of 8 ft. See TxDOT Schematic Design.
[10] Border width less than the minimum requirement of 15 feet will be allowed only at locations shown on TxDOT Schematic Design,
[11] Cross slope may be transitioned using less than 2% at intersections.
[12] Comfort control criteria for sag curve would be allowed for vertical curve with continuous lighting condition only when it is approved by TxDOT.
[13] 4' buffer space required as shown on schematic between barrier separated mainlanes and managed lanes to accommodate overhead sign structures and bridge columns within buffer space without encroaching on required shoulder widths. Required 4' inside shoulder width for managed lanes may be reduced to 2' minimum at localized locations to accommodate overhead sign structures.
[14] Design Speed shall be 50 MPH for the I-35E General Purpose Lanes NBGP STA 734+02 to STA 768+98, SBGP STA 734+02 to STA 769+10 and I-35E Managed Lanes STA 734+02 to STA 768+23.

19.2.2.3 **Reserved**

19.2.2.4 **Superelevation**

In areas where proposed roadways and ramps are to connect to existing pavement, DB Contractor's design may retain existing superelevation if appropriate. 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 longitudinal grades flatter than 0.10%.

When existing pavement is being widened, the DB Contractor shall design to prevent hydroplaning.

19.2.3 **Miscellaneous Design Requirements**

The border width, measured from back of curb, along frontage roads and crossing streets shall be 15 feet minimum unless shown otherwise on the Schematic Design.

DB contractor shall design and construct BG-11 barrier gate per TxDOT Special Specification 5052 at the mid-point between Managed Lane access points in both northbound and southbound directions, as described further in Item 25 for the I-35E Managed Lanes to allow emergency vehicles access.

Precast traffic barrier shall not be used as permanent barrier throughout the Project limit.

19.2.3.1 **Driveways**

DB Contractor shall design driveways to be functionally adequate for existing land use of adjoining property and permits approved prior to the Effective Date. This shall be in accordance with the guidelines specified in TxDOT *Roadway Design Manual* – Appendix C, "Driveways Design Guidelines," provisions of which will be requirements for use on this Project. DB Contractor shall design driveways to utilize consistent pavement to the existing driveway pavement, except for unpaved existing driveways which shall accommodate the applicable land use. DB Contractor shall remove and replace all existing driveways within the pavement reconstruction limits at a minimum to the ROW line or further to meet TxDOT design standards.

19.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 19 in accordance with the requirements of this Item 19 and TxDOT Standard Specifications.

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Item 20
Drainage

20.1 General Requirements

In the design of the drainage facilities, DB Contractor shall account for all sources of runoff that may reach the Project, whether originating within or outside the Project ROW.

DB Contractor shall design the Project, including all drainage facilities, such that the revised or newly constructed drainage system will not increase flooding to properties outside the Project ROW. If existing drainage patterns or flows are revised during the Project design, DB Contractor shall design and construct a solution that does not have adverse impacts to property owners outside the Project ROW. Adverse impacts for the purposes of this Item 20 are defined as impacts that have the potential to increase risk to health and human safety, cause or exacerbate flooding of developed structures, or increase water surface elevations on undeveloped properties.

DB Contractor's drainage design shall include assessments of pre- and post-construction conditions, as well as assessments of 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. DB Contractor shall obtain the appropriate drainage easement at its own cost if easement is deemed necessary and has not previously been obtained by TxDOT. Grading activities and drainage structures needed outside of the Project ROW require a construction or perpetual easement as appropriate.

DB Contractor shall meet the requirements specified in this Item 20 along with the requirements of the TxDOT *Hydraulic Design Manual*.

DB Contractor shall ensure that any drains or grates which are located within Toll Zone pavement are installed in accordance with Item 29 and shall not interfere with loop detection systems in the Toll Zone pavement.

DB Contract shall provide adequate drainage at Toll Zone maintenance driveways and shall design all equipment pads located within a Toll Zone to the same hydraulic requirements as the mainlanes.

DB Contractor shall clean all closed drainage systems for the Project no sooner than two months prior to the Final Acceptance date. DB Contractor shall provide camera video to TxDOT to show that all closed drainage systems are clean and clear of debris and settlement.

20.2 Administrative Requirements

20.2.1 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 20.2.1.

DB Contractor shall collect all applicable 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; in FEMA mapped floodplains; and official documents concerning the Project, such as the EA or other drainage and environmental studies. 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, county ditches, 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 existing survey data, including data for all culverts, drainage systems, and storm drain 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 GIS data within the Project limits that depicts the "Outstanding National Resource Waters" (ONRW) and impaired waters as listed by the TCEQ. DB Contractor shall conduct surveys for information not available from other sources.

DB Contractor shall create an inventory of all existing drainage facilities including structures, culverts, ditches, and storm drains 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 this Item 20 and Item 21. If any elements of the existing system do not comply with the requirements of this Item 20 or Item 21, DB Contractor shall improve those elements to meet requirements of this Item 20 and Item 21.

The data collected shall be used in the design of the drainage facilities.

All existing drainage facilities within the Project limits shall be replaced, within the entire ROW limits except for the following:

- Any existing drainage facilities outside of beginning and ending pavement reconstruction limits;
- The existing bridge class culvert crossing the northbound frontage road at Station 734+75;
- The existing culvert crossing under the main lanes and frontage roads at Station 904+00.

DB Contractor shall inspect and verify that the existing drainage facilities and structures identified to remain in this Item 20 or Item 21, have adequate capacity and are in good condition. If any elements of the existing facilities do not comply with the requirements of this Item 20 or Item 21, the DB Contractor shall improve or replace those elements in order to meet the requirements of this Item 20 and Item 21. DB Contractor shall inspect the condition and verify the capacity of all existing off-site drainage facilities which receive flow from the Project to ensure that the existing and proposed drainage facilities within the Project limits can be properly connected to the facility and operate per the requirements of this Item 20.

20.2.2 Coordination with Other Agencies

DB Contractor shall coordinate all water resource issues with affected stakeholders and regulatory agencies. DB Contractor shall document the resolution of water resource issues.

While coordinating design with TxDOT, DB Contractor shall make every effort to design the Project in a manner to avoid CLOMR and LOMR. 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 and receive a permit from the floodplain administrator.

DB Contractor shall coordinate with the local floodplain administrator and provide information related to all proposed, existing, and/or improved drainage crossings and outfalls within the project limits for their information.

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. DB Contractor shall be responsible for obtaining applicable USACE permits.

In areas surrounding railroad facilities, DB Contractor shall coordinate the drainage design with the TxDOT District Railroad Coordinator and the appropriate railroad owner in accordance with Item 22.

20.3 Design Requirements

DB Contractor shall design all elements of the drainage facilities in accordance with this Item 20, the applicable design criteria, Good Industry Practice and the TxDOT *Hydraulic Design Manual*.

The design of temporary and proposed drainage systems shall meet the performance requirements as defined in this Item 20. 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 temporary or proposed drainage system tie to an existing drainage system, the connected existing system shall also be designed and reconfigured, as necessary, to ensure the temporary or proposed system meets

the performance requirements as defined in this Item 20 or Item 21 while maintaining or improving the performance of the connected existing drainage system.

Modifications to existing drainage patterns should be minimized. DB Contractor bears full responsibility for the Final Design and its effects on property owners outside the Project ROW.

DB Contractor shall base its design on design computations and risk assessments for all aspects of Project drainage.

DB Contractor shall design roadside open channels such that the profiles have adequate grade to minimize sedimentation.

DB Contractor shall provide a drainage system that maintains or improves the existing drainage.

DB Contractor shall utilize the TxDOT Dallas District Drainage Standard Sheets (https://www.txdot.gov/inside-txdot/district/dallas/design-standards.html) and TxDOT statewide precast drainage standard sheets (https://www.dot.state.tx.us/business/standardplanfiles.htm) for inlets, manholes, and additional details as shown in the TxDOT Engineering Standard Sheets .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 SWMM, HEC-RAS, or HY-8 Models, culvert hydraulic computations, drainage area reports, and rational method, NRCS method or regional regression equations. The native files for the models and analyses should represent the record set submitted.

20.3.1 Surface Hydrology

20.3.1.1 Design Frequencies

DB Contractor shall use the design frequencies listed in Table 20-1 below.

20.3.1.2 Hydrologic Analysis

DB Contractor shall ensure that no adverse drainage impacts will result from the construction of the Project. DB Contractor shall evaluate and document the analysis confirming that the temporary drainage system and proposed drainage improvements do not result in any adverse impacts. Flood damage potential for the Project, while under construction and when completed, shall not exceed pre-Project conditions.

Roadside ditch restrictors are allowed 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.

DB Contractor shall use the following criteria in developing runoff calculations:

- Run-off Coefficients:
  - Pavement (Asphalt) = 0.9
  - Pavement (Concrete) = 0.9
  - Unpaved areas within the Project ROW = 0.7
  - For areas outside the Project ROW, use the methods in Chapter 4 of the TxDOT *Hydraulic Design Manual* for calculating the Run-off Coefficients
- Minimum Time of Concentration, Tc = 10 minutes
- Use of underground storage facilities for mitigation of adverse impacts is prohibited.
- DB Contractor's base hydraulic model shall reflect the most current as-built conditions.

DB Contractor shall design for future changes in land use allowable under current cities of Dallas, Farmers Branch and Carrollton development policies and proposed zoning maps that may affect the magnitude of runoff and therefore the design capacity of drainage structures. DB Contractor shall incorporate anticipated changes in the basin land use, characteristics, or water operations into the hydrologic parameters. DB Contractor shall design all drainage facilities to accommodate probable land use in accordance with the current City of Dallas, Farmers Branch and Carrollton development policy and proposed zoning maps. 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 future changes in land use allowable under current City of Dallas, Farmers Branch and Carrollton development policy and

proposed zoning maps. 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.

Table 20-1: Drainage Design Summary Table

	Design AEP (Design ARI)				
Functional classification and structure type	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)
Freeways (main lanes):					
Culverts					X
Bridges+					X
Principal arterials:					
Culverts				X	
Small bridges+				X	
Major river crossings+					X
Minor arterials and collectors (including frontage roads):					
Culverts			X		
Small bridges+				X	
Major river crossings+					X
Local roads and streets: **					
Culverts			X		
Small bridges+			X		
Storm drain systems on interstates and controlled access highways (main lanes and ramps):					
Inlets, drain pipe, and roadside ditches			X		
Inlets, drain pipe for depressed roadways*					X
Storm drain systems on other highways and frontage roads:					
Inlets, drain pipe, and roadside ditches			X		
Inlets, drain pipe for depressed roadways*					X

Table 20-1 notes:
All facilities, including storm drain systems, must be evaluated to the check flood/1% AEP (100-yr) flood event. The purpose of the check flood evaluation is to ensure the safety of the drainage structure and downstream development by identifying significant risk to life or property in the event of capacity exceedance.
All features of the roadway facility shall be assessed under the 2-, 5-, 10-, 25-, and 50-year storm events to ensure no significant adverse impacts.
For structures extending underneath both mainlanes and frontage roads the structure shall be designed to the mainlane design AEP.
* A depressed roadway provides nowhere for water to drain even when the curb height is exceeded.
**Drainage design for existing local roads and streets shall meet existing condition or better; however, the design shall meet at a minimum the 20% AEP (5-yr).
+ It may be necessary to calculate the 4% (25-yr), 2% (50-yr), 0.5% (200-yr), or 0.2% (500-yr) AEP for scour computations. See the TxDOT *Geotechnical Manual*: *Chapter 5.*

20.3.2 **Storm Drain Systems**

Where precluded from handling runoff with open channels by physical site constraints, or as directed in this Item 20, DB Contractor shall design enclosed storm drain systems to collect and convey runoff to appropriate discharge points.

DB Contractor shall prepare a storm drain drainage report encompassing all storm drain systems that contains, at a minimum, the following items:

- Detailed table of contents and narrative of design methodology;
- 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;
- Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class and gauge, detailed structure designs, and all special designs;
- Specifications for the pipe bedding material and structural pipe backfill on all proposed pipes and pipe alternates;
- 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;
- 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
- Demonstration that the drainage design does not cause any adverse 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 drain systems such that the hydraulic grade line for the design frequency event is no higher than 1 foot below:

- Gutter depression for curb inlet;
- The top of grate inlet; and
- 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.

The use of slotted drains or trench drains will not be allowed unless approved by TxDOT.

The use of slotted barriers that allow storm water runoff to flow into adjacent travel lanes will not be allowed for permanent barriers. Slotted barriers may be used only for temporary conditions during construction. DB Contractor shall not be permitted to mitigate impacts by using restrictor plates for in-line detention facilities.

20.3.2.1 **Pipes**

DB Contractor shall meet the requirements set forth in Chapter 10 of the TxDOT *Hydraulic Design Manual.*

Storm drain pipes shall be designed to maintain a minimum velocity of three feet per second whenever feasible. If design flow velocities less than three 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. Pipes shall be designed to achieve a maximum velocity of 12 feet per second in the pipe. All storm drains shall be designed and constructed to sustain all external loads with zero deflection and shall have positive seals at the pipe joints.

All pipes shall be reinforced concrete pipe (RCP), with the exception of drainage pipes on bridge structures.

The minimum pipe size inside diameter shall be 24 inches. The minimum pipe size inside diameter of a discrete drainage system may be less than 24 inches if the drainage system is tying to an existing system

that is in good condition and is adequate size to properly convey the flow. The existing system must meet the performance requirements in this Item 20 and Item 21. Storm drain design will be non-pressure flow unless otherwise approved by TxDOT.

Trunk lines may be designed through the inlets.

- Pipe depth of cover: 1 foot desirable; 6 inches minimum (top of pipe to bottom of treated subgrade)
- Pipe slope: ≥0.50% desirable; 0.30% minimum
- Pipe flow velocities: 3 fps minimum; 12 fps maximum
- Outfall velocity criteria: 6 fps desirable; > 8 fps provide outfall protection

20.3.2.2 **Ponding**

DB Contractor shall design drainage systems to limit ponding to the widths defined in Table 20-2 below for the design frequency event:

Table 20-2: Allowable Ponding Widths by Roadway Classification

Roadway Classification	Design Storm Allowable
Interstate, Controlled Access Highways	Shoulder width
Barrier-Separated Managed Lanes: Single Lane Multiple Lanes	 Shoulder width Shoulder width
Ramps, Direct Connectors	Shoulder width
Frontage Roads	One travel lane width
Minor Cross Streets	One travel lane width

Maximum carryover is 0.5 cfs.

20.3.3 **Miscellaneous Drainage Design Requirements**

DB Contractor shall design mainlane cross structures (culverts and bridge openings) in accordance with the TxDOT *Hydraulic Design Manual.*

DB Contractor shall design mainlanes and shoulders such that each is above the 1% AEP WSE for the 100-year storm event for the entire Project.

DB Contractor shall examine water surface elevations to assure that the Project will not cause any adverse impacts to adjacent properties. A rise in water surface elevation can be considered as having no impact if the rise is contained within the Project ROW and drainage easements.

DB Contractor shall ensure the proposed design conditions at the Farmers Branch Creek crossing meet or improve those of the existing conditions. DB Contractor shall provide evaluation and analysis of the crossing showing that the water surface elevations of the proposed conditions meet or improve those of the existing conditions and have no adverse impacts to adjacent properties.

20.3.3.1 **Inlet Design Criteria**

DB Contractor shall design inlets in accordance with the criteria shown below and the TxDOT *Hydraulic Design Manual.*

Table 20-3: Inlet Design Criteria

Storm Drain Inlets	
Inlet Locations	▪ On-grade: Place inlets to keep gutter ponding less than or equal to maximums, as defined in Section 20.3.2.2. Carryover is acceptable. ▪ 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 feet from low point. ▪ Redundant inlets: Inlets shall be located at ends of curb returns at intersections. ▪ 100% flow interception: On pavement at end of ret. Wall, at ramp gores, at intersections. ▪ Inlets shall be placed outside the main lane pavement (proposed and future expansion)

Design Drop Inlets for the following criteria:

- Maximum ponding depth shall be 1 foot for the design frequency
- Area Reduction Factor = 0.5
- Perimeter Reduction Factor = 0.5

20.3.4 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 NPDES regulations. Types of SWSF include ponds, basins, and any other facilities employed to detain or retain quantities of storm water for a given period of time.

DB Contractor shall perform analyses including a detailed routing analysis for SWSF affected by significant environmental issues, such as hazardous waste or groundwater concerns.

SWSF shall not be used within the Project limit without TxDOT approval.

20.3.4.1 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 Storm Water Management Plan that accounts for any regional SWSF.

20.3.4.2 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.

20.3.4.3 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 review and concurrence by TxDOT prior to completion of 100% 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.

20.3.4.4 Freeboard and Spillway

A minimum of 2 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.

20.3.4.5 **Design Details**

DB Contractor shall include all inlet and outlet details, skimmers, and emergency spillway designs in the design. Design must address safety and measures to secure access to SWSF.

20.3.4.6 **Flood Routing**

DB Contractor shall perform flood routing analyses and submit calculations to the reviewing authorities, such as municipalities, TCEQ, and USACE for approval.

20.3.4.7 **Environmental Issues**

DB Contractor shall include special analysis and documentation for SWSF affected by environmental issues in the Final Design, such as hazardous waste or groundwater concerns.

20.3.4.8 **Documentation**

DB Contractor shall include a graphic display (both paper and electronic format) showing what areas are treated by each SWSF with the design calculations provided to TxDOT. The display must also show those areas not treated.

20.3.5 **Hydraulic Structures**

20.3.5.1 **Culverts**

DB Contractor shall analyze existing and proposed culverts and drainage-ways impacted, replaced, or created by the Project, for any localized flooding problems.

DB Contractor shall use the following design criteria for the design of culverts:

- The design year ARI headwater elevation will be no higher than the top of curb of the headwall or shall not exceed the top of the upstream ditch bank, whichever is lower.

As feasible, culverts shall be designed to achieve a minimum tailwater velocity of 2 feet per second, or a maximum tailwater velocity of eight feet per second. In the event the maximum desirable tailwater velocities are exceeded, velocity-reducing devices and outfall channel erosion protection shall be included in the design in order to reduce erosion at the culvert outlets. DB Contractor shall obtain TxDOT approval prior to the installation and use of velocity-reducing devices.

Culverts are classified as major or minor, as follows:

- Major Culvert: A culvert that provides an opening of more than 35 SF in 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. Culverts are classified as bridges when they provide an opening measured along the center of the roadway of more than 20 feet between spring lines of arches, or extreme ends of the openings for multiple box culverts; such culverts shall be included in the bridge inventory. Bridge class culverts shall have a minimum rise of 4 feet and design shall include drop-off protection. Major culverts should be analyzed using HEC-RAS.
- Minor Culvert: Any culvert not classified as a major culvert.

The minimum box inside culvert height dimension for all proposed box culverts shall be 3 feet.

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. DB Contractor shall coordinate with the local floodplain administrator and FEMA in order to satisfy all floodplain permitting requirements.

20.3.5.2 **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.

20.3.5.3 **Ditches**

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 and TxDOT HDM Chapter 7, Section 3, Roadside Channel Design-Channel Linings. Open channels shall be designed to minimize sedimentation.

DB Contractor shall use the following drainage ditch design criteria:

Ditches between roadways:

- Design ARI = 10-year
- Flat-Bottom Ditch = 6-foot bottom width, 4:1 side slopes
- V-Ditch = 6:1 side slopes
- Minimum ditch slope = 0.5%

Ditches next to ROW Line:

- Design ARI = 5-year
- Flat Bottom Ditch = 6-foot bottom width, 4:1 side slopes
- V-Ditch = 6:1 side slopes
- Minimum Ditch Slope = 0.5%

All ditch lining types will be determined by the shear stress calculations for the design discharge procedure as contained in the TxDOT *Hydraulic Design Manual*.

20.3.5.4 **Method Used to Estimate Flows**

DB Contractor shall use methods outlined in the TxDOT *Hydraulic Design Manual* for flow determination.

DB Contactor shall compare Atlas 14 and TxDOT rainfall data and use the more conservative data for hydraulic analysis.

20.3.5.4.1 **Design Frequency**

Major waterway crossings, bridges, culverts, and storm drain systems shall be designed for the frequency corresponding to the roadway classification shown in Section 20.3.1.1. The functional classification for each roadway is shown in Item 19.

DB Contractor shall evaluate bridges for contraction scour and pier scour concerns in accordance with FHWA Hydraulic Engineering Circular No. 18 (HEC-18) – *Evaluating Scour at Bridges* and incorporate protection in accordance with Good Industry Practice. DB Contractor shall provide a scour analysis in accordance with TxDOT *Geotechnical Manual*, Chapter 5, Section 6 for all bridges. If necessary, DB Contractor shall provide countermeasures for any instability and scour problems in accordance with FHWA HEC-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.

20.3.5.4.2 **Hydraulic Analysis**

DB Contractor shall use the most comprehensive available hydraulic models as design base models. For waterways mapped as FEMA Special Flood Hazard Area (SFHA), DB Contractor must comply with TxDOT *Hydraulic Design Manual* procedures, including coordination with the local floodplain administrator(s) and use of the current FEMA effective models to create revised effective and proposed effective models. DB Contractor shall coordinate with major adjacent developments that are pursuing a LOMR during the initial 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.

Existing offsite upstream SWSF shall be ignored except as noted in Section 20.3.5.2. for bridges.

20.3.5.4.3 **Bridge/Culvert Waterway Design**

For existing crossings, DB Contractor shall analyze the existing structure using the proposed flows to ensure the headwater does not exceed allowable headwater elevations, as defined in Section 20.3.5.1. If the proposed drainage produces headwater elevations greater than those allowed by Section 20.3.5.1, 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.

When designing a bridge 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 result in a narrowing of the existing channel.

20.3.5.4.4 **Bridge Deck Drainage**

Storm water flowing toward the bridge shall be intercepted upstream from the approach slab. Runoff from bridge deck drainage shall be treated as required by TCEQ and other applicable regulation prior to discharge to the natural waters of the State.

Open deck drains and slotted rail are not permissible for new bridges passing over waterways or railroad tracks, other roadways, sidewalks, or parking lots. In addition, open deck drains are not permissible for the bridge widenings for the I-35E bridges at Belt Line for the bridge limits south of College Avenue and must be conveyed in a closed system. 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 drain system or into an open channel. In no case shall storm water be discharged against any part of the structure.

20.3.5.4.5 **Drainage Report for Major Stream Crossings**

DB Contractor shall prepare a drainage 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 20.3.5.1. Any other waterway will be a minor stream crossing. The report shall include the detailed calculations, electronic and printed copies of the computer software input and output files, a discussion about hydrologic and hydraulic analysis, and reasons for the design recommendations. The report shall follow the Hydraulic Report Guidelines referenced and outlined in the TxDOT *Hydraulic Design Manual,* Chapter 3. At a minimum, for each crossing the report shall include:

- FEMA SFHA
  - FIRMette;
  - Discussion of SFHA and implications; and
  - Flood Plain Permit, if required by City or County.
- Hydrology
  - Drainage area maps with watershed characteristics/parameterization including topography, both hardcopy and GIS format;
  - Hydrologic calculations (where computer software is used, both hardcopy and electronic input and output files); and
  - Historical or Site data used to review computed flows;
- Hydraulics and Recommended Waterway Opening and/or Structure
  - Photographs of the Site (pre- and post-construction);
  - General plan, profile, and elevation of recommended waterway opening and/or structure;
  - 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;

- Cross-sections of waterway (DB Contractor shall provide a hard copy plot, plus any electronic data used); and
- Channel profiles.

- Scour Analysis
  - Channel cross-sections at bridge showing predicted scour;
  - Calculations and summary of calculations, clearly showing predicted scour and assumptions regarding bridge opening and piers used to calculate predicted scour;
  - Discussion of review of long-term degradation/aggradation and effects; and
  - 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 Record Documents.

20.4 **Drainage Design Report**

A preliminary Drainage Design Report shall be submitted with Preliminary Design Submittal. The preliminary Drainage Design Report shall include at a minimum everything included in the Drainage Design Report as described in this Item 20. Prior to construction of any drainage element, DB Contractor shall submit a final Drainage Design Report for each drainage element to TxDOT.

DB Contractor shall submit to TxDOT, as part of the Record Documents, a revision to the final Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system. The revision to the final Drainage Design Report shall document all changes to the drainage design made during construction. At a minimum, the Drainage Design Report shall include:

- 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 Excel or XMCD for Mathcad.
- 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, Hydrologic, Engineering Center's 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 shall be included with the Submittal to ensure the results match those in the record set.
- Storm drain drainage reports.
- Bridge and culvert designs and reports for major stream crossings.
- Open channel design data.
- SWSF designs, including graphic display of treatment areas and maintenance guidelines for operation.
- 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.
- Demonstration that DB Contractor has obtained appropriate drainage easements.
- Correspondence files that include:
  - Meeting minutes pertaining to drainage
  - Email and letter correspondence with all Governmental Entities pertaining to drainage and drainage studies, including any issued floodplain permits
  - Letters to all Governmental Entities pertaining to drainage
- 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.

- Exhibits demonstrating the compatibility of the drainage design with the future expansion configuration.

20.5 **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. DB Contractor shall conduct all Work necessary to meet the requirements for this Item 20 in accordance with the requirements of this Item 20 and the TxDOT Standard Specifications.

The water resources notes in the plans shall include a description of the drainage design for each stage of construction, including temporary drainage elements.

20.6 **Submittals**

All Submittals described in this Item 20 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 20-4. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 20-4: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Video of closed drainage systems	No sooner than two months prior to Final Acceptance	For information	20.1
All native design files used in the hydrologic and hydraulic analyses to prepare computations and plans	Upon request	Review and comment	20.3
Calculations of flood routing analyses	As part of the Preliminary Design Submittal	Approval	20.3.4.6
Hydraulic summary sheets and bridge scour envelope sheets with projected scour calculation summaries for every bridge crossing a waterway	As part of the Record Documents	Review and comment	20.3.5.4.5
Preliminary Drainage Design Report	As part of the Preliminary Design Submittal	Review and comment	20.4
Final Drainage Design Report for each drainage element	Prior to construction of any drainage element	Review and comment	20.4
Revision to the final Drainage Design Report	As part of Record Documents	Review and comment	20.4

Item 21
Structures

21.1 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 Contract Documents, TxDOT Engineering Standard Sheets, AASHTO *LRFD Bridge Design Specifications* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD* and TxDOT *Geotechnical Manual* and TxDOT bridge design policy and information listed at http://www.txdot.gov/inside-txdot/division/bridge.html.

DB Contractor shall design bridges, retaining walls, noise barriers, sign structures, and toll gantry structures if applicable in conformance with the approved aesthetic schemes, guidelines, and standards as identified in Item 23.

DB Contractor shall ensure that any reinforcing steel within the limits of Toll Zone pavement, as illustrated in Attachment 29-3 (Toll Zone Pavement Details), shall be epoxy-coated in accordance with Item 29.

Throughout the Term, DB Contractor shall allow access to TxDOT bridge inspectors performing National Bridge Inspection Standards (NBIS) inspections. DB Contractor shall coordinate with TxDOT 90 days prior to opening any portion of the new bridge to traffic to allow for the initial NBIS inspection by TxDOT.

21.1.1 Lead Structural Engineer

DB Contractor shall employ a Lead Structural Engineer responsible for overseeing the design and construction of all structural elements of the Project such that each element is complete and design requirements are met. The Lead Structural Engineer shall be a PE responsible for coordination of interdisciplinary design reviews in cooperation with leaders of other disciplines. The Lead Structural Engineer or a PE reporting directly to the Lead Structural Engineer shall be the engineer of record for the design of all structural elements on the Project.

21.2 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. The Corridor Structure Type Study and Report shall clearly define DB Contractor's action to achieve a durable structure compatible with the AASHTO *LRFD Bridge Design Specifications* (or extended life if otherwise called for in Contract Documents) for new Project bridges, walls, culverts and miscellaneous structures. Evaluation of existing structures within the Project limits that will be retained shall be included in the Corridor Structure Type Study and Report.

DB Contractor shall maintain a minimum of 14.5' vertical clearance during construction.

DB Contractor shall replace all existing structures, including bridge class culverts, within the Project ROW, except for the following:

- The existing structures listed in Table 21-1 (Bridges to be Rehabilitated);
- The existing bridges and bridge class culverts outside of the pavement reconstruction limits;
- All bridges within the existing I-35E/I-635 interchange;
- All bridges within the existing I-35E/PGBT interchange; and
- The existing abutments and associated retaining walls for the Luna Road bridge, NBI # 18-057-0-0196-03-095. (Subject to the rehabilitation measures as outlined in Section 21.2.11)

If the above existing structures are damaged or the structural integrity is impacted due to DB Contractor's design and construction, DB Contractor shall rehabilitate and restore the impacted structure to its existing condition in accordance with this Item 21 or the owner's design criteria.

21.2.1 **NBI Reporting Procedures**

Upon completion of the bridge layout during the design phase, DB Contractor shall coordinate with the appropriate TxDOT District Bridge Engineer or Bridge Inventory Inspection and Appraisal Program (BRINSAP) Coordinator to obtain permanent structure numbers for all bridges and bridge class culverts. This will require an approved bridge layout and completion of the permanent structure number request form. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Submittal.

DB Contractor shall stencil NBI numbers on all bridge structures and bridge class culverts. DB Contractor shall stencil NBI numbers and bent numbers on all bridges with four or more spans. The NBI numbers and bent numbers shall be placed at locations as directed by TxDOT.

21.2.2 **Design Parameters**

Unless otherwise noted, design for all roadway structural elements shall be based on the LRFD methodology included in the TxDOT *Bridge Design Manual – LRFD*, TxDOT bridge design policy and information listed at http://www.txdot.gov/inside-txdot/division/bridge/specifications.html and the AASHTO *LRFD Bridge Design Specifications*.

Design of project structures, foundations, embankments, walls, excavations, retained structures, slopes, bridges, and other related design features as well as soil exploration frequencies and boring requirements shall be in compliance with provisions of the TxDOT *Geotechnical Manual* and in accordance with the provisions of Item 16. Where design requirements are not specific in the TxDOT *Geotechnical Manual*, FHWA manuals including guidance regarding geotechnical design shall be used in their entirety.

Rehabilitation or modification of existing structures are not allowed for the Project, unless approved by TxDOT. If approved by TxDOT, DB Contractor shall rehabilitate or modify existing structures not originally designed to LRFD provisions to be governed by their original requirements as defined in the AASHTO *Standard Specifications for Highway Bridges,* but never less than HS-20 design loading. Design of widening of existing structures shall be based on the LRFD methodology included in the TxDOT *Bridge Design Manual - LRFD*, HL-93 loading and the AASHTO *LRFD Bridge Design Specifications*. For widening of structures, neither shall the service nor inventory load rating of all existing bridge components be reduced in the process of widening.

If rehabilitation or modification of existing structures is approved by TxDOT, DB Contractor shall inspect all structures within the project limits to be reused, widened, lengthened, or modified in accordance with AASHTO *Manual for Bridge Evaluation* and TxDOT *Bridge Inspection Manual*. DB Contractor shall submit a signed and sealed condition survey report upon completion of the inspection in accordance with the requirements in Section 21.2.11.

Bridge widths shall meet the typical sections shown on the Schematic Design. Bridge span lengths shall span the typical section widths of the roadways below including appropriate clear distance unless otherwise shown on the Schematic Design or approved by TxDOT.

Steel bridge design shall comply with TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*.

Corrosion protection measures shall be in accordance with the Dallas District and TxDOT Bridge Division's practices. Specific corrosion protection measures can be found at http://www.txdot.gov/inside-txdot/division/bridge/specifications/super-corrosion.html and District-specific requirements can be found at http://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/district-corrosion.pdf.

Segmental bridges shall conform to the requirements of the AASHTO *LRFD Bridge Design Specifications Bridges* except where directed otherwise by the TxDOT *Bridge Design Manual – LRFD*.

Hydraulic design shall be in accordance with the provisions of Item 20.

Structural design of signs, luminaires, and traffic signals shall be in accordance with TxDOT Engineering Standard Sheets and the 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 the AASHTO *Guide Design Specifications for Bridge Temporary Works* and shall be compliant with OSHA and local jurisdictional standards and requirements.

Load ratings shall be in accordance with the AASHTO *Manual for Bridge Evaluation* and the TxDOT *Bridge Inspection Manual*.

DB Contractor shall design bridge units to prevent uplift at supports under all load conditions.

DB Contractor shall ensure that bridges crossing over waterways withstand a 100-year frequency event with no loss of structural integrity. DB Contractor shall ensure all applicable requirements of FHWA *HECs* are met for bridge structures.

Unless otherwise directed, DB Contractor shall ensure at least 2 feet of clearance between the 100-year frequency water surface elevation and the low chord of bridges crossing over waterways, except for the following bridges:

- 18-057-0-0196-03-501 IH-35E SBFR over Hutton Branch,
  - Meets or exceeds existing clearance
- 18-057-0-0196-03-064 IH-35E NBFR over Hutton Branch, and
  - Ensure at least 1.75 feet of clearance.
- 18-057-0-2964-03-620 SH-190 WBFR T/A over Furneaux Creek,
  - Ensure at least 1.5 feet of clearance.

For bridges that cross water features where the distance between the bottom of the beam and the 100-year high water level is less than 4 feet, the DB Contractor shall design shear keys on abutment and bent caps of I-girder, U-beam, and spread box beam (X-Beam) bridges.

At TxDOT's request during design and construction, all electronic and hard copies of files and design calculations shall be made available no later than the start of construction of Elements related to the request. All files and calculations (bridge design notes) shall be submitted with the Record Documents in accordance with Bridge Division's Procedure for Archiving Bridge Design Notes in Chapter 6 of the TxDOT *Quality Control and Quality Assurance Guide* and other requirements of the DBA. DB Contractor shall submit load rating calculation including input and output files for all new or widened bridges and all new or widened bridge class culverts.

Sidewalks and bicycle lanes shall be provided on bridge structures as shown on the Schematic Design and in accordance with the provisions of Item 19 and Item 28. DB Contractor shall design sidewalks to meet the criteria of the AASHTO *A Policy on Geometric Design of Highways and Streets* and the AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. Pedestrian bridges shall additionally conform to the requirements of AASHTO *LRFD Guide Specifications for the Design of Pedestrian Bridges*.

21.2.3 Bridge Design Loads and Load Ratings

All roadway bridges and bridge class culverts shall be designed to accommodate the following live loads:

- New Construction: A vehicular design load designated HL-93 consisting of the design truck or the design tandem, and the design lane load as defined in the AASHTO *LRFD Bridge Design Specifications* shall be utilized for bridges. Sidewalks of vehicular bridges shall be loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications*.
- Existing Bridge Structures: Load rating of HS 20 Operating. Structures failing to meet this standard shall be rehabilitated to a load rating of HS 20 Operating or replaced using LRFD design and HL-93 loading.
- Existing Bridge Class Culverts: Load rating of HS 20 Operating. Structures failing to meet this standard shall be rehabilitated to a load rating of rating factor of HS 20 Operating or replaced using LRFD design and HL-93 loading.
- Existing Bridge Widenings: HL-93 for widening and for existing portion (designate both existing and widening loading on bridge layouts). Existing structures with load rating exceeding HS 20 Operating shall not have their existing capacity reduced in the process of widening. Neither shall the service and inventory load rating of all existing bridge components be reduced in the process of widening.

Pedestrian bridges shall be designed in accordance with requirements in the AASHTO *Guide Specifications for the Design of Pedestrian Bridges* and AASHTO *LRFD Bridge Design Specifications*. Sidewalks of vehicular bridges shall be designed in accordance with the requirements in the AASHTO *LRFD Bridge Design Specifications.* 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.

21.2.4 **Bridge Decks and Superstructures**

Fracture critical members shall not be used for bridges.

Multi-beam bridges shall include a minimum of four beam lines. The type of bridge substructure and superstructure shall be restricted to those identified within the TxDOT *Bridge Design Manual – LRFD*.

DB Contractor shall design the lateral restraint of bridge superstructures with the additional considerations described below:

- I-Girder Bridges:
  - Crossing Water Features: Locate shear keys between the exterior and first interior beam on the upstream side of the bridge. Refer to the TxDOT Bridge Standard *Shear Key Details for I-Girders (IGSK)* for design and detailing information. The updated design practice supplements the use of dowels, if dowels are required.
- U-Beam Bridges:
  - Grade Separations: Design U-beam bridges with shear keys on bent caps when the roadway has a single-direction cross-slope. Locate shear keys between the exterior and first interior beam on the high side of cross-slope.
  - Crossing Water Features: Locate shear keys between the exterior and first interior beam on the upstream side of the bridge.
- Spread Slab Beam and Spread Box Beam (X-Beam) Bridges;
  - Grade Separations: Include shear keys on bent and abutment caps of X-Beam and spread slab beam superstructures, for all allowable skews (0° through 30°) when the roadway has single-direction cross-slope. Locate shear keys between the exterior and first interior beam on the high side of cross-slope. Refer to the TxDOT Bridge Standard *Shear Key Details for 5XB X-Beams (XBSK)* for design and detailing information.
  - Crossing Water Features: Locate shear keys between the exterior and first interior beam on the upstream side of bridge. Refer to the TxDOT Bridge Standard *Shear Key Details for 5XB X-Beams (XBSK)* for design and detailing information.
- Steel Beam or Girder Bridges:
  - Crossing Water Features: Provide lateral restraints on steel bridges crossing water features. For additional considerations and guidance, refer to the TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*.

Modular joints shall not be used.

DB Contractor shall minimize the number of bridge deck joints. 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 provide reinforcing steel with epoxy coating for the following bridge components: approach slab, bridge deck, sidewalk, median, concrete traffic barrier, and rail. Epoxy coated reinforcing is not required for portions of rail or concrete traffic barrier not located on a bridge. Galvanized reinforcing is an acceptable alternative to the epoxy coated steel in the concrete traffic barrier and rail.

Reinforcing for abutments, bents and columns are not required to be epoxy coated.

R-bars (I-beams, U-beams, X-Beams and TX Girders), Z-bars (boxes), and H-bars (Slab beams) are not required to be epoxy coated.

For bridge widenings, existing uncoated reinforcing in the bridge deck exposed during bridge deck removal shall receive an abrasive blast cleaning followed closely by an application of BASF Emaco P25, Sika Armatec 110 EpoCem, or Euclid Duralprep A.C. Perform all work in accordance with manufacturer's specifications. Cleaning and coating operations must be performed no more than 7 days prior to placement

of the concrete. In the event more than seven days is required between initial coating and bridge deck placement, DB Contractor shall apply a second coat of the same material used initially to the bars approximately one day prior to placement of the concrete.

All ties, chairs, and other appurtenances used with epoxy coated reinforcing shall be epoxy coated or non-metallic.

DB Contractor shall incorporate the following additional superstructure corrosion protection measures:

- 8.5-inch minimum concrete bridge deck thickness with 2.5-inch clear cover to the top mat of reinforcing steel; and
- High Performance Concrete (HPC) for bridge deck, medians, approach slabs, railing, sidewalks and medians.

In addition, DB contractor shall not waive the air entrainment requirement for all bridge deck, approach slabs, and rails.

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 embed all conduits within structure with the exception that conduits shall not be embedded in bridge beams unless specifically approved by TxDOT. No exposed conduit will be allowed on bents, columns, outer face of exterior bridge beams, bridge slab overhangs, retaining walls, or any other visible surface unless specifically approved by TxDOT.

DB Contractor shall embed drainage pipes in bents and columns. Drainage pipes in the superstructure shall be designed with appropriate expansion joint, clean out, pipe support and restraint. Drainage pipes exposed to view shall be located in between beams and shall not be attached to the beam or girder.

Box girders and caps (substructure) shall be accessible without impacting traffic below; DB Contractor shall make 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-foot 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). Steel plate girders, I-girders, box beams, caps, tub girders, diaphragms, and cross-frames shall meet the guidelines in the TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*.

Post-Tension strands shall be designed in accordance with TxDOT Standard Specification Item 426.

Segmental bridges shall additionally conform to the following:

- 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.
- 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.
- All expansion joints shall be sealed or drained.
- External tendons, if used, shall be protected with a water-tight duct system with welded high-density polyethylene (HDPE) joint(s).
- The design, detail and construction of segmental bridges shall provide additional ducts or other means to allow for future post-tensioning. Flexible fillers are not permitted.

21.2.5 Bridge Substructure

Integral abutments, where the superstructure is structurally framed (either completely or partially) into the abutment, shall not be used unless approved by TxDOT. 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, if approved by TxDOT, 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. Bridge foundations and columns may be located between the cross street pavement and U-turns. Bridge columns shall have a minimum of 6'-0" horizontal clearance to the face of curb.

Spread footing foundations are not allowed.

All new bridge structure shall be design with vertical abutments. Slope abutments are not allowed.

DB Contractor shall use HPC in abutments, bents and columns.

DB Contractor shall maintain a minimum of 10'-0" horizontal clearance to Dallas Water Utility (DWU) facilities unless approved otherwise by DWU.

21.2.6 Bridge Railing and Barriers

All barrier systems used on the Project shall meet current crash test criteria as specified in the AASHTO *Manual for Assessing Safety Hardware (MASH),* TxDOT *Bridge Railing Manual,* 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*. SSTR shall be utilized on bridge structures. DB Contractor shall protect sidewalks on high speed bridges from vehicular impact by using TxDOT-approved bridge railings.

21.2.7 Retaining Walls

The type of retaining wall shall be restricted to those pre-approved by TxDOT, unless DB Contractor requests and is granted approval of an alternative system by TxDOT.

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.) to which each wall is subjected. These live load surcharges shall be based on AASHTO *LRFD Bridge Design Specifications*, AREMA *Manual for Railway Engineering*, or the requirements of the specific railroad and transit owner/operator.

The retaining wall layout shall address slope maintenance above and below the wall.

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.

If pipe culverts are to extend through the retaining walls, the pipe shall be installed so that no joints in the pipe are located within 2 feet of face of wall. Slip joints shall be placed on either side of the pipe and a headwall shall be placed over the portion of the pipe exiting the wall when any portion of the pipe exits the wall above finished ground.

Pipe for storm drain systems shall not run longitudinally within the MSE retaining wall earth reinforcement zone unless approved by TxDOT.

No weep holes through the face of the retaining walls will be permitted, except at the base of the walls.

Underdrains are required and shall be a minimum of 8 inches with cleanouts at a maximum of 300-foot spacing unless an alternative is approved by TxDOT. Underdrains shall be sloped to drain to permanent outfalls. Outfalls and the flowlines shall be shown on the retaining wall layouts.

The top of the retaining wall leveling pad shall be located a minimum of two feet below ground, unless approved by TxDOT.

The length of earth reinforcements for MSE retaining walls shall be a minimum of either 8 feet or 70% of the wall height, whichever is greater. Earth reinforcement length is measured perpendicular to the wall. Adjust skewed earth reinforcements as necessary to obtain required length in accordance with the requirements of

this Item 21 and Section 16.2.2. Wall height is the distance from the top of the leveling pad to the finished grade at the top of the wall.

Retaining walls shall end as close as practical to proposed grade within limits of fabrication heights of wall panels. Riprap shall be used to channel water from flume behind wall to outlets and to avoid soil erosions at ends of walls.

All non-pavement reinforcing steel installed in retaining walls located within a Toll Zone shall be epoxy-coated in accordance with Item 29.

Cement-Stabilized Backfill is not permitted.

DB Contractor shall use:

Type AS backfill as defined under TxDOT Standard Specification Item 423 for permanent MSE or concrete block (CB) walls not subject to inundation.

Type DS backfill as defined under TxDOT Standard Specification Item 423 for permanent MSE or CB walls subject to inundation.

Drainage aggregate meeting the requirements of TxDOT Standard Specification Item 423 for use as filter material with the retaining wall.

Flowable backfill meeting the requirements of TxDOT Standard Specification Item 401 between the back of panels and inlets or drainage pipes where the required compaction cannot be achieved.

Embankment Type C2, with a plasticity index maximum of 25 and minimum of 8, as defined under TxDOT Standard Specification Item 423.2.4.1 for non-select embankment backfill behind retaining walls and install fill in accordance with TxDOT Standard Specification Item 132, Type C2.

Either select material as required for the select fill zone or backfill meeting or exceeding the requirements of TxDOT Standard Specification Item 132 Type C2, for the backfill between the select fill zone and the existing ground for cut walls. Place material in accordance with TxDOT Standard Specification Item 132, Type C2 requirements. If existing ground is laid back (i.e. not vertical), the lay back shall be done as a series of equal height benches so as to prevent the formation of a smooth surface at the material interface. The DB Contractor shall avoid creating distinct vertical joints between select backfill and embankment (Non-Select) backfill as required by TxDOT Standard Specification Item 423.3.4. DB Contractor shall provide a zone of material behind the strap zone (1' min width) in which alternating lifts of select and non-select materials are interlaced.

21.2.8 Noise Barriers

DB Contractor shall design and construct all noise barriers to achieve the decibel reduction requirements in the NEPA Approvals and meet the aesthetic requirements in Item 23.

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.

If any portion of the existing noise barrier needs to be temporarily disassembled for any reasons during construction, the noise barrier shall be reassembled and restored to its existing condition. DB Contractor shall repair all existing noise barriers in accordance with TxDOT Standard Specifications and TxDOT *Concrete Repair Manual* that are damaged during construction within the Project limits.

If pipe culverts are to extend through the noise barriers, the pipe shall be installed so that no joints in the pipe are located within two feet of face of wall.

21.2.9 Drainage Structures

In developing the design of drainage structures, DB Contractor shall account for maximum anticipated loadings for the Project.

Energy dissipaters, if used, shall be considered as structural Elements.

DB Contractor shall analyze existing drainage structures for capacity and condition. As necessary, retrofit or replace elements to accommodate required hydraulic capacity, and any additional loads, settlements, and/or other structural impacts associated with the Project.

DB Contractor shall clean all closed drainage systems for the Project no sooner than two months prior to the Final Acceptance date. DB Contractor shall provide camera video to TxDOT to show that all closed drainage systems are clean and clear of debris and settlement.

21.2.10 **Sign, Illumination, and Traffic Signal Supports**

DB Contractor shall design toll gantries if applicable, overhead sign bridges, and cantilever sign supports to accommodate the Project. Cantilever and sign bridge supports shall be placed outside the clear zone or shall be otherwise protected by appropriate safety measures. Sign supports shall be provided at locations necessary to meet the signing requirements of the Project. Type O signs shall not be mounted on bridges. Supports for bridge mounted illumination poles shall not be located more than 10 feet away from centerline of a bridge bent or abutment unless approved by TxDOT.

Large sign as defined by the TxDOT Standard Specifications shall not be mounted on bridges unless approved by TxDOT.

21.2.11 **Rehabilitation of Structures to be Widened, Extended, or Reused**

Rehabilitation of existing bridges and bridge class culverts and widening of existing bridges and bridge class culverts will not be allowed unless approved by TxDOT at its sole discretion or as specified in this section.

The following structures are to be widened, extended, or reused and evaluated for rehabilitation:

Table 21-1: Bridges to be Evaluated for Rehabilitation

Structure Number (NBI #)	Feature Crossed	Facility Carried	Action
18-057-0-0196-03-500	W Belt Line BNSF RR etc	IH 35E	Widen
18-057-0-0196-03-539	Drainage Ditch	IH 35E NBFR	Extend
18-057-0-0196-03-169	Harry Hines BLvd overpass	IH 35E SB	Reuse
18-057-0-0196-03-180	Farmers Branch Crk	IH 35E SBFR	Reuse
18-057-0-0196-03-182	Farmers Branch Crk	IH 35E NB	Reuse
18-057-0-0196-03-184	Farmers Branch Crk	IH 35E NB On-Ramp	Reuse
18-057-0-0196-03-185	Farmers Branch Crk	IH 35E NBFR	Reuse
18-057-0-0196-03-187	IH 35E SB Exit-Ramp	IH 35E SB On-Ramp	Reuse
18-057-0-2374-01-529	IH 35E NB Ent Ramp/Farmers Branch Crk	IH 35E NB Exit Ramp	Reuse
18-057-0-0196-03-003	Furneaux Creek	IH 35E NBML	Reuse
18-057-0-0196-03-018	Furneaux Creek	IH 35E SBML	Reuse
18-057-0-0196-03-168	Harry Hines BLvd overpass	IH 35E NBML	Reuse
18-057-0-0196-03-181	Farmers Branch Crk	IH 35E SB	Reuse
18-057-0-0196-03-483	4th Ave Main St RR	IH 35E SB FR	Reuse
18-057-0-0196-03-484	4th Ave, Main St, RR	IH 35E NB FR	Reuse
18-057-0-0196-03-485	College Ave and RR	IH 35E NB FR	Reuse
18-057-0-0196-03-486	College Ave and RR	IH 35E SB FR	Reuse
18-057-0-0196-03-489	Harry Hines BLvd overpass	IH 35E NB	Reuse
18-057-0-0196-03-501	Hutton Branch	IH 35E SBFR	Reuse

Table 21-1: Bridges to be Evaluated for Rehabilitation

Structure Number (NBI #)	Feature Crossed	Facility Carried	Action
18-057-0-0196-03-508	BNSF RR	Belt Line Road	Reuse
18-061-0-0196-03-503	Right of Way/NB FR	Dickerson Pkwy	Reuse
18-061-0-0196-03-504	Right of Way	Dickerson SW Ramp	Reuse
18-061-0-0196-03-505	I35E NB FR	Dickerson NE Ramp	Reuse
18-061-0-0196-03-506	Right of Way	Dickerson NW Ramp	Reuse
18-061-0-0196-03-507	IH35E Broadway St RR	Dickerson Pkwy	Reuse

Bridge Condition Rating Summary located in the RIDs contains a table that provides the most current condition ratings for structures.

For the sections of the existing structures to be widened, extended, or reused in Table 21-1, DB Contractor shall perform a condition survey including condition rating, load rating, remaining service life and recommended rehabilitation. DB Contractor shall submit a rehabilitation report to TxDOT for approval 60 Days prior to performing rehabilitation activities on the bridge.

The condition rating of the structures to be reused, widened, extended, modified or repaired shall achieve a minimum of seven according to the FHWA coding guide. Any component with a condition rating less than 7 as determined in the condition survey and any other defects discovered by DB Contractor shall be rehabilitated. DB Contractor shall perform inspections using inspectors, pre-approved by TxDOT, with previous experience inspecting TxDOT bridge inventory. Rehabilitation must achieve a minimum condition rating of 7 for each structural component at Substantial Completion.

For existing structures to be reused within pavement reconstruction limits or structures identified to be widened, extended, or rehabilitated outside the reconstruction limits, the following shall apply:

- DB Contractor shall add crashwalls to existing two-column bents.
- DB Contractor shall upgrade any substandard or obsolete rail .
- DB Contractor shall clean and repair existing expansion joints and provide new full width seals including all existing open joints.
- DB Contractor shall inspect all existing bridge bearings. As necessary, DB Contractor shall rehabilitate, repair, or replace existing bridge bearings to accommodate design loads and expansion.
- DB Contractor shall patch and repair concrete spallings, and concrete delaminations, clean and repair exposed reinforcing, seal cracks and repair or replace structurally damaged elements.

DB contractor shall perform concrete repair work in accordance with TxDOT *Concrete Repair Manual*.

DB Contractor shall remove rust, clean, and paint all existing steel bridge superstructures and associated steel bridge bearings to remain. DB Contractor shall perform a paint condition assessment for all painted structures prior to any rehabilitation activities. Recommendations to leave any existing coatings intact shall be submitted to TxDOT for approval 60 days prior to any rehabilitation activities.

Full bridge deck replacements shall consist of a minimum of 8.5-inch-thick Class S concrete bridge deck. Bridge beams/girders and substructures shall be rehabilitated or replaced as required to support the new bridge deck load in combination with live load specified in this Section 21.2.3. Bridge widenings shall utilize 8.5-inch-thick deck regardless of the deck thickness of existing bridge. Existing decks less than 8.5-inch-thick may only remain in place when meeting bridge design load and rating criteria from Section 21.2.3.

21.3 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 21 in accordance with the requirements of this Item 21 and TxDOT Standard Specifications.

21.3.1 **Concrete Finishes**

All concrete surfaces that do not have aesthetic treatments shall have a uniform texture and appearance. Painting or Coating, 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 Item 23, Ordinary Surface Finish as defined by Sections 420.4.13 and 427.4.1.1 of the TxDOT Standard Specifications shall be applied as a minimum.

21.3.2 **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. Paint all structural steel using protective “System II" paint in accordance with Item 446 of the TxDOT Standard Specifications.

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.

21.3.3 **Structure Metals**

Welding shall be in accordance with the requirements of the AASHTO/American Welding Society D1.5 *Bridge Welding Code* and Item 448 of the TxDOT Standard Specifications.

21.3.4 **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.

21.4 **Submittals**

All Submittals described in this Item 21 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 21-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 21-2 : Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
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	21.2
Condition Survey Report for existing structures to be modified	Prior to commencing design of structure modifications	Approval	21.2.2
Load rating calculations (including input & output files)	Upon request and no later than the start of construction of Elements related to the request	Review and comment	21.2.2
All electronic and paper copies of files and design calculations	Upon request and no later than the start of construction of Elements related to the request	For information	21.2.2
Video of closed drainage systems	No sooner than two months prior to Final Acceptance	For information	21.2.9
Rehabilitation report for existing structures	60 Days prior to performing rehabilitation activities	Approval	21.2.11
Recommendations to leave any existing coatings intact	60 Days prior to any rehabilitation activities	Approval	21.2.11

Item 22
Rail

22.1 **General Requirements**

This Item 22 defines the criteria required to design and construct rail corridors, rail facilities, rail structures, and rail line crossings within the Project ROW.

The Project includes multiple rail corridor crossings within the Project ROW as depicted on the Schematic Design. If required, DB Contractor shall prepare a geometric design for the rail corridor. DB Contractor's PMP shall set forth an approach, procedures, and methods for the rail corridor design and construction meeting the requirements set forth in the Contract Documents.

DB Contractor shall ensure that the Project does not negatively impact the safety of railroad operations. DB Contractor shall coordinate the Work with the railroad to avoid impacts to railroad operations, except as specifically approved by the railroad.

DB Contractor shall be responsible for all fees, flagging charges, and inspection charges required by the railroad.

DART's Silver Line expansion project for the Cotton Belt Corridor is planned within the Project limits in the DART right-of-way crossing I-35E. DART's project is currently planned to be under construction concurrently with the Project. DART's preliminary plans are included in the RIDs. DB Contractor will be obligated to coordinate construction works with DART's contractor as described in Section 5.5 of the DBA General Conditions.

22.1.1 **Insurance Requirements**

If any railroad impacted by the Project requires insurance in addition to that required by the Contract Documents, DB Contractor shall procure such additional insurance at its own cost and submit copies of insurance policies to TxDOT.

22.2 **Railroad Design Standards**

The design for all railroad elements of the Project shall be based on the AREMA *Manual for Railway Engineering* 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 TxDOT *Rail-Highway Operations Manual*.

Additionally, the requirements of the owner of each facility crossed shall be compared to the requirements in the TxDOT *Rail-Highway Operations Manual* and the most restrictive criteria shall be utilized.

At highway-rail grade crossings, the roadway and drainage design parameters shall be maintained at the crossing with exception for the cross slope of the pavement, which may be transitioned to match the grade across the rail line.

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 with the operating railroad the design and construction of the construction staging, including any shooflies.

22.2.1 **Design 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 obtaining required approvals.

22.3 **Administrative Requirements**

22.3.1 **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 license fees, 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 or to pay for a railroad approved flagging vendor.

22.3.1.1 **Executed Railroad License Agreements**

TxDOT has entered into the Executed Railroad (RR) License Agreements regarding Work involving certain railroad property. Pursuant to these Executed RR License Agreements, the applicable railroad companies have granted TxDOT, and its authorized contractors, license and permission to enter onto the specified railroad property to complete the Work in accordance with and as set forth in such Executed RR License Agreements.

The Executed RR License Agreements include initial plans (Preliminary Exhibit A) based on TxDOT Schematic Design and specifications developed by TxDOT and approved by the applicable railroad company. DB Contractor may utilize such initial plans and specifications in its design for such Work; provided, however, that notwithstanding the development of such initial plans, DB Contractor is responsible for all Design Work, including the development of the final design and any related documents required by the applicable railroad company. The only relief available to DB Contractor with respect to such initial plans is the relief set forth in Section 6.10 of the DBA.

DB Contractor shall be responsible for reimbursing the railroad companies for all of the actual costs incurred by the railroad companies with respect to the Work, including for collaborating in the development of plans, the preliminary engineering, flagging if provided by the railroad company, and other preliminary activities, including attending project meetings, reviewing and approving designs, site inspections, and developing any necessary cost estimates.

DB Contractor shall be responsible for performance of all obligations related to the design and construction work set forth in the Executed RR License Agreements or otherwise required by the applicable railroad company, including paying all costs and fees to the applicable railroad company in relation to the Work and preparation of all plans and specifications for the applicable Work for review and approval by TxDOT and the applicable railroad company. For the avoidance of doubt, DB Contractor shall be responsible for complying with all requirements of the applicable railroad company, even where such requirements are not included in, or are in conflict with other provisions in, the applicable Executed RR License Agreement, and the only relief available to DB Contractor in relation to an Executed RR License Agreement is the relief granted pursuant to Section 6.10.2 of the DBA with respect to initial plans.

DB Contractor shall prepare and be responsible for executing any further agreements required by any railroad company in connection with Work involving railroad property, including any easement agreements.

DB Contractor also shall prepare and be responsible for executing Design and Construction License Agreements and Contractor ROE Agreements for each construction area within the railroad ROW with the applicable railroad company. DB Contractor shall comply with all terms of the executed Design and Construction Agreements and Contractor ROE Agreements and shall perform the Work as shown in the final plans, as reviewed and approved by TxDOT and the railroad company. No changes to the final plans shall be made without the prior written approval of such changes by both TxDOT and the railroad company.

22.3.1.2 **Additional Railroad License Agreements**

For any Work that impacts rail and for which TxDOT has not provided an Executed RR License Agreement, DB Contractor will be responsible for preparing all necessary documents required by railroad company for TxDOT to pursue a railroad license agreement.

The following agreements may be required based upon the railroad's requirements:

- 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 representative(s) included attending project meetings, reviewing and approving designs, and developing any necessary cost estimates;
- License to Cross (License Agreement) – DB Contractor shall assist TxDOT with preparing necessary design plans and exhibits for any necessary License to Cross agreement to be executed between railroad 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. DB Contractor shall prepare all the documents required by railroad company to obtain the License Agreement, including but not limited to preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT; and DB Contractor shall prepare and be responsible for executing any further agreements required by any railroad company in connection with Work involving railroad property, including any easement agreements;
- Joint-Use Agreement (Drainage Easements) – DB Contractor shall assist TxDOT with preparing necessary design plans and exhibits for any necessary agreement to be executed between railroad and TxDOT. A Joint-Use Agreement is required for DB Contractor to install drainage facilities and features in the railroad ROW. DB Contractor shall prepare all the documents required by railroad company to assist TxDOT to obtain the Joint-Use Agreement, including but not limited to preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT; and DB Contractor shall prepare and be responsible for executing any further agreements required by any railroad company in connection with Work involving railroad property, including any easement/ROE agreements;
- Construction and Maintenance Agreement (Signal Warning System) – DB Contractor shall assist TxDOT with preparing necessary design plans and exhibits for any necessary agreement to be executed between railroad and TxDOT. A Construction and Maintenance Agreement is required for TxDOT to reimburse railroad company for removing and/or reconstructing the signal warning system at surface crossings. DB Contractor shall prepare all the documents required by railroad company to assist TxDOT to obtain the Construction and Maintenance Agreement, including but not limited to preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT; and DB Contractor shall prepare and be responsible for executing any further agreements required by any railroad company in connection with Work involving railroad property, including any easement/ROE agreements;
- Design and Construction License Agreements and/or Contractor ROE Agreements – DB Contractor may be required by the applicable railroad company to enter into Design and Construction Agreements and Contractor ROE Agreements for each construction area within railroad ROW. DB Contactor shall reimburse the railroad for actual costs incurred by the railroad companies including plan review, railroad representatives attending project meetings, flagging if provided by the railroad company, site inspection, and other in accordance with the Design and Construction License Agreements;
- Aerial Easements (for grade separations only) – DB Contractor may be required by the railroad company to enter into a separate easement agreement to obtain aerial rights to cross

railroad ROW. If an aerial easement is required, the "License" portion of the construction and maintenance agreement will be modified to identify the aerial easement as the right to cross railroad ROW with the new highway facility;

- 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 construction and maintenance agreement; and

DB Contractor shall comply with all terms of the executed Design and Construction Agreements and/or Contractor ROE Agreements and shall perform the Work as shown in the final plans, as reviewed and approved by TxDOT and the railroad company. No changes to the final plans shall be made without the prior written approval of such changes by both TxDOT and the railroad company.

All executed agreements shall be submitted in their entirety as part of the Record Documents.

22.3.2 **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 Construction License Agreement, Contractor's ROE 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.

22.3.3 **DB Contractor ROE 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.

22.4 **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 pre-construction meetings for work performed within the railroad's ROW.

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 its performance of the obligations in the railroad agreements, including any amendments, change orders, or force account work under such agreements.

The operation of the railroad and the affiliated railroads (those running through the railroad property in particular), and the operations of the lessees, 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.

22.4.1 **Flagging**

DB Contractor shall arrange for railroad flagging, as required by the railroad company, to ensure the safe passage of rail traffic throughout the Project limits affecting railroad ROW.

22.5 **Submittals**

All Submittals described in this Item 22 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 22-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 22-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Copies of all additional or modified insurance policies	Prior to any entry upon operating railroad property	For Information	22.1.1
Copies of the fully executed railroad agreements and permits	Prior to performing any work within the affected railroad ROW	For information	22.3.1

Item 23
Aesthetics and Landscaping

23.1 General Requirements

This Item 23 defines requirements with which DB Contractor shall design and construct 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.

This Item 23 presents minimum aesthetics and landscape design requirements for Project designs. For purposes of this Item 23, the following list of items will be considered the aesthetics elements of the Project design:

- Material, finish, color, shape, and texture of bridge elements;
- Materials, finish, and color of barriers and railings;
- Paved slope treatments;
- Finish, color, and texture of retaining and noise/sound walls;
- Contour grading, slope rounding, channel treatments, and drainage;
- Sculptural and artistic features of other structures;
- Sidewalks, medians, or pedestrian specialty paving, including material, finish, and color;
- Hardscape at interchanges and intersections;
- Gateway and wayfinding markers;
- Fencing;
- Signage – overhead, attached, and ground-mounted;
- Toll gantries if applicable;
- Any permanent building construction within the Project, including ancillary and operational support;
- Light fixture, ambient light colors, and general layout conditions; and
- Landscape plant materials.

23.1.1 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.

It shall be understood that with TxDOT approval, the concepts for components of the Project corridor may need to be adapted to the Site-specific conditions of the Project.

DB Contractor shall adhere to the approved I-35E Phase 2 Aesthetic Technical Guidelines, contained in the RIDs aesthetics requirements folder, which are hereby incorporated by this reference.

DB Contractor may develop an alternative aesthetic concept for TxDOT approval. Approval or rejection of said concept will be at TxDOT's sole discretion. DB Contractor shall base an alternative aesthetic concept on the principles, requirements, and strategies provided in Section 23.3. DB Contractor may be required to present the alternative aesthetic concept to the public prior to developing the final aesthetic concept and submit to TxDOT for final approval.

23.1.2 Aesthetics and Landscaping Plan

All unpaved areas and areas not covered by permanent structures or concrete riprap shall be sodded.

DB Contractor shall prepare an Aesthetics and Landscaping Plan in conformance with the Project's approved aesthetic concept shown in the I-35E Phase 2 Aesthetic Technical Guidelines for approval by TxDOT, in its reasonable discretion. The Aesthetics and Landscaping Plan shall provide guidelines and requirements for

the aesthetics design of the Project. The Aesthetics and Landscaping Plan shall include all elements to fully communicate the proposed aesthetic treatment to TxDOT. The Aesthetics and Landscaping Plan shall meet the requirements of all standards and documents identified or otherwise specified within this Item 23.

The Aesthetics and Landscaping Plan shall include all elements to fully communicate the proposed aesthetic treatment to TxDOT and shall address the following requirements:

23.1.2.1 **Aesthetics**

DB Contractor shall provide:

- 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, signage structures, and toll gantry supports if applicable; 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);
- 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); and
- Drawings showing color schemes and their locations.

23.1.2.2 **Landscaping**

DB Contractor shall provide:

- A plan that indicates plant palettes, plant size and locations, plant specifications, planting specifications and staking details, soil preparation plan, and planting dates;
- An establishment program that meets the requirements of Item 193 of the TxDOT Standard Specifications;
- A maintenance program; and
- 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 of the Project shall comply with the TxDOT Standard Specifications and Good Industry Practice.

The Aesthetics and Landscaping Plan shall serve as the primary standard guidance necessary to produce the intended aesthetic form, function, and appearance of this Project.

TxDOT approval of the Aesthetics and Landscaping Plan is required prior to construction of any elements affected by this plan.

Upon completion of the alternative Aesthetics and Landscaping Plan, if approved by TxDOT, DB Contractor shall consolidate the information, which establishes the requirements for engineering of the highway corridor aesthetics.

Other than sodding, no proposed landscaping is anticipated for the Project except for any landscaping that is impacted by DB Contractor's construction that was placed with the I-35E Phase 1 Project. Details of I-35E Phase 1 landscaping is detailed in the RID and DB Contractor must propose replacement of such landscaping and irrigation if impacted by construction. If proposed landscaping is incorporated into the Project, DB Contractor's maintenance program must be approved by TxDOT, the City of Farmers Branch and the City of Carrollton.

23.1.3 **Personnel**

DB Contractor shall provide a landscape architect, registered in the State of Texas, with experience in designing aesthetics and landscaping elements for roadway projects of similar scope and size, if DB Contractor develops an alternative Aesthetics and Landscaping Plan. DB Contractor's landscape architect shall remain involved from the beginning of the Aesthetics and Landscaping Plan, through construction, and

shall ensure continuity and compliance with the Aesthetic and Landscaping Plan and applicable TxDOT and TxDOT District office standards and these Design-Build Specifications.

DB Contractor's landscape architect shall coordinate with the District's landscape architect, or the otherwise TxDOT appointed designee, for the TxDOT District office, throughout design and construction relative to compliance with the aforementioned plans, guidelines, and standards. DB Contractor's landscape architect shall coordinate in advance with the TxDOT District landscape architect or their designee the scheduling for associated Aesthetics and Landscaping Plan 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.

23.2 Design Requirements

23.2.1 Aesthetics Principles and Strategies

DB Contractor shall follow the guidelines and requirements of the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan if approved by TxDOT, as well as the aesthetics principles, requirements, and strategies established by TxDOT for the Project design, including the following:

- Aesthetics shall not interfere with safety, constructability, or maintenance requirements;
- The Project design shall minimize impact on the existing natural environment to the extent possible;
- The Project design shall emphasize and enhance the existing natural context and landscape to the fullest extent possible;
- Simple geometric shapes for structures shall be used to the extent possible for continuity along the entire length of the Project;
- All bridges and other structures shall be simplified in their design, and to the greatest extent possible, kept small in size, bulk, and mass;
- All structures shall be carefully detailed so as to achieve the greatest level of aesthetic quality and conform to the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan if approved by TxDOT;
- Color, texture, and form shall be used appropriately for all structures;
- Graphics, signage, and lighting shall be consistent along the entire length of the Project;
- All toll gantry supports shall be consistent along the entire length of the Project;
- Existing native trees and established naturalized trees and natural features shall be preserved to the greatest extent possible, and TxDOT consent will be required in order to use a natural feature for erosion control;
- Aesthetic elements shall be fully integrated with the overall structure and landscape design;
- Visual quality of the landscape shall be consistent along the entire length of the Project;
- Native-area and/or naturalized plant materials that exhibit good drought tolerance shall be used to the extent possible;
- Aesthetic elements shall be easy to maintain and resistant to vandalism and graffiti; and
- Aesthetic elements shall conform to the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan if approved by TxDOT.

23.2.2 Walls, Sign Columns and Toll Gantry Supports

DB Contractor shall design retaining walls to be similar in color, texture, style, and aesthetic treatment consistent with the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan if approved by TxDOT. DB Contractor shall apply aesthetic treatments to the vertical surfaces of retaining walls where the surface is visible from the roadway or adjacent residential dwelling units. Consistent treatments shall be used for retaining walls and exposed concrete column sign and toll gantry support structures that articulate the design themes established in the approved I-35E Phase 2 Aesthetic Technical Guidelines. DB Contractor shall clearly detail and identify how wall patterns shall be incorporated into the chosen design solution.

23.2.3 **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 with similar shapes and details used for all bridges, in accordance with the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan, if approved by TxDOT.

No exposed conduits or drain pipes will be allowed on bents, columns, bridge beams, retaining walls, or any other visible surface.

Concrete beam spans shall be of constant depth throughout the structure.

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 transition from concrete beams to steel girders may be accomplished by dapped end girders.

23.2.4 **Trees, Shrubs, and Other Plant Materials**

All trees, shrubs, deciduous vines, and perennials shall comply with the applicable requirements of *American Standard for Nursery Stock (ANSI Z60.1)*. DB Contractor shall utilize plant species native to or naturalized in the Project region.

If landscaping is incorporated into the Project, the DB Contractor shall:

- Provide weed control measures;
- Consult with the agricultural extension agent of the applicable county and TxDOT for recommended plant species lists;
- Submit the overall landscape design, including plant types, sizes, density, and locations, for TxDOT approval;
- Select plants considering the soil conditions, slopes and watering requirements; and
- Place trees, if used, in the Project ROW between mainlanes and frontage roads;
    - Trees shall be a minimum of six feet tall and shall have a three-inch caliper minimum.
    - The mature tree canopy shall not overhang the travel lane or shoulder of any part of the roadway. The root of the mature trees shall be prevented from extending into the pavement subgrade.

23.2.5 **Riprap, Paving, and Pavers**

Concrete paving or landscape pavers shall be used in hard-to-reach mowing areas, less than two feet in width, 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 I-35E Phase 2 Aesthetic Technical Guidelines or alternative Aesthetics and Landscaping Plan, if approved by TxDOT.

23.2.6 **Color Palette**

DB Contractor shall submit a plan that indicates where each color is to be applied based on the approved I-35E Phase 2 Aesthetic Technical Guidelines or alternative Aesthetics and Landscaping Plan, if approved by TxDOT. This plan can be diagrammatic in nature, but shall list each element and its colors. In addition to integrated colors, painting, and staining, DB Contractor may use colored lighting in selected areas to add color.

23.2.7 **Lighting Aesthetics**

DB Contractor shall utilize TxDOT standard roadway illumination poles 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).

23.3 Construction Requirements

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 23 in accordance with the requirements of this Item 23 and the TxDOT Standard Specifications.

DB Contractor shall provide TxDOT sample panels 30 days in advance of starting construction of textured concrete surfaces and landscape pavers. DB Contractor shall construct sample panels in accordance with Section 427.4.3.5 of the TxDOT Standard Specifications that comply with the principles, requirements, and strategies established by TxDOT, the approved I-35E Phase 2 Aesthetic Technical Guidelines or an alternative Aesthetics and Landscaping Plan if approved by TxDOT, and 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 TxDOT 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.

23.4 Aesthetic and Landscaping 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 and landscaping enhancements) shall be the responsibility of the adjacent Governmental Entity. At TxDOT's request, 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 during the Term.

Aesthetic enhancements shall be incorporated into the aesthetic concept to be submitted in plan form to TxDOT for approval.

23.5 Submittals

All Submittals described in this Item 23 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 23-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 23-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Alternative aesthetic concept	As needed	Approval	23.1.1
Aesthetics and Landscaping Plan	Prior to construction of any elements affected by this plan	Approval	23.1.2
Landscape design	As needed	Approval	23.2.4
Color Palette Plan	As needed	Review and comment	23.2.6
Panel samples	Prior to starting construction of textured concrete surfaces and landscape pavers	Approval	23.3

Item 24
Signing, Delineation, Pavement Marking, Signalization, and Lighting

24.1 **General Requirements**

This Item 24 includes requirements with which DB Contractor shall design, construct, and maintain, all signs, delineation, pavement markings, signals, and lighting for the Project.

24.2 **Administrative Requirements**

24.2.1 **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 may attend such meetings.

DB Contractor shall arrange and coordinate all meetings with Governmental Entities or other Persons requesting special signs.

24.3 **Design Requirements**

DB Contractor shall design all signing, delineation, pavement marking, and signalization in accordance with the TMUTCD and TxDOT SHSD, TxDOT *Freeway Signing Handbook,* TxDOT *Sign Crew Field Book,* TxDOT *Toll Road Signing Guidelines,* TxDOT *Traffic Signals Manual,* TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, and Good Industry Practice. DB Contractor shall design all illumination (lighting) in accordance with the TxDOT *Highway Illumination Manual*, NEC, AASHTO *Roadway Lighting Design Guide*, TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, TxDOT Departmental Material Specifications, and Good Industry Practice.

DB Contractor shall incorporate into its design the wrong-way driving countermeasure concepts shown in the *"Signing and Signal Layout Details"* located in the RIDs.

24.3.1 **Preliminary Layouts**

DB Contractor shall submit, for TxDOT approval, a preliminary operational signing schematic. Design of the signing, delineation, pavement marking, signalization, and lighting shall be based on the approved preliminary operational signing schematic. Before placing any signs, delineation, non-standard sign structures, pavement markings, traffic signals, and lighting, DB Contractor shall provide TxDOT a layout indicating the proposed location of such items. DB Contractor shall provide TxDOT advance notice of changes or revisions to sign locations included in the preliminary operational signing schematic. DB Contractor shall prepare a preliminary lighting layout, in a roll type format with photometric curves, and submit this to TxDOT for approval prior to commencing Final Design.

24.3.2 **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. The use of existing sign structures by DB Contractor shall be subject to TxDOT approval. DB Contractor shall confirm the suitability of existing sign structures considered for use and shall be responsible for necessary modifications. 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, toll gantries if applicable, 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.

Subject to Section 24.3.4, 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 approval.

DB Contractor's design of delineators and object markers shall comply with TMUTCD requirements.

Signs shall meet the requirements of TxDOT SHSD.

DB Contractor shall replace signs, including school signs and flashers, affected by any local street improvements.

DB Contractor shall ensure all existing street name signs for cross streets are replaced or relocated and proposed street name signs are installed according to TMUTCD requirements.

DB Contractor shall install city limits signs adjacent to roadways at locations where roadway crosses city limits.

DB Contractor shall design signing to accommodate any truck restriction signs shown on the TxDOT Schematic Design. DB Contractor shall install any truck restriction signs provided by TxDOT.

24.3.3 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 ROW controlled by local Governmental Entities or other State Governmental Entities. DB Contractor shall coordinate with appropriate Governmental Entities for DB Contractor's design and installation of such signs.

24.3.4 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 will 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.

DB Contractor shall maintain existing third-party signs and shall not remove, adjust, or relocate third party signs without approval of the third party and TxDOT.

24.3.5 Sign Support Structures

DB Contractor shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practice. Designs for sign supports shall also comply with requirements in Item 21 and Item 23.

DB Contractor shall design toll rate DMS sign supports in accordance with System Integrator's requirements for DMS modules and the requirements of Item 30.

DB Contractor shall design sign support structures to provide a vertical clearance of not less than 25 feet from the highest point of the roadway to the centerline of the truss. Additionally, there shall be a vertical clearance of not less than 18 feet - 6 inches between the highest point on the roadway and the bottom of the sign.

DB Contractor shall design all overhead sign structures for Zone 4 with ice, 70 mph wind zone as shown in the TxDOT Wind Velocity and Ice Zones Standard.

Guide signs, excepting supplemental and traffic generator signs, shall not be ground-mounted alongside roadways with more than two lanes in a given direction. Guide signs for tolled Managed Lanes shall not be ground-mounted.

Guide signs shall not be mounted to bridges without TxDOT approval (this excludes signs shown as bridge-mounted on the Schematic Design).

24.3.6 **Toll Gantry Support Structures**

DB Contractor shall determine foundation types and design toll gantry foundations based upon geotechnical surveys/tests using Good Industry Practice. Designs for gantry support structures shall also comply with requirements in Item 21, Item 23, Item 29, and Attachment 29-4 (Toll Gantry Requirements).

24.3.7 **Pavement Markings**

DB Contractor shall ensure that the design and installation of all pavement markings comply with applicable TMUTCD requirements, Item 666 of the TxDOT Standard Specifications, and TxDOT Engineering Standard Sheets.

DB Contractor shall use shadow markings for skip lines on the controlled access main lanes where light-colored pavement does not provide sufficient contrast with the markings. Shadow markings consist of black markings in combination with standard TMUTCD marking colors as indicated in the TxDOT Contrast and Shadow Pavement Markings standard CPM (1)-14 and Dallas District Pavement Markings (Contrast Lane Lines) standard.

DB Contractor shall incorporate into its design the requirements for Dallas District SOP No. 126-11 "Striping for Controlled and Non-controlled Access Roadways."

24.3.8 **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.

24.3.8.1 **Traffic Signal Requirements**

DB Contractor shall design and install new or modified existing fully-actuated temporary and permanent traffic signals at all TxDOT-authorized intersections within Project limits that are impacted by the Traffic Control Plan and/or Final Design. DB Contractor shall maintain all signals modified by DB Contractor from the time at which it is modified through Final Acceptance. 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 comply with TxDOT *Traffic Signals Manual*.

DB Contractor shall provide both pedestrian and vehicle detectors at all traffic signals within the Site complying with TxDOT *Traffic Signals Manual*: Accessible Pedestrian Signal Guidelines.

DB Contractor's design shall also incorporate the following requirements:

- Design mast arms, poles, heads and foundations in accordance with TxDOT Engineering Standard Sheets and TxDOT Specifications;
- For City of Farmers Branch traffic signals use black Polycarbonate Signal Heads (no fewer than one signal head per lane, centered over each lane, oriented vertically) with LED signal indications and black aluminum, non-vented backplates;
- For City of Carrollton traffic signals use black Polycarbonate Signal Heads (no fewer than one signal head per lane, centered over each lane, oriented horizontally) with LED signal indications and black aluminum, non-vented, retroreflective backplates;
- Use timber poles and span wire only for temporary signals (construct in accordance with Dallas District Construction Details for Span Wire Mounted Traffic Signals standard);
- For City of Farmers Branch traffic signals install video detection systems for all approaches;
- For City of Carrollton traffic signals install video detection systems for all approaches;
- Use LED safety lighting on traffic signal poles;
- Design electrical system powering the signal equipment in accordance with the UAR for proper cover of conduit;
- Comply with Electrical Detail (ED) sheets of the TxDOT Engineering Standard Sheets, TxDOT Standard Specifications, TxDOT Departmental Material Specifications, and NEC;

- Use new or modified traffic signal equipment that is compatible with existing equipment currently used by the City of Farmers Branch, and the City of Carrollton, as appropriate;
- Install controllers, cabinets, video detection systems, and battery backup units provided by City of Farmers Branch (with agreed upon advance notice provided to City of Farmers Branch);
- Install controllers, cabinets, video detection systems, and battery backup units provided by City of Carrollton (with agreed upon advance notice provided to the City of Carrollton); and
- Use 1"-4" conduits for electrical and communications as required by design and recommended by City of Farmers Branch and City of Carrollton.

DB Contractor shall purchase and install traffic signals that meet the requirements of TxDOT, the City of Farmers Branch, and the City of Carrollton. Signal equipment designated to be furnished by the City of Farmers Branch and the City of Carrollton will be provided at no cost to DB Contractor. A list of furnished signal equipment is included in the signals force account agreement located in the RID. DB Contractor shall install all signal equipment furnished by the City of Farmers Branch and the City of Carrollton and shall purchase and install any additional signal equipment necessary for traffic signal operation that is not furnished by the City of Farmers Branch and the City of Carrollton.

DB Contractor shall submit its signal timing plan design for all new and modified traffic signals to City of Farmers Branch and the City of Carrollton, as appropriate, for review. The City of Farmers Branch and the City of Carrollton may each elect to implement signal timing themselves. DB Contractor shall implement signal timing, unless notified that the City of Farmers Branch and/or City of Carrollton have elected to implement their corresponding signal timing.

DB Contractor shall provide training for city staff on all new Accessible Pedestrian Signal units.

DB Contractor shall install communications hardware/equipment provided by the City of Farmers Branch, and City of Carrollton in order for the City of Farmers Branch, and City of Carrollton, as appropriate, to communicate with each new or modified signal from their respective traffic management centers.

DB Contractor shall install emergency vehicle pre-emption hardware and equipment, if provided by the City of Farmers Branch and/or City of Carrollton. If equipment is existing and the City of Farmers Branch and/or City of Carrollton elect not to provide new equipment, DB Contractor shall relocate existing equipment to temporary and permanent signals.

DB Contractor shall install CCTV equipment, if provided by the City of Farmers Branch and/or City of Carrollton. If equipment is existing and the City of Farmers Branch and/or City of Carrollton elect not to provide new equipment, DB Contractor shall relocate equipment to temporary and permanent signals.

For signals in City of Carrollton, DB Contractor shall accommodate and install decorative signal pole base and cap, if provided by City of Carrollton.

For locations in City of Farmers Branch, DB Contractor shall protect and re-use existing street name blades. For locations in City of Carrollton, DB Contractor shall protect and re-use existing street name blades and only install permanent street name blades if provided by City of Carrollton.

TxDOT authorized intersections requiring new (or full replacement) permanent traffic signals are:

- NB I-35E Frontage Road at Valley View Lane (City of Farmers Branch)
- SB I-35E Frontage Road at Valley View Lane (City of Farmers Branch)
- NB I-35E Frontage Road at Valwood Parkway (City of Farmers Branch)
- SB I-35E Frontage Road at Valwood Parkway (City of Farmers Branch)
- NB I-35E Frontage Road at Crosby Road (City of Carrollton)
- SB I-35E Frontage Road at Crosby Road (City of Carrollton)
- NB I-35E Frontage Road at Whitlock Lane (City of Carrollton)
- SB I-35E Frontage Road at Sandy Lake Road (City of Carrollton)

DB Contractor shall modify other existing signals, when appropriate and as necessitated by the Project. This includes, but is not necessarily limited to, modifying the existing signals at Belt Line Road.

24.3.8.2 Traffic Signal Timing Plans

DB Contractor shall design signal timing plans for all new and modified traffic signals. DB Contractor shall coordinate and implement signal timing plans that optimize traffic flows and provide signal coordination with

adjacent intersections and arterials for all new and modified signals. This includes providing updated timing plans for adjacent network throughout the construction duration. Unless timing maintenance is otherwise provided by a Governmental Entity pursuant to a Third Party Agreement, DB Contractor shall be responsible for updating signal timing as necessary to maintain optimized flow. DB Contractor shall provide on-site staffing to make signal timing adjustments. 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 the appropriate Governmental Entity.

24.3.8.3 **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 all intersections requiring new (or full replacement) permanent traffic signals listed in Section 24.3.8.1 and shall submit these signal warrant studies to TxDOT for review prior to advancing Final Design and prior to submitting traffic signal plans 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 shall be subject to TxDOT approval. Requests for signals shall include supporting signal warrant studies. Traffic signal plans prepared in accordance with the TMUTCD, TxDOT Engineering Standard Sheets and TxDOT Specifications shall be submitted to TxDOT for review if TxDOT approves the request.

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 Chapter 3 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% reduction to the design year traffic projections. At TxDOT's request, DB Contractor shall conduct additional traffic signal warrant studies for all intersections located in the Project ROW, prior to Final Acceptance. If additional signals or modifications to existing signals are warranted, based on the traffic volumes obtained through these studies, DB Contractor shall be responsible for installation of additional traffic signals or modification of previously-installed traffic signals. If, based on the above traffic counts, the need for a signal or signal modification is unclear, TxDOT will reasonably determine if the new signal or signal modification is required.

24.3.8.4 **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 appropriate Governmental Entities' approval of traffic signal support structures to be used on new and modified signal installations.

Designs for traffic signal support structures shall also comply with requirements in Item 21.

DB Contractor shall use long mast arms (LMA) when more than three signal heads are to be supported on a mast arm.

24.3.8.5 **Traffic Signal Systems**

DB Contractor shall provide interconnection (using radio) between new or modified signals and the City of Carrollton for traffic signal monitoring and control. DB Contractor shall ensure continuous communication with these new or modified signals.

DB Contractor shall provide to TxDOT an ATP for all traffic signals as part of the Final Design Submittal. 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.

24.3.9 **Lighting**

DB Contractor shall perform locates on existing, temporary and proposed illumination infrastructure. TxDOT will not perform any locates after NTP2.

DB Contractor shall provide continuous illumination, utilizing high mast lighting, throughout the Project. Existing conventional lighting shall be removed. New conventional lighting shall only be used along cross streets and at locations where high mast lighting cannot provide the required photometric coverage or there are FAA height restrictions, subject to approval by TxDOT.

The existing high mast illumination located along I-35E in the vicinity of the President George Bush Turnpike interchange is owned and maintained by the North Texas Tollway Authority (NTTA). Proposed illumination in this area shall remain as part of the NTTA illumination system. If any of the existing high mast lights are impacted by the proposed construction, they must be relocated/replaced to meet NTTA standards.

DB Contractor shall provide LED fixtures for high mast lighting and LED fixtures for conventional roadway lighting and under bridges at underpass/overpass locations throughout the project. Underpass lighting will be limited to locations with existing underpass lighting or to locations with new structures (or widened structures) greater than or equal to 100 feet in width.

DB Contractor shall design the lighting, where necessary, through the entire project limits to prevent measurable spillage outside the Project ROW and onto the adjacent properties using either cut-off shields or tightly-controlled photometrics combined with appropriate mounting height. DB Contractor shall submit a lighting plan and light spillage measurements for the entire project limits to TxDOT for review and approval as part of the Final Design Submittal. In addition, the overflow of light onto any surface area outside of the Project ROW shall not exceed 10% of the average horizontal illumination as defined in the TxDOT *Highway Illumination Manual*.

DB Contractor shall prepare lighting plans 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 the photometric data results for all lighted areas within the Project limits to TxDOT for review and approval as part of the Final Design Submittal. The Submittal shall include all input data.

Lighting along cross streets shall be provided in locations where lighting systems are currently provided within the Project limits. All third-party requests for lighting within the Project limits shall be subject to TxDOT approval including a lighting agreement covering responsibilities for operation and maintenance of the finished lighting.

DB Contractor shall provide lighting designs to meet criteria listed in Table 3-5a of the AASHTO *Roadway Lighting Design Guide* on all traveled roadways to be illuminated. Traveled roadways include: mainlanes, Managed Lanes, interchanges, collector distributors, ramps, ramp terminals, and frontage road intersections with cross streets.

DB Contractor shall design lighting systems, including safety lighting where warranted, in accordance with the TxDOT *Highway Illumination Manual*. All design and construction shall comply with the NEC, latest TxDOT Engineering Standard Sheets, TxDOT Departmental Material Specifications, and TxDOT Standard Specifications. At all times during the Term, DB Contractor shall maintain safe lighting conditions along the Project roadway. DB Contractor shall develop temporary illumination plans as part of the Final Design process that demonstrate that lighting conditions will be maintained throughout construction.

Conventional luminaire poles and breakaway bases shall be designed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* and TxDOT Engineering Standard Sheets. 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. Any high mast lighting poles shall meet the requirements of TxDOT Engineering Standard Sheets and TxDOT Standard Specifications.

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 cables, fiber-optic lines, traffic 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:

- Placing luminaire mast arms on traffic signal poles
- Placing pole bases on existing or proposed concrete traffic barrier
- Placing poles behind existing or proposed concrete traffic barrier or metal beam fence
- 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 must coordinate with the FAA regarding the installation of obstruction lights, if any, on a case-by-case basis.

DB Contractor shall provide to TxDOT an ATP for all illumination as part of the Final Design Submittal. This ATP shall also be submitted to the appropriate Governmental Entity. DB Contractor shall conduct testing in accordance with the ATP and Item 616 of the TxDOT Standard Specifications and document those results to show conformance.

24.3.9.1 **Lighting Infrastructure**

At a minimum, all underground conduit shall be Schedule 80 PVC and not less than 2 inches in diameter.

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.

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.

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.

Minimum dimensions for ground boxes shall be as shown on TxDOT Engineering Standard Sheet ED(4)-14.

Ground box covers shall be 2-inch-thick (nominal), non-conducting material and labeled "Danger High Voltage Illumination."

Riprap aprons shall be provided around all ground boxes and high mast light poles not otherwise protected with concrete.

Illumination related electrical services shall have an identification tag denoting a contact person or office in case of Emergency or for maintenance, and the address and telephone number.

Electrical part of the installation shall be designed and installed in conformance with the NEC, TxDOT Engineering Standard Sheets, and TxDOT Standard Specifications.

Seal all conduit ends with lighting circuits with at least three feet of polyurethane foam approved by the Engineer that will not adversely affect other plastic materials or corrode metals – alternate methods of wire theft prevention may be submitted for approval.

Seal ground boxes for lighting circuits with polyurethane foam approved by the Engineer that will not adversely affect other plastic materials or corrode metal – alternate methods of wire theft prevention may be submitted for approval.

Existing high mast light poles within the Project limits may be relocated by the DB Contractor.

24.3.10 **Visual Quality**

Notwithstanding the requirements of Section 24.3.9, DB Contractor shall provide luminaires of equal height along the roadway when using conventional poles.

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.

24.4 Construction Requirements

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 24 and the TxDOT Standard Specifications.

24.4.1 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 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 MMS.

All signs within the Project Limits are required to meet the minimum retroreflectivity values specified in TMUTCD Table 2A-3 (Minimum Maintained Retroreflectivity Levels).

24.4.2 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 10 days after application:

- Type I, thermoplastic pavement markings
  - White markings: 250 millicandelas per square meter per lux (mcd/m2/lx)
  - Yellow markings: 175 mcd/m2/lx
- Type II, paint and beads
  - White markings: 175 mcd/m2/lx
  - Yellow markings: 125 mcd/m2/lx

The IQF shall measure retroreflectivity values for all pavement markings in accordance with Item 666 of the TxDOT Standard Specifications and TxDOT Special Specification 6291 to confirm the compliance.

24.4.3 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.

During the test period, DB Contractor must provide a contact that can handle emergency calls 24 hours/day for all new signals.

24.4.4 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 during construction and restore or replace prior to Substantial Completion. At all times during the Term, safe lighting conditions shall be maintained along the Project roadway.

DB Contractor shall remove all unused existing illumination-related cable and conduit that does not have existing pavement or riprap above it; any unused existing illumination-related conduit that is under the existing pavement or riprap may be abandoned.

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 label on each electrical service indicating service address as well as all required information shown on the Electrical Detail (ED) sheets of the TxDOT Engineering Standard Sheets and TxDOT Departmental Material Specifications.

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.

Existing conductors shall be removed from abandoned conduit.

24.4.5 Reference Markers

DB Contractor shall place reference markers and/or mile markers at approximately one mile apart in accordance with the TRM system. DB Contractor shall set reference markers and/or mile markers according to the TMUTCD. Once placed, DB Contractor shall inventory and record reference markers with GPS. DB Contractor shall provide this information to TxDOT in Microsoft Excel format.

24.5 Submittals

All Submittals described in this Item 24 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 24-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 24-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notification of meetings with local Governmental Entities	48 hours prior to the start of Governmental Entity meeting	For information	24.2.1
Preliminary operational signing schematic	Prior to commencing Final Design	Approval	24.3.1
Signs, delineation, non-standard sign structures, pavement markings, traffic signals, and lighting layout	Prior to placement	Review and comment	24.3.1
Preliminary lighting layout	Prior to commencing Final Design	Approval	24.3.1
Copies of all final implemented signal timing plans	With Record Drawings	For information	24.3.8.2
Signal warrant studies	Prior to advancing Final Design and prior to submitting traffic signal plans for review	Review and comment	24.3.8
ATP for all traffic signals	As part of the Final Design Submittal	Review and comment	24.3.8.5
Third Party requests for lighting within Project limits, including lighting agreements for operations and maintenance	As part of the Final Design Submittal	Approval	24.39
Lighting plan and light spillage measurements	As part of the Final Design Submittal	Approval	24.3.9
Photometric data results	As part of the Final Design Submittal	Approval	24.3.9
ATP for all illumination	As part of the Final Design Submittal	Review and comment	24.3.9
Non-standard light pole design	As part of the Final Design Submittal	Approval	24.3.9.1
Electronic design calculations for light poles with a base 25 feet above the elevation of surrounding terrain to TxDOT, Bridge Division	As part of the Final Design Submittal	Approval	24.3.9.1

Table 24-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Electronic shop drawings for light poles with a base 25 feet above the elevation of surrounding terrain to TxDOT, Bridge Division	Prior to construction	Approval	24.3.9.1
Alternate methods of wire theft prevention	As part of the Final Design Submittal	Approval	24.3.9.1
Sign identification record	After placement of all signs	For information	24.4.1
Reference marker record	After placement of all markers	For information	24.4.5

Item 25
Intelligent Transportation Systems

25.1 **General Requirements**

An ITS is necessary for monitoring the Project's traffic flow and performance both temporarily during construction and as a permanent installation after roadway opening to traffic. 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.

DB Contractor shall connect the Project ITS that it provides 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.

DB Contractor shall maintain and protect any existing ITS functionality to include communications networks within the Project until Final Acceptance, except during Force Majeure Events, periods of system maintenance or system crossovers, or other periods approved by TxDOT.

DB Contractor shall abide by TxDOT's information security standards:

- Access to the TxDOT network can be granted to DB Contractor where there is a demonstrated business need;
- TxDOT follows the principles of "least privilege," where the access granted should be the minimum necessary to perform legitimate business functions; and
- Access to the TxDOT network or system for DB Contractor is granted by issuing each individual that requires such access a unique email address, requiring the contractor to certify that they understand and agree to abide by TxDOT acceptable use standards, and authenticating the user through TxDOT's active directory system.

DB Contractor shall produce temporary ITS plans detailing how connectivity and functionality will be maintained throughout construction, including connectivity with other appropriate Governmental Entities which have existing connections. DB Contractor shall not use wireless connectivity to maintain the ITS for either the general ITS or the Tolling ITS components during construction. DB Contractor may propose to use temporary aerial fiber to maintain ITS connectivity during construction.

The Project ITS shall conform to TxDOT and Dallas District Standards and 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.

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. The Project ITS shall be planned and designed using a systems engineering approach, including the performance of a systems engineering analysis for the Project as required by 23 CFR § 940.11. All components of the ITS shall conform to the provisions of the NTCIP, and the statewide Transportation Systems Management and Operations (TSMO) Strategic Plan, available at https://www.txdot.gov/inside-txdot/division/traffic/tsmo.html.

The Project ITS shall operate under the Regional ITS Architecture. DalTrans shall be the main Traffic Management Center (TMC) for this Project, and DB Contractor shall maintain ITS interoperability with the TMC and other Governmental Entities over the Term. Communication and interoperability shall be achieved with other TMCs in the region, 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 ITS shall be coordinated with the ETCS such that the communication requirement of the ETCS are accommodated.

25.2 **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 the systems of TxDOT in the manner described in this Section 25.2 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 efforts, DB Contractor shall conduct an ITS workshop with TxDOT, and affected Governmental Entities (per TxDOT's direction) to:

- Confirm TxDOT's operational requirements;
- Review DB Contractor's survey of existing ITS infrastructure and condition assessment;
- Discuss concepts, identify potential resolutions for Site-specific issues (as identified by DB Contractor);
- Determine communication requirements;
- Determine requirements for design;
- Determine requirements for construction including security considerations (burying of ground boxes, welding ground boxes shut, etc.);
- Determine requirements for construction and coordination of activities with adjacent roadways;
- Confirm requirements of other affected parties and Governmental Entities; and
- Address other topics as needed to ensure the design meets all requirements herein.

DB Contractor shall prepare a preliminary ITS layout for review and comment by TxDOT to ensure adequate planning of the ITS implementation. Subject to the specific requirements of this Item 25, DB Contractor shall determine the number and specific locations of all ITS components. The ITS shall consist of all equipment necessary to implement the ITS described in this Section 25.2.

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 DalTrans.

DB Contractor shall not make any recommended modifications to the specifications without TxDOT's approval.

ITS devices may be co-located on the same ITS pole, provided that they can function independently for the portion of the facility for which they are intended (i.e. existing mainlanes or proposed elevated structure).

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, except that DMS and SDMS cabinets may be ground mounted.

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. DB Contractor shall provide metered service to ITS field devices and cabinets consistent with TxDOT's Engineering Standard Sheets and TxDOT Standard Specifications.

ITS devices and associated mountings shall be designed to withstand at least an 80-mph wind load, except that DMS and associated mountings with a design wind height of more than thirty feet (as defined by TxDOT Traffic Engineering Standard Sheets) shall be designed to withstand at least a 100-mph wind load. CCTV poles shall have a minimum height of 60 feet, except when shorted CCTV poles are needed for a view under bridges or other obstructions to meet the coverage requirement, subject to TxDOT approval. Poles used solely for RVSD shall have a minimum height of 40 feet. DMS shall have a minimum vertical clearance to the roadway of 18.5 feet.

The installed ITS equipment shall provide TxDOT accurate and reliable data and quality video images, and accurate control of field devices from DalTrans on a real-time basis, 24 hours a day, 7 days a week. Real-time is defined as correct data being available at DalTrans 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 Dallas 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 Dallas 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.

New ITS electrical services shall use stainless steel enclosures. Unless otherwise approved by TxDOT, underground services shall be utilized to provide aesthetically pleasing structures on public ROW.

25.2.1 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 by TxDOT, DB Contractor shall provide communication node buildings and cabinets to support the communications network.

The current TxDOT communications network backbone is a 10 GB 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 three single mode fiber optic cables in the duct bank. One 48 strand ITS fiber optic cable shall be utilized as a main trunk line, one 48 strand ITS fiber optic cable for hub-to-hub, and one fiber optic cable for the tolling elements. The- tolling-specific cable shall meet the fiber requirements of Items 29 and 30 to provide the required number of fiber strands. Lateral fiber optic cables from hub cabinets to ITS devices shall be a minimum of 6-strand single mode fiber optic cable. No splicing of trunk line 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 two cables of 48 strands of general purpose fiber (main trunk line and hub-to-hub) 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 1 ground boxes with aprons shall be utilized unless otherwise approved by TxDOT, with the exception that Type 2 ground boxes shall be used at hub cabinets, satellite buildings, and toll gantries. All ground box lids shall be secured. DB Contractor shall provide alternatives to TxDOT to improve TxDOT's current practices for securing ground box lids and are subject to TxDOT approval.

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 (according to SS Item 6007) prior Substantial Completion and prior to turnover of the toll and toll-related ITS locations, at each Toll Zone Work Section, to the Systems Integrator.

DB Contractor shall submit proposed fiber termination charts to TxDOT for approval.

25.2.2 **Conduit**

DB Contractor shall submit, for 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 as part of the Final Design Submittal. ITS devices shall be powered by dedicated services which are separate from traffic signals, illumination, and other devices. No exposed conduit sections will be permitted. Rigid metal conduits hung between girders and only visible from a location under a bridge are considered not to be exposed. All sections shall have a minimum of 42 inches of cover over all ITS conduit except:

- Where boring is required to cross under intersections; and
- 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 conduit for tolling communication cable and electrical conductor at all Toll Zones in accordance with Item 29; and at each ETCS Element and throughout the corridor for the Managed Lanes in accordance with Item 30.

DB Contractor shall provide separate conduits for tolling and toll-related ITS communication, tolling and toll-related ITS power, general purpose ITS communication and general purpose ITS power. For trunk lines, three 3-inch Schedule 40 conduits and one 4-inch multi-duct shall be used, with the multi-duct and one 3-inch conduit for general purpose ITS and two 3-inch conduits for tolling ITS. For branches to power sources, one 2-inch Schedule 40 conduit shall be used. The percent fill per conduit shall not exceed 30% of the fill capacity. 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. With TxDOT's concurrence, additional conduits or increased conduit dimension shall be provided should the capacity requirement be exceeded. A #8 insulated (orange color-coded) electrical conductor wire for detection shall be placed in all three trunk lines. All conduit shall have end to end pull tape.

Lateral communication conduits from trunk line to ITS devices shall be three-inch diameter. Power to ITS devices shall be 2-inch minimum diameter.

Specifications for the conduit and other communications infrastructure needed for tolling are located in Item 29.

Within the proposed tolling and ITS duct bank, the general purpose ITS conduit shall support a minimum of two 48-strand fiber optic cables and be separate from the conduit for the toll fiber optic cable. DB Contractor shall maintain adequate separation (generally at least ten feet) 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 24 hours.

DB Contractor shall provide materials and use construction methodology that, at a minimum, meets the most current or applicable TxDOT statewide specifications and TxDOT Dallas District specifications, including placement of a trace wire within the conduit, placing locator tape and installing above ground markers, and providing the required 42 inches or more of cover.

25.2.3 **CCTV Cameras**

DB Contractor shall provide CCTV cameras for Incident or Emergency 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.

25.2.3.1 **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 Engineering Standard Sheets and TxDOT Standard 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 DalTrans, and if necessary, convertible for use by TxDOT's in-place ITS network.

25.2.3.2 **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 ITS poles unless otherwise approved by TxDOT. CCTV cameras are not to be mounted on DMS structures. Permanent locations of CCTV camera poles shall be submitted prior to commencing Final Design and subject to TxDOT approval.

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. Additionally, each CCTV camera shall be able to view the CCTV camera immediately upstream and downstream from itself unless otherwise approved by TxDOT.

DB Contractor shall additionally provide fixed CCTV cameras dedicated to clearly viewing the front of each toll rate DMS. These additional CCTV cameras are not to be included in general spacing and coverage measurements.

25.2.3.3 **Video Requirements**

DB Contractor shall provide state-of-the-art CCTV cameras that meet the requirements of the applicable TxDOT Engineering Standard Sheets and Dallas District Standards. If at any time prior to Final Acceptance, should any CCTV cameras fail to meet the latest TxDOT Engineering Standard Sheets or Dallas District Standards in effect at the time of design, DB Contractor shall replace such cameras within 48 hours of discovery of lack of compliance.

25.2.3.4 **Operating Requirements**

DB Contractor shall provide cameras with built-in heaters, mounting structure, and related equipment capable of operating within the following weather conditions:

- Wind load of 80 mph without permanent damage to mechanical and electrical equipment;
- Ambient temperature range of -35 degrees Fahrenheit to +140 degrees Fahrenheit;
- Relative humidity range not to exceed 95% within the temperature range of +40 degrees Fahrenheit to +110 degrees Fahrenheit; and
- Humidity range of 0 to 100% condensing.

25.2.3.5 **Control Requirements**

DB Contractor shall supply CCTV equipment on this Project which is fully compatible with the existing CCTV control systems operated from DalTrans by the Lonestar software system. 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 DalTrans information technology personnel as part of the equipment submittal and approval process. DB Contractor shall test CCTV equipment prior to installation. A minimum of 30 days prior to testing, provide to TxDOT the proposed test procedure for review and comment. DB Contractor shall invite TxDOT to observe testing and shall coordinate with TxDOT personnel schedules to enable TxDOT observation. The equipment submitted for testing must be fully assembled and in a fully operational condition. DB Contractor shall configure all equipment submitted for testing as is intended for use on the Project. Prototype equipment is not permitted. 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, the equipment must, at a minimum, correctly respond to the following commands:

- Pan left

- Pan right
- Focus near
- Focus far
- Tilt up
- Tilt down
- Iris open
- Iris close
- Iris override
- Zoom in
- Zoom out
- Camera power (latching)
- Pan tilt position preset

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 shall 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 DalTrans. Equipment which in any manner is not fully operational with the control system will be considered as not passing the test. DB Contractor shall be permitted one opportunity to retest equipment which does not pass the initial test. The retest must occur within 30 days after the initial test. All issues of non-compliance and all discrepancies shall be resolved prior to commencing the second test. Equipment which is not able to be retested within 30 days, or which does not pass the second test, shall not be used on the Project. DB Contractor shall not be entitled to additional time or compensation on account of 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.

25.2.4 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-half mile for each highway lane in the Project, and, at a minimum, provide detection for all highway lanes at one location and shall include each interchange lane, each entrance ramp lane, and each exit ramp lane. DB Contractor shall locate the devices on the side of the Project nearest the largest shoulder so as to limit the potential interference by the concrete traffic barrier on detecting vehicles and collecting information. Vehicle detection devices are not required for the frontage roads.

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. DB Contractor shall provide detectors that allow TxDOT to adjust the frequency rates that the data files are provided by device.

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 the TxDOT Standard Specifications and Good Industry Practice 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. Permanent locations of vehicle detector poles shall be subject to TxDOT approval.

25.2.5 **DMS**

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 with full control of DMS messaging at all times.

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.

Location and placement of DMS shall be approved by TxDOT.

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 full color DMS that use LED display technology and support full matrix graphics. DMS used shall conform to the TxDOT special specification NTCIP for DMS and shall demonstrate compliance to TxDOT therewith prior to installation of DMS by DB Contractor.

DB Contractor shall provide all necessary DMS, support structures and equipment, including, but not limited to, DMS devices, controls, cables, and connections.

DB Contractor shall maintain any existing DMS functionality within the Project during construction and shall not impact the operation of any existing DMS within the Project during construction absent approval from TxDOT.

DB Contractor shall design all Toll Rate DMS signs and supports in accordance with Systems Integrator's requirements for DMS modules and the requirements of Item 30. All DMS shall be visible and legible via CCTV cameras. DMS shall have the ability to be controlled using the latest TxDOT's DMS operating system being used at DalTrans.

Existing DMS are located near the following locations:

- SB I-35E at Valley View (non-TxDOT owned/operated);
- SB I-35E at Valwood;
- NB I-35E at Crosby;
- NB I-35E at Belt Line;
- SB I-35E at Luna (full replacement);
- NB I-35E at Whitlock.

Existing DMS shall be maintained in these locations and relocated in the vicinity as necessary to accommodate proposed construction. DB Contractor shall fully replace the DMS identified above as "full replacement" locations with new equipment. DB Contractor shall seek approval from TxDOT for any and all changes to DMS locations. DB Contractor shall be responsible for working with the owner/operator of the non-TxDOT DMS near SB I-35E at Valley View (for this and any other non-TxDOT DMS, SDMS, other equipment, and other ITS infrastructure).

DB Contractor shall be responsible for any rehabilitation necessary for the on-site re-use of existing DMS. Should rehabilitation not be possible, DB Contractor shall replace with new DMS. Any existing DMS not re-used on-site are to be removed and returned to TxDOT.

25.2.6 **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.

Connectivity to DalTrans will be maintained by fiber connectivity through existing Satellite #2 at the IH35E/IH635 interchange or existing Satellite #15 at the IH35E/PGBT interchange as determined by TxDOT.

New general purpose ITS Hub Cabinets shall be ground mount Type 332 Hub Cabinets (Type 4) with front and back doors.

25.2.7 **Single-Line DMS (SDMS)**

Install new external side mount battery backup units to all Single-Line DMS (SDMS) cabinets (including existing cabinets, if applicable).

25.2.8 **Access Control System (ACS)**

I-35E features an existing reversible tolled managed lane facility. To remain consistent with the access control system designed for other regional reversible tolled managed lane facilities, the ACS at each access location shall consist of a series of automated barricade gates on each side of a vehicle arresting barrier (VAB). The exhibit titled "Reversible Managed Lanes Access Control System" provided in the RID depicts the required control systems to be installed in order for the facility to continue to be operated as reversible operations. DB Contractor shall maintain the ACS system during the construction period.

The automated barricade gate includes, but is not limited to the following:

- gate support frame with built-in anchoring base;
- Gate swing arm;
  - Gates shall not be operated wirelessly unless approved by TxDOT.
- Horizontal FHWA approved NCHRP 350 crash tested swing gate;
- Electrical linear actuator equipped with:
  - End of travel limit switches;
  - Mechanical overload protection; and
  - Hand crank manual override.
- Electrical components and associated equipment:
  - Power control circuit for actuator operation;
  - 12 VDC battery charger;
  - Full gate light power management and flashing logic; and
  - The equipment shall be capable of using a generator in the event of a power loss.
  - Pushbutton Control Panel (remote).

These gates shall be hardwired together at a given entrance or exit location

At least one gate shall be installed on either side of the VAB at the end of the concrete traffic barrier so that a vehicle will encounter at least one gate if trying to enter or exit the reversible Managed Lane facility against the flow of traffic.

The VAB is used to prohibit motor vehicles from entering a closed highway. The VAB must safely decelerate and stop a vehicle in accordance with NCHRP 350 guidelines, Test Level 3. Vehicles shall be limited to light cars up to busses with a maximum speed of 60 MPH and 40 MPH, respectively. The VAB includes, but is not limited to the following:

- Vehicle restraining mechanism;
- Structural frame;
- Lifting mechanism; and
- Local controls.

The restraining mechanisms consist of, as a minimum, two energy-absorbing devices on either side of a restraining net. The devices travel with the lifting-lowering mechanism to open or close a road and have bi-directional vehicle stopping ability. The restraining net has high strength impact capacity and has a reflective stop sign attached to both sides of the net. The net entraps the vehicle and transfers the force of the impact to the energy-absorbing devices.

Both the gates and the VAB shall be connected to the ITS network and controllable in an automated manner both with systems in use by TxDOT at DalTrans and locally using a hand-held device capable of controlling all control access systems. Each device shall also be able to be lowered and raised manually.

Modifications to concrete traffic barrier, pavement, or other civil elements may be required to accommodate the gate and VAB devices. DB Contractor is required to incorporate these modifications.

DB Contractor shall consult with TxDOT prior to incorporating modifications to the TxDOT Schematic Design that could impact the number or configuration of gates and VABs.

DB Contractor is required to have the gates and VAB connected to, and controlled by, the software in use by/from/at DalTrans. DB Contractor shall bear responsibility for making their components work with the existing software and shall make modifications necessary to accomplish this. SDMS, gates, and VAB shall be connected and controlled in a way that they cannot be in conflicting/contradictory states; for example, SDMS states that the Managed Lanes are open when the gates and VAB are closed. This conflict monitoring controller shall be NTCIP compliant with all configuration files provided to, and property of, TxDOT. System shall be capable of providing a confirmation message regarding the open/closed status to TxDOT at DalTrans.

Communications equipment for the gates and VAB at a given entrance or exit location may be housed in the same cabinet. SDMS communications shall be housed separately. The maximum proximity of the communication cabinet to the VAB and gates shall be 300 feet.

25.3 Construction Requirements

25.3.1 General

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 25 in accordance with the requirements of this Item 25 and the TxDOT Standard Specifications.

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. To maintain detection accuracy, DB Contractor shall reconfigure vehicle detectors throughout the duration of the Project to correspond with any changes in roadway geometry.

DB Contractor shall coordinate with Utility Owner(s) and ensure that power service is available for permanent ITS systems.

The DB Contractor shall also conduct all Work for this Item 25 in accordance with the requirements of the following TxDOT special specifications and special provisions:

The following list includes, but is not limited to, ITS elements with the most recent special specifications:

- ITS System Support Equipment – SS6003;
- Networking ITS Comm Cable – SS6004;
- Testing, Training, Documentation, Final Acceptance & Warranty – SS6005;
- Electronic Components – SS6006;
- Fiber Optic Cable – SS6007;
- ITS Ground Mounted Cabinet – SS6008;
- Rack Mounted Electronic Equipment Cabinets – SS6064;

- Closed Circuit Television (CCTV) Field Equipment – SS6010 and SP6010-001;
- Fiber Optic RS-232 Data Modem – SS6015;
- Multi-duct Conduit System – SS6016;
- Preparation of Existing Conduits, Ground Boxes, or Manholes – SS6027;
- Dynamic Message Sign System – SS6028;
- Radar Vehicle Sensing Device – SS6304;
- ITS System Integration – SS6032;
- Battery Backup System for Signal Cabinets – SS6058;
- ITS Radio – SS6062;
- ITS Pole with Cabinet – SS6064;
- ITS Media Converter – SS6183;
- Fiber Optic Transceiver – SS6184; and
- Intelligent Transportation System (ITS) Ground Box - SS6186
- Automated Barricade Gate – 2004 SS2055.

25.3.2 **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.

DB Contractor may reuse during construction existing vehicle detection devices and CCTV cameras that are operational and meet current TxDOT requirements, but shall replace these components with new equipment prior to the Substantial Completion Deadline.

All existing general purpose ITS Hub Buildings within the Project limits shall be removed and replaced with new ground mount Type 332 Hub Cabinets (Type 4) with front and back doors.

Existing general purpose ITS Satellite Buildings impacted by the Project shall be relocated and shall retain all existing functionality and fiber connectivity to DalTrans.

25.3.3 **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:

- Functional design plan;
- Communications analysis report;
- Operational and requirements report
- Applicable updates to the regional ITS architecture; and
- 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 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.

The DB Contractor shall document the existing regional ITS architecture and document applicable updates to the regional ITS architecture within the ITS Implementation Plan. The DB Contractor, as a part of Final Design, shall update the regional ITS architecture in the format used by TxDOT (such as turbo architecture) for this Project.

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 submit this certification to TxDOT prior to Substantial Completion.

DB Contractor shall submit the CCTV secondary control equipment and design to TxDOT for approval a minimum of six months prior to Substantial Completion.

25.3.4 **End-to-End Testing**

DB Contractor shall provide notice and coordinate with TxDOT DalTrans to allow for end-to-end testing of the ITS. Testing for ITS fiber will occur during the 21 Day period prior to Substantial Completion and testing for the tolling fiber will occur according to the requirements of each Toll Zone Work Section Completion Milestone and DB Contractor shall provide TxDOT and DalTrans staff 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 shall coordinate to ensure that there will be no conflicts between TxDOT, and their affiliated contractors, and DB Contractor's staff.

DB Contractor shall not commence end-to-end testing until the following conditions have been met: DB Contractor and TxDOT shall have successfully completed all their testing, DB Contractor has completed training of all relevant TxDOT staff, and DB Contractor has met all acceptance requirements for DB Contractor installed ITS devices, satellite buildings, communication and electrical networks, and generators.

DB Contractor shall be responsible, at a minimum, for the following:

- Coordinating the end-to-end testing with TxDOT to ensure that there will be no conflicts between TxDOT, their affiliated contractors, and DB Contractor's staff;
- Providing temporary advance signing (if needed) stating that the facility is closed and testing is occurring;
- Providing MOT/traffic control at all necessary locations for a maximum of five full days, which could include evenings and weekends and are not required to be consecutive;
- Providing access to the facility for authorized TxDOT staff and contractors; and

- Repairing any issues found with DB Contractor's work within one 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 the services as described above, or to meet other maintenance, safety or emergency requirements of the DB Contract. TxDOT may, at its sole discretion, provide DB Contractor access to the Project to conduct work outside the services described above.

DB Contractor shall compile and provide the results of the end-to-end testing to TxDOT as a submittal within 10 Days of completing the end-to-end testing.

25.3.5 **Record Documents**

The Record Documents shall include the construction drawings, documentation of end-to-end testing, as well as catalog sheets for all equipment and components. DB Contractor shall maintain for the Term 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.

25.3.6 **Salvaging Existing Items**

DB Contractor shall salvage any existing ITS equipment removed during construction of the Project, including all existing detection devices and cameras, deliver to a location specified by TxDOT, and stockpile as requested by TxDOT, all in an undamaged condition.

25.4 **Reserved**

25.5 **Submittals**

All Submittals described in this Item 25 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 25-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise required.

Table 25-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Preliminary ITS Layout	Prior to Final Design Submittal	Review and comment	25.2
Termination charts	Prior to implementation	Approval	25.2.1
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	As part of the Final Design Submittal	Review and comment	25.2.2
CCTV camera pole locations	Prior to commencing Final Design	Approval	25.2.3.2
Proposed CCTV equipment test procedure	30 days prior to testing	Review and comment	25.2.3.5
DMS Location and Placement	As part of Implementation Plan	Approval	25.2.5
ITS Implementation Plan	As part of the Final Design Submittal	Approval	25.3.3
Certification that the ITS effectively meets the required functional requirements	Prior to Substantial Completion	For information	25.3.3
CCTV secondary control equipment and design	Six months prior to Substantial Completion	Approval	25.3.3
Notice of end-to-end testing	Prior to implementation	For information	25.3.4
Results of the end-to-end testing	10 days after testing is completed	For information	25.3.4

Item 26
Traffic Control

26.1 **General Requirements**

DB Contractor shall design, construct, and maintain the Project, in conformance with the requirements stated in this Item 26, 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 is responsible for gaining approval from TxDOT, the appropriate Governmental Entity and property owner for each intersecting street or driveway closure.

During all phases, temporary, new and existing ITS equipment, street lights, and traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system.

DB Contractor shall provide and maintain temporary illumination throughout the duration of construction for all roadways and intersections that have existing illumination. All temporary illumination shall meet or exceed existing illumination levels.

DB Contractor shall install permanent illumination during construction as soon as practicable to enhance safety and benefit the traveling public but in no event later than opening to traffic.

26.1.1 **Lead MOT Design Engineer**

DB Contractor shall employ a Lead MOT Design Engineer responsible for ensuring the Traffic Control Plans (TCP) are prepared in accordance with the Contract Documents. The Lead MOT Design Engineer shall be a PE with relevant experience overseeing the development of TCP during the design and construction phase of highway projects similar in size and scope as the Project. Lead MOT Design Engineer shall be responsible for signing and sealing the TCP, details, and all revisions to the TCP in accordance with the plan submittal requirements. Lead MOT Design Engineer shall be available through the duration of the Project and work with the Lead MOT Implementation Manager to coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities.

26.1.2 **Lead MOT Implementation Manager**

DB Contractor shall employ a Lead MOT Implementation Manager responsible for: ensuring the TCP are adhered to during their implementation, supervising the MOT QC personnel, and working closely with the Lead MOT Design Engineer to implement and manage Project MOT, including identifying and coordinating design changes to the MOT plans. The Lead MOT Implementation Manager shall be available through the duration of the Project and report jointly to TxDOT and the Construction Manager. The Lead MOT Implementation Manager shall have the authority to stop Work. Lead MOT Implementation Manager shall have relevant experience overseeing the implementation of TCP during the construction phase of highway projects similar in size and scope as the Project. Lead MOT Implementation Manager shall coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities. Refer to Section 2 of Attachment 4-2 of the General Conditions for a detailed description of the responsibilities of the Lead MOT Implementation Manager.

26.2 **Design Requirements**

26.2.1 **Traffic Control Plans**

DB Contractor shall use the procedures in the TMP, TxDOT Engineering Standard Sheets, and TMUTCD requirements to develop detailed TCPs that provide for all construction phasing, as well as all required switching procedures. TCPs are required for the Work during the Term and for the duration of the Warranty Term.

DB Contractor shall provide to TxDOT for approval a TCP concept presentation at or near 30% design status but prior to TCP plan sheet development. DB Contractor shall utilize Microsoft PowerPoint and roll plots to convey this concept at a TCP concept presentation meeting. Approval of the concept does not indicate automatic approval of the subsequent plan sheets, nor does it authorize DB Contractor to implement the concept in the field.

DB Contractor shall produce a TCP for 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 required to implement the plans. TCPs shall be designed, signed, sealed, and dated by a PE.

26.2.1.1 **Traffic Control Plan Requirements and Restrictions**

Each TCP shall be submitted to TxDOT for review and approval a minimum of 14 days prior to implementation. This requirement is increased to 21 days for full closures of any direction of a roadway. 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. DB Contractor shall request approval from TxDOT for each Lane Closure before being implemented, regardless of whether or not the Lane Closure is shown in the TCP. 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. DB Contractor should have no expectation that speed limit reductions will be granted and should design the Project in such a way as to allow for existing posted speed limits to remain in place during construction. On interstate and U.S. highways, for all alignments including the general purpose lanes, Managed Lanes, frontage roads, and cross streets, the minimum design speed shall be 10 mph under the existing posted speed limit, except for major alignment transitions, where the design speed may match that of the existing alignment geometry. TCPs meeting this design speed standard do not require a change in the posted speed limit. DB Contractor shall use advisory speed plaques as appropriate.

DB Contractor shall utilize appropriate traffic control devices to ensure that opposing traffic on a divided roadway is 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 TxDOT *Compliant Work Zone Traffic Control Device List*. Traffic control that involves the physical separation of contiguous lanes of the same roadway component (i.e., general purpose or access road lanes) traveling in the same direction will not be allowed.

DB Contractor shall identify a designated route for trucks/hazardous cargo.

DB Contractor shall maintain signing and striping continuity on all active roadways within or intersecting the Project at all times. DB Contractor shall maintain existing overhead signing within the Project throughout the Term. DB Contractor shall use temporary overhead signing structures located above the travel lanes when existing overhead signing structures cannot be maintained or the use of existing overhead signing structures would result in signs not being above the travel lanes. DB Contractor shall sequence construction activities and the overall phasing of the Project to meet the overhead signing requirement at all times. DB Contractor shall design and install signing compliant with TMUTCD, Freeway Signing Handbook, and Item 24.

Throughout the Term, DB Contractor shall ensure that all streets and intersections remain open to traffic to the greatest extent possible by constructing the Work in phases except as shown on a 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 Term.

When DB Contractor shifts lane alignments through intersections, DB Contractor shall use shifting tapers corresponding to the width of offset and the required design speed for the roadway.

DB Contractor shall coordinate with the respective landowners and tenants and also secure written permission prior to disrupting access to parking facilities, unless the written permission is previously provided by TxDOT.

DB Contractor shall prepare public information notices, in accordance with Item 11, in advance of the implementation of any Lane Closures, detours, 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 any 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 is responsible for noting the requirement for uniformed police officers in the TCPs when Lane

Closure is applied. DB Contractor is responsible for the costs associated with the use of uniformed police officers.

26.2.1.2 **Design Parameters for Traffic Control Plans**

Design Vehicle. Turning movements on all local streets and driveways shall be designed to a minimum turning radius of a *WB-62* design vehicle or designed based on the existing vehicle types utilizing the street or driveway, and provide the same operational characteristics as their existing conditions or better.

Design Speed. For the limited access general purpose lanes and Managed Lanes of Interstate and US Highways, frontage roads, and cross streets, the minimum design speed shall be 10 miles per hour (mph) under the existing posted speed limit, except for major alignment transitions utilizing existing alignment geometry, where the design speed may match that of the existing alignment geometry. For all other facilities, including, but not limited to, ramps, frontage roads, and cross-streets, the minimum design speed shall match either the design speeds specified in Item 19, or the existing posted speed limit, except for major alignment transitions utilizing existing alignment geometry, where the design speed may match that of the existing alignment geometry. For avoidance of doubt, posted speed limits are the regulatory speed limits displayed in black text on white background and do not include advisory/warning/ramp speeds displayed in black text on yellow background.

Number of Lanes. The minimum number of lanes to be maintained shall be as described in Section 26.2.1.3. Lane Closure requests by DB Contractor on adjacent, connecting, or crossing facilities may be considered for approval by TxDOT in its sole discretion, and may be acceptable, so long as all traffic patterns and accesses are maintained.

Lane Widths. During construction, the minimum lane width shall be 11 feet. TxDOT may, in its sole discretion, allow 10 foot lanes in limited circumstances, for short distances, after reviewing DB Contractor's proposed TCP. DB Contractor shall have no expectation of approval from TxDOT and DB Contractor shall only implement lane widths less than 11 feet when approved by TxDOT.

Shoulders. A minimum one foot offset from the edge of travel way to the edge of pavement or traffic barrier is required. Work on shoulder without positive protective barriers during peak hours (Time Period A and Time Period B), including setting of barrier during peak hours, constitutes a Lane Closure and requires TxDOT approval.

26.2.1.3 **Minimum Number of Lanes and Allowable Lane and Roadway Closures**

Lane Closures shall comply with the approved Traffic Management Plan and TCP. Lane Closures desired by DB Contractor, including those allowable closures identified below, will only be permitted as part of a TCP when DB Contractor can demonstrate that the Lane Closure will provide clear benefit to the progress of the Work and may be approved or denied by TxDOT in its sole discretion. Lane Closures must be coordinated with adjacent projects. When simultaneous requests for traffic control are received from DB Contractor, adjacent projects, and/or Governmental Entities, TxDOT will give priority to the closure submitted first. For Lane Closures on a non-TxDOT controlled facility, DB Contractor shall obtain approval from the applicable Governmental Entity in addition to approval from TxDOT. DB Contractor shall coordinate Lane Closures that may affect crossing TxDOT facilities with appropriate TxDOT Project staff, as needed, to ensure that no conflicts occur.

Except for Lane Closures required due to Incidents or Emergencies, advance written notice of any Lane Closure (a "Lane Closure Notice" or "LCN") must be provided to TxDOT no fewer than seven days before the placement of any traffic control devices associated with the Lane Closure, if the Lane Closure is expected to exceed 24 hours in duration. Advance notice must also be provided to TxDOT no fewer than seven days before implementing each traffic switch. If the Lane Closure is expected to be 24 hours or less, the LCN must be provided to TxDOT no later than 48 hours before the placement of any traffic control devices associated with the Lane Closure. The LCN shall provide information as to the location and duration of the Lane Closure, and shall contain such other information as requested by TxDOT.

Except for Lane Closures required due to Incidents or Emergencies, all Lane Closures shall be pursuant to a TCP submitted to TxDOT for approval fourteen days in advance of the Lane Closure. This requirement is increased to 21 days for TCP showing the full closure of any direction of any roadway. Approval of the TCP shall be in TxDOT's good faith discretion. TxDOT and DB Contractor may agree on a standard TCP which can be used on a recurring basis for Lane Closures that come within the parameters of the TCP.

In addition to obtaining applicable Governmental Entity and TxDOT advance approval, DB Contractor shall inform the PIO of all Lane Closures so the PIO can inform the public, emergency services, schools, etc. as needed.

DB Contractor shall consider the safety of workers and the traveling public as the primary factor when determining the appropriate time to implement a Lane Closure.

The following TxDOT standards, specifications, procedure manuals, and references apply to all Lane Closures:

- Texas Manual of Uniform Traffic Control Devices (TMUTCD);
- TxDOT Traffic Control Plan (TCP) standards;
- TxDOT Barricade and Construction (BC) standards; and
- TxDOT Standard Specifications Item 502 (Barricades Signs and Traffic Handling).

DB Contractor shall implement Lane Closures as directed by TxDOT related to Systems Integrator work.

The minimum number of lanes and movements to be maintained during construction are listed below. DB Contractor shall provide the number of through lanes indicated for a given location or movement without splitting the lanes around bridge columns or other objects. Permitted closures below are intended to be single closures with durations not exceeding the number of days indicated. Should DB Contractor temporarily re-open an impacted roadway, time charges remain in effect. That is, the total number of days provided below is to be taken as the number of consecutive days allowed from the first time the roadway closes until the roadway permanently opens. DB Contractor shall be assessed Liquidated Damages for Lane Closures and Lane Rental Charges, as described in Section 26.2.1.7 and in Exhibit 15 to the DBA, for Lane Closures resulting in the number of lanes open to road users being reduced from the numbers specified below.

Northbound I-35E:

1. Three continuous adjacent through general purpose lanes shall remain open throughout construction from the I-635/I-35E interchange until a fourth lane is added on the left from the existing northbound Managed Lanes exit north of the I-635/I-35E interchange. Splitting the three continuous adjacent through lanes around bridge columns or other objects will not be allowed.
2. Four continuous adjacent through general purpose lanes shall remain open throughout construction from the existing northbound Managed Lanes exit north of the I-635/I-35E interchange until the northbound entrance to the northbound Managed Lanes, where the left lane shall exit to the Managed Lanes. Splitting the four continuous adjacent through lanes around bridge columns or other objects will not be allowed.
3. Three continuous adjacent through general purpose lanes shall remain open throughout construction from the existing northbound Managed Lanes entrance north of the I-635/I-35E interchange to a location1500 feet before the northbound exit to President George Bush Turnpike (PGBT), where an additional lane is added on the right. Splitting the three continuous adjacent through lanes around bridge columns or other objects will not be allowed.
4. Four continuous adjacent through general purpose lanes shall remain open throughout construction from a location 1500 feet before the northbound exit to PGBT, where the two right lanes exit to the PGBT direct connectors and the three left lanes continue as northbound general purpose lanes. Specifically, the second lane from the right has the option of exiting to the PGBT direct connectors or continuing on I-35E. Splitting the four continuous adjacent through lanes around bridge columns or other objects will not be allowed.
5. Three continuous adjacent through general purpose lanes shall remain open throughout construction from the exit to PGBT to Dickerson Pkwy, where a lane is added on the right. Splitting the three continuous adjacent through lanes around bridge columns or other objects will not be allowed.
6. Four continuous adjacent through general purpose lanes shall remain open from Dickerson Pkwy until the Sam Rayburn Tollway exit ramp, where the right lane exits. Splitting the four continuous adjacent through lanes around bridge columns or other objects will not be allowed.
7. Three continuous adjacent through general purpose lanes shall remain open from the Sam Rayburn Tollway exit to the north limits.

8. The general purpose lanes exit to Valley View Lane shall remain open throughout construction.
9. The general purpose lanes entrance from the northbound frontage road south of Valley View may be closed once the northbound general purpose lanes entrance from Harry Hines Blvd is open.
10. The frontage road from I-635 to Valley View Ln shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of three lanes must be maintained for 200 feet at the approach for Valley View Ln.
11. The general purpose lanes exit to Valwood Pkwy shall remain open throughout construction.
12. The frontage road from Valley View Ln to Valwood Pkwy shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of three lanes must be maintained for 200 feet at the approach for Valwood Pwky.
13. The general purpose lanes entrance from Valley View Lane shall remain open throughout construction.
14. The general purpose lanes entrance from Valwood Pkwy shall remain open throughout construction.
15. The general purpose lanes exit to Crosby may close once construction near the existing exit commences. The general purpose lanes exit to Valwood Pkwy must remain open.
16. The frontage road from Valwood to Crosby shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of two lanes must be maintained for 200 feet at the approach for Crosby.
17. The general purpose lanes exit to Belt Line Rd shall remain open throughout construction.
18. The frontage road from Crosby to Belt Line Rd shall remain open throughout construction but may be reduced to one lane except for the approach to Belt Line Rd. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of six lanes must be maintained for 350 feet at the approach to Belt Line Rd. The u-turn at Belt Line Rd from the northbound frontage road to the southbound frontage road shall remain open throughout construction.
19. The general purpose lanes exit to Whitlock Rd/Sandy Lake shall remain open throughout construction.
20. The general purpose lanes entrance from Belt Line Rd shall remain open throughout construction.
21. The frontage road from Belt Line Rd to Sandy Lake/Whitlock shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of two lanes must be maintained for 200 feet at the approach for Sandy Lake/Whitlock. The u-turn at Sandy Lake/Whitlock from the northbound frontage road to the southbound frontage road shall remain open throughout construction.
22. The general purpose lanes exit to Dickerson Pkwy/SH 190 shall remain open throughout construction.
23. The general purpose lanes two lane exit to PGBT shall remain open throughout construction.
24. The frontage road from Sandy Lake/Whitlock to the Denton County Line shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. A minimum of two lanes must be maintained for 200 feet at the approach for a signalized intersection.

25. The northbound frontage road entrance ramp to Dickerson shall remain open throughout construction.
26. The northbound general purpose lanes exit to Sam Rayburn Tollway shall remain open throughout construction.
27. The general purpose lanes exit to Frankford shall remain open throughout construction.
28. The general purpose lanes entrance ramp north of PGBT shall remain open throughout construction.

Southbound I-35E:

1. Four continuous adjacent through general purpose lanes shall remain open throughout construction from PGBT to Sandy Lake/Whitlock, where the right lane ends and merges left into the adjacent lane. Splitting the four continuous adjacent through lanes around bridge columns or other objects will not be allowed. Upon completion of the permanent Southbound C-D road carrying traffic including traffic with access from Sam Rayburn Tollway to southbound I-35E, three continuous adjacent through general purpose lanes shall remain open.
2. The southbound entrance ramp from Sam Rayburn Tollway to southbound I-35E shall remain open until the permanent southbound C-D road is open to traffic.
3. Three continuous adjacent through general purpose lanes shall remain open throughout construction from Sandy Lake/Whitlock to the I-635/I-35E interchange. Splitting the three continuous adjacent through lanes around bridge columns or other objects will not be allowed.
4. The two lane exit ramp to PGBT off the I-35E collector distributor shall remain open throughout construction.
5. The general purpose lanes exit ramp to Sandy Lake/Whitlock shall remain open throughout construction.
6. The general purpose lanes entrance ramp from Sandy Lake/Whitlock shall remain open throughout construction.
7. The frontage road from the Denton County Line to Sandy Lake/Whitlock shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. Two lanes shall be open on the approach to the signalized intersection at Sandy Lake for a minimum of 200 feet, with one lane designated as right turn only.
8. The general purpose lanes exit ramp to Belt Line Rd/Crosby shall remain open throughout construction.
9. The general purpose lanes entrance ramp from Belt Line Rd shall remain open throughout construction.
10. The frontage road from Sandy Lake/Whitlock to Belt Line Rd shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. Six lanes shall be open on the approach to the signalized intersection at Belt Line for a minimum of 300 feet. The u-turn at Belt Line Rd from the southbound frontage road to the northbound frontage road shall remain open throughout construction.
11. The general purpose lanes entrance ramp from Crosby may close once construction near the ramp commences.
12. The frontage road from Belt Line Rd to Crosby shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. Three lanes shall be open on the approach to the signalized intersection at Crosby for a minimum of 200 feet, with one lane designated as right turn only.

13. The general purpose lanes exit ramp to Valwood Pkwy shall remain open throughout construction.
14. The general purpose lanes entrance ramp from Valwood Pkwy shall remain open throughout construction.
15. The frontage road from Crosby to Valwood shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. Three lanes shall be open on the approach to the signalized intersection at Valwood for a minimum of 200 feet.
16. The general purpose lanes exit ramp to Valley View Lane shall remain open throughout construction.
17. The general purpose lanes entrance ramp from Valley View Lane shall remain open throughout construction.
18. The frontage road from Valwood to Valley View Ln shall remain open throughout construction, but may be reduced to one lane except for at signalized intersections. If an exit ramp to the frontage road is followed by an entrance ramp from the frontage road, provide an auxiliary lane (additional lane) on the frontage road between the ramps. Three lanes shall be open on the approach to the signalized intersection at Valley View for a minimum of 200 feet.
19. The general purpose lanes exit ramp to I-635E/I-635 Express shall remain open throughout construction.
20. The general purpose lanes exit ramp to I-635 West shall remain open throughout construction.
21. The frontage road from Valley View Ln through I-635E shall remain open throughout construction, with at least two lanes open.

I-35E Managed Lanes:

1. Two continuous adjacent through and reversible Managed Lanes shall remain open throughout construction through the Project Limits. The reversible Managed Lanes shall remain connected to the tolled Managed Lanes north and south of the Project Limits to ensure connectivity through the corridor. Splitting the two continuous adjacent thru lanes around bridge columns or other objects will not be allowed.
2. The northbound Managed Lanes entrance ramp north of I-635 shall remain open to traffic and operational throughout construction.
3. The southbound Managed Lanes exit ramp to I-635/I-635 Express shall remain open to traffic and operational throughout construction. This southbound Managed Lanes exit ramp shall be a minimum of 4500 feet and a maximum of 6000 feet from the I-635 general purpose lanes ramp.
4. The southbound Managed Lanes entrance ramp from the southbound general purpose lanes south of Valley View Ln shall remain open to traffic and operational throughout construction.
5. The existing northbound Managed Lanes entrance ramp from the northbound general purpose lanes north of Valley View Ln shall remain open to traffic and operational until the proposed entrance ramp wishbone into the northbound Managed Lanes from the I-35E northbound frontage road north of Belt Line Rd. is open to traffic and operational. This northbound Managed Lanes entrance ramp shall be a minimum of 4500 feet and a maximum of 6000 feet from the I-635 general purpose lanes ramp.
6. The existing northbound exit ramp from the Managed Lanes to the northbound general purpose lanes south of Luna with access to PGBT/Sam Rayburn Tollway shall remain open to traffic and operational until the proposed northbound Managed Lanes exit ramp wishbone to the northbound collector distributor south of PGBT/Sam Rayburn Tollway is open to traffic and operational. This northbound Managed Lanes exit ramp shall be a minimum of 4500 feet and a maximum of 7000 feet from the PGBT ramp (the exit shall be signed for both PGBT and Sam Rayburn Tollway to match the existing signing).
7. The existing southbound Managed Lanes entrance ramp from the southbound general purpose lanes north of Sandy Lake/Whitlock shall remain open to traffic and operational until the proposed entrance ramp wishbone into the southbound Managed Lanes from the southbound collector distributor north

of Sandy Lake is open to traffic and operational. This southbound Managed Lanes entrance ramp shall be a minimum of 4000 feet and a maximum of 6000 feet from the PGBT ramp.

8. Existing Managed Lanes access points (exits and entrances) other than those listed above may be closed during construction only once construction commences immediately adjacent to the access point.

Cross Streets:

1. Harry Hines Blvd/Morgan Pkwy – The existing number of lanes shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
2. Valley View Lane – Two through lanes shall remain open in each direction throughout construction. The left turn bay to each frontage road shall remain open throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
3. Valwood Parkway – Two through lanes shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
4. Crosby – One lane shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
5. Belt line Road – The existing number of lanes shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
6. Luna Road – Three through lanes shall remain open in each direction throughout construction, except that Luna Road may be closed only once for a duration of no more than 365 days.
7. Sandy Lake Road/Whitlock Lane –One through lane shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.
8. Dickerson Pkwy – The existing number of lanes shall remain open in each direction throughout construction. Maintain existing connectivity to/from this street and the frontage roads.

26.2.1.4 Holiday Restrictions

No Lane Closure that restricts or interferes with traffic shall be allowed during the following holiday schedule. TxDOT has the right, without liability, to lengthen, shorten, or otherwise modify these restrictions as actual, or expected, traffic conditions may warrant.

- New Year's Eve, and New Year's Day (12:00pm on December 31 through 10:00pm on January 1)
- Easter Holiday Weekend (12:00pm on Friday through 10:00pm on Sunday)
- Memorial Day Weekend (12:00pm on Friday through 10:00pm on Monday)
- Independence Day (12:00pm on July 3 through 12:00pm on July 5)
- Labor Day Weekend (12:00pm on Friday through 10:00pm on Monday)
- Thanksgiving Holiday (12:00pm on Monday through 10:00pm on Sunday)
- Christmas Holiday (12:00pm on December 23 through 10:00pm on December 26)

TxDOT may, by notice to DB Contractor, lengthen, shorten, add to, or otherwise modify the restricted period and duration for any holiday. If a holiday falls midweek, TxDOT may, by notice to DB Contractor, extend the related restricted period through the weekend before and/or after the holiday.

Should any Lane Closures violate the holiday-related restrictions above, Liquidated Damages for Lane Closures and Lane Rental Charges, as appropriate, will be assessed based on the next higher Time Period than what would otherwise apply based upon those shown in Table 26-1 and Table 26-2 (that is, a Time Period B violation will be assessed as a Time Period A closure, etc.).

26.2.1.5 Special Event Restrictions

Lane closure requirements and the assessment of Liquidated Damages for Lane Closures and Lane Rental Charges for Special Events are set forth in Exhibit 15 to the DBA.

26.2.1.6 **Incidents and Emergencies**

DB Contractor shall not be liable for Liquidated Damages for Lane Closures and Lane Rental Charges for Lane Closures required due to Incidents or Emergencies that are not attributable to, could not have been avoided by or are not exacerbated by the actions of a DB Contractor-Related Entity, but only to the extent necessary to remediate the Incident or Emergency.

26.2.1.7 **Time Periods**

DB Contractor shall not reduce the number of roadway controlled access lanes, including general purpose lanes, Managed Lanes, entrance ramps, exit ramps, and direct connectors, below the number of roadway controlled access lanes required above in Section 26.2.1.3 during Time Period A. Time Period A Lane Closures are not eligible for the Lane Rental Bank provisions as specified in Exhibit 15 of the DBA.

Table 26-1 and 26-2 shows the Time Periods for each of the hours of the day for general purpose lanes, Managed Lanes, ramps, and direct connectors. These periods are referenced in this Item 26 and in Exhibit 15 of the DBA and are used to determine Liquidated Damages for Lane Closures and Lane Rental Charges.

Table 26-1 shows the Time Periods for each of the hours of the day for the general purpose lanes, ramps, and direct connectors.

Table 26-1: Period Per Hour of the Day

Hour/Day	Sun	Mon-Thurs	Fri	Sat
0:00	D	D	D	D
1:00	D	D	D	D
2:00	D	D	D	D
3:00	D	D	D	D
4:00	D	D	D	D
5:00	D	A	A	D
6:00	D	A	A	C
7:00	D	A	A	C
8:00	C	A	A	A
9:00	C	A	A	A
10:00	B	A	A	A
11:00	B	A	A	A
12:00	B	A	A	A
13:00	B	A	A	A
14:00	B	A	A	A
15:00	B	A	A	A
16:00	B	A	A	A
17:00	B	A	A	A
18:00	B	A	A	A
19:00	C	A	A	A
20:00	C	C	C	C
21:00	C	C	C	C
22:00	C	C	C	C
23:00	C	D	C	C

Table 26-2 shows the Time Periods for each of the hours of the day and direction of operation required for the Managed Lanes during each time period. SB refers to the Southbound direction and NB refers to the Northbound direction. Only one direction of travel can be open at the same time unless approved by TxDOT. Lane Rental Charges and Liquidated Damages for Lane Closures will not be assessed during the hours noted as "Switch" as that is the time period allotted to switch the flow of traffic for the reversible Managed Lanes. If the Managed Lanes are open but not open in the required direction of operation as noted in Table 26-2, this is considered a Lane Closure and subject to Liquidated Damages for Lane Closures and Lane Rental Charges.

Table 26-2: I-35E Managed Lanes Period Per Hour of the Day

Hour/Day	Sun	Mon	Tues-Fri	Sat
0:00	SB - C	SB - C	NB-C	NB-C
1:00	SB - C	SB - C	Switch	Switch
2:00	SB - C	SB - C	Switch	Switch
3:00	SB - C	SB - C	SB-C	SB-C
4:00	SB - C	SB - C	SB-C	SB-C
5:00	SB - C	SB-A	SB-A	SB-C
6:00	SB - B	SB-A	SB-A	SB-B
7:00	SB - B	SB-A	SB-A	SB-B
8:00	SB - B	SB-A	SB-A	SB-B
9:00	SB - B	SB-A	SB-A	SB-B
10:00	SB - B	SB-A	SB-A	SB-B
11:00	SB - B	Switch	Switch	SB-B
12:00	SB - B	Switch	Switch	SB-B
13:00	SB - B	NB-A	NB-A	SB-B
14:00	SB - B	NB-A	NB-A	SB-B
15:00	SB - B	NB-A	NB-A	SB-B
16:00	SB - B	NB-A	NB-A	SB-B
17:00	SB - B	NB-A	NB-A	SB-B
18:00	SB - B	NB-A	NB-A	SB-B
19:00	SB - B	NB-A	NB-A	SB-B
20:00	SB - C	NB-C	NB-C	SB-C
21:00	SB - C	NB-C	NB-C	SB-C
22:00	SB - C	NB-C	NB-C	SB-C
23:00	SB - C	NB-C	NB-C	SB-C

26.2.2 Driveway Closures

DB Contractor is responsible for coordinating with the property owner on driveway closures. DB Contractor shall maintain a minimum of one driveway per business at all times.

26.3 Construction Requirements

DB Contractor shall ensure construction of the traffic control Elements is in accordance with DB Contractor's TMP, the manufacturer's directions or recommendations where applicable, and the applicable provisions of the TMUTCD.

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 26 in accordance with the requirements of this Item 26 and TxDOT Standard Specifications.

26.3.1 DB Contractor Responsibility

If at any time TxDOT determines DB Contractor's traffic control operations do not meet the intent of the TMP or the 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 Lead MOT Implementation Manager 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.

26.3.2 **Access**

DB Contractor shall maintain existing bicycle and pedestrian access and mobility. Access to existing transit stop locations shall be maintained during construction or reasonable alternative locations shall be coordinated with and approved by transit operators.

26.3.3 **Detours**

DB Contractor shall maintain all detours in a safe and traversable condition. DB Contractor shall provide a pavement transition, suitable for the posted speed and accounting for the vertical and horizontal geometry of the section at all detour interfaces.

DB Contractor shall use State routes for detour routes, wherever applicable. If State routes are unavailable, DB Contractor shall use local streets provided that DB Contractor has obtained the necessary permits from the Governmental Entity having jurisdiction. DB Contractor shall take necessary action to restore or rebuild all detour routes to as good as or better than pre-construction condition in accordance with the requirements of the Governmental Entity having jurisdiction.

DB Contractor shall provide 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 and changeable message signs to divert traffic around the Project.

26.3.4 **Local Approvals**

DB Contractor shall communicate all roadway and ramp closures and staging analyses with each Governmental Entity having jurisdiction for roads that may be affected by the Project. When roadway and ramp movements are diverted or detoured along existing roads, DB Contractor shall be responsible for any and all costs and schedule risk. This may include traffic operation analysis, temporary traffic control devices, and road user costs. DB Contractor is responsible for obtaining the necessary approvals from any Governmental Entity having jurisdiction over the routes used. At DB Contractors request, TxDOT will reasonably assist the DB Contractor in meetings with a Governmental Entity to coordinate closures or detours necessary along existing roads for completion of the Work.

26.3.5 **Pavement Markings and Signing**

DB Contractor shall remove existing pavement markings and/or signs that conflict with temporary or permanent pavement markings. These pavement markings and signs shall be removed by any method that does not materially damage the existing elements or facilities. Pavement marking removal by over-painting is prohibited. DB Contractor shall not use temporary tape at any time during the Term.

DB Contractor is responsible for temporary signing outside of the Project limits required for the Project.

DB Contractor shall utilize existing, temporary, or proposed overhead sign structures to mount temporary or proposed guide signs above freeway main lanes where there are at least three main lanes in a given direction, per TMUTCD requirements. DB Contractor shall maintain existing overhead signing within the Project throughout the construction duration.

DB Contractor shall maintain safe travelling conditions of all roadways used outside the Project limits including routes to fabrication facilities, plants and haul roads.

26.3.6 **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, DB Contractor shall be restored the pavement 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.

26.3.7 **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.

DB Contractor shall use rubber-tired equipment 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 at least twice a day.

In the event that 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. Damage caused by DB Contractor shall be repaired at the expense of DB Contractor.

DB Contractor shall only use haul routes utilizing any street of an adjacent Governmental Entity after coordinating with the appropriate Governmental Entity.

26.3.8 **Final Clean-Up**

DB Contractor shall clear and remove from the Project all surplus and discarded materials and debris of every kind and leave the entire Project in a clean, smooth, and neat condition after each construction process.

26.3.9 **Stockpiles**

DB Contractor shall place barricades and warning signs at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT Engineering Standard Sheets and the TMUTCD. DB Contractor shall not locate any material stockpiles within the clear zone of any traveled lane, unless positive protection is provided.

26.4 **Submittals**

All Submittals described in this Item 26 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 26-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 26-3: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
TCP concept presentation (meeting)	Prior to TCP plan sheet development	Approval	26.2.1
Traffic Control Plans (TCP)	At least 14 days prior to implementation and at least 21 days prior to implementation if the TCP shows a full closure of any direction of a roadway.	Approval	26.2.1, 26.2.1.1
Names and phone numbers of the Lead MOT Implementation Manager and support personnel, including a backup coordinator	Prior to start of any construction activities	For information	26.3.1
TMP	Prior to NTP2	Approval	4.2.10
Requests for Lane Closure for less than 24 hours	At least 48 hours in advance of the proposed closure	Approval	26.2.1.3
Lane Closure Notice (LCN) for: (i) Full roadway closure; and (ii) Lane closures and/or traffic switches planned to be in effect longer than 24 hours	At least 7 Days prior to the publication of any notices or placement of any traffic control devices	Approval	26.2.1.3

Item 27
Maintenance

27.1 General Requirements

27.1.1 General Maintenance Obligations

Throughout the period between NTP2 and Final Acceptance, DB Contractor shall be responsible for and shall carry out Maintenance Work within the Maintenance Limits. DB Contractor shall conduct all Maintenance Work necessary to meet the requirements for this Item 27 in accordance with the requirements of this Item 27 and TxDOT Standard Specifications.

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:

- Coordinate activities of other entities with interests or activities within the Maintenance Limits;
- 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, and conditions that could threaten the infrastructure, and to attend to existing or changing conditions;
- Minimize delay and inconvenience to Users and, to the extent DB Contractor is able to control, users of related transportation facilities;
- Mitigate hazards and repair all Defects, including those identified by TxDOT, the DB Contractor and third parties within the specified periods;
- Identify and correct all Defects and damages from Incidents;
- 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;
- Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from the Project ROW;
- Minimize the risk of damage, disturbance, or destruction of third-party property during the performance of Maintenance Work;
- 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;
- Perform Maintenance Work, including inspections, Incident response, traffic control, and routine maintenance in accordance with the MMP and the Contract Documents; and
- Promptly investigate reports or complaints received from all sources.

27.1.2 Scope of Maintenance Work and Interfaces with TxDOT and Third Parties

The Maintenance Work shall apply to all Elements as identified in Attachment 27-1 (Baseline Performance and Measurement Table During Construction). 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.

(a) until traffic is on newly reconstructed pavement, the Performance Requirements of Element Category 0: "Roadway - Existing Pavement within the Maintenance Limits" apply;

(b) immediately upon completion and opening to traffic of new roadway, the Performance Requirements of Element Category 1: "Roadway - New Alignments on Reconstructed Pavement within the Maintenance Limits" in Attachment 27-1 also take effect; and

(c) Performance Requirements of Element Categories 2 through 18 apply to all areas within the Maintenance Limits including existing pavement areas and newly reconstructed pavement areas from NTP2 through Final Acceptance.

Nothing in this Item 27 shall excuse DB Contractor from satisfying all requirements for new construction applicable at Substantial Completion and Final Acceptance, including the smoothness requirements in Section 16.5.2 of the Design-Build Specifications. TxDOT's maintenance responsibilities from the Proposal Due Date until 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 *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 of the maintenance responsibilities to relevant parties after Final Acceptance.

27.1.3 Maintenance Limits

The initial Maintenance Limits are provided in Attachment 27-2 "Maintenance Limits during Construction." DB Contractor shall prepare and submit updated Maintenance Limits drawings consistent with DB Contractor's final design as part of the MMP during construction for TxDOT's review and approval. DB Contractor shall periodically validate that the Maintenance Limits are correctly and clearly identified by physical delineation and shall liaise with TxDOT and Governmental Entities as necessary to review the Maintenance Limits, identify any jurisdictional gaps or inefficiencies and recommend solutions to TxDOT.

27.2 Maintenance Management

27.2.1 Maintenance Management Plan

DB Contractor shall prepare and submit the MMP in accordance with Section 4.2.11 of the General Conditions, update the MMP as required, and shall submit it to TxDOT for approval in TxDOT's good faith discretion. The requirements for the MMP are set forth in Attachment 27-3 (MMP Template).

27.2.2 Maintenance during Work

DB Contractor shall be responsible for maintenance and repairs to any portion of the Work until Final Acceptance is issued in accordance with the DBA. The Work shall include routine maintenance (such as litter pickup, mowing, and repair of third-party-damaged traffic control and safety devices), responding to Emergencies and operational problems, and inspections and repairs required on an as-needed basis or as directed by TxDOT until issuance of Final Acceptance. Upon Final Acceptance, TxDOT shall assume the maintenance obligations (except for landscape maintenance during the establishment period in accordance with TxDOT Standard Specifications and Good Industry Practice); provided, however, that if TxDOT issues Maintenance NTP1 under the CMA, DB Contractor shall be responsible for the Maintenance Services pursuant to the terms of the CMA Documents. If DB Contractor fails to perform such maintenance within ten (10) Business Days of discovery of the need for the work, TxDOT reserves the right to perform such work as it deems necessary with its own forces, and/or to enter into special contracts for the maintenance of specific items. TxDOT will recover its costs for such work from the DB Contractor.

27.2.3 Maintenance Manager

DB Contractor shall assign a Maintenance Manager who shall be responsible for:

- Implementing the maintenance obligations in this Item 27 and the MMP;
- Causing the Maintenance Work to be performed in accordance with the Contract Documents;
- Causing all maintenance personnel and resources performing Maintenance Work to be available and properly trained;
- The health and safety of personnel delivering the Maintenance Services and the general public affected by the Project; and
- Coordinating with TxDOT and other entities during Incidents and Emergencies

The Maintenance Manager shall meet or exceed the qualifications and experience established in the Contract Documents, and:

- Must have experience on maintenance projects; and
- Must have managerial experience in design, construction, or maintenance on any road project of similar size, scope and complexity.

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.

27.3 Performance Requirements

27.3.1 Performance and Measurement Table

DB Contractor's performance of the Maintenance Work shall be governed by the Performance and Measurement Table. The Performance and Measurement Table shows for each Element:

- Performance Objectives that each Element is required to meet or exceed;
- The Defect Repair Periods for each Defect;
- Inspection and Measurement Methods that DB Contractor shall use to determine compliance; and
- Measurement Records that DB Contractor shall establish and maintain based upon inspections and measurements.

DB Contractor shall record a separate Defect upon failure to achieve any of the requirements set forth in the Performance Objective or Measurement Record. DB Contractor shall address each Defect within the specified Defect Repair Period as further described in this Item 27.

27.3.2 Defect Identification, Recording and Categorization

27.3.2.1 Definitions

For Defects shown on the Performance and Measurement Table:

- Hazard mitigation is an action taken by DB Contractor with respect to a Category 1 Defect 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; and
- Permanent repair is an action taken by DB Contractor with respect to any Defect to restore the condition of an Element to a condition such that no Defect exists.

27.3.2.2 Defects Identified by DB Contractor, TxDOT or Third Party

Whenever DB Contractor identifies, becomes aware of or is notified by TxDOT or a third party of a Defect, DB Contractor shall establish a system to record details of the associated Element, the nature and categorization of the Defect and the proposed timing and details of hazard mitigation and permanent repair of the Defect. DB Contractor shall categorize each Defect, based upon its determination as to whether:

- It represents an immediate or imminent health or safety hazard to Users or road workers;
- There is a risk of immediate or imminent structural failure or deterioration;
- There is an immediate or imminent risk of damage to a third party's property; or
- There is 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-categorized Defects and shall enable TxDOT to flag any Defect where TxDOT disagrees with any attribute or categorization assigned by DB Contractor.

27.4 Maintenance Obligations

27.4.1 Incident and Emergency Management

As part of the MMP for Maintenance Work, DB Contractor shall prepare and implement an Incident and Emergency Management Plan (IEMP). Refer to Attachment 27-3 (MMP Template) for the required contents of the IEMP.

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 4.2.3 of the General Conditions.

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 ensure 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.

27.4.2 Weather Related Events

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 27-3 (MMP Template). 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). DB Contractor shall pretreat roadways with brine solution ahead of a forecasted snow or ice event in coordination with TxDOT forces pretreating adjacent roadways in the area. DB Contractor must pre-treat, at a minimum, at the same time TxDOT pre-treats.

27.4.3 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 27-3 (MMP Template).

27.4.4 Maintenance Document Management

For all Maintenance Records, DB Contractor shall follow the document storage and retrieval requirements set forth in Section 4.2.1.2 of the General Conditions. 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 system, so that all data and records can be retrieved by reference marker and Performance Section.

Maintenance Records shall be kept throughout the Term. Such records shall be provided to TxDOT upon Final Acceptance. All records obtained during the Warranty Term shall be kept and provided to TxDOT at the end of the Warranty Term.

Unless otherwise directed by TxDOT, DB Contractor's record retention shall comply with the requirements of the Texas State Records Retention Schedule.

27.4.5 Safety

DB Contractor shall establish and implement safety and health procedures for Maintenance Work in compliance with Section 4.2.3 of the General Conditions and in accordance with the Maintenance Safety Plan. Refer to Attachment 27-3 (MMP Template) for the required contents of the Maintenance Safety Plan.

27.4.6 **Communication**

DB Contractor shall establish and implement communication procedures for Maintenance Work in compliance with Sections 4.2.5 of the General Conditions, Item 11 and Item 26.

27.4.7 **Hazardous Materials Management**

DB Contractor shall establish and implement Hazardous Materials Management procedures for Maintenance Work in compliance with Section 4.2.4.4 of the General Conditions and in accordance with the Hazardous Materials Management Plan (HMMP). Refer to Attachment 27-3 (MMP Template) for the required contents of the HMMP.

27.4.8 **Environmental Compliance and Mitigation**

DB Contractor shall establish and implement environmental compliance and mitigation procedures for Maintenance Work in compliance with Section 4.2.4.2 of the General Conditions and Item 12 and shall follow the requirements described in Attachment 27-3 (MMP Template).

27.4.9 **Traffic Management**

DB Contractor shall establish and implement traffic management procedures for Maintenance Work in compliance with Item 26 and shall follow the requirements described in Attachment 27-3 (MMP Template).

27.4.10 **Maintenance of the I-35E Managed Lanes**

All operations and maintenance of Automated Barricade Gates (ABG), Vehicle Arresting Barriers (VAB) and wind screens within the Maintenance Limits are the responsibility of DB Contractor. DB Contractor is required to keep a stock of materials on-hand to ensure timely repairs of ABGs, and VABs.

DB Contractor will repair and maintain all damaged crash cushion attenuators, guard rail end treatments and Automated Barricade Gates with flashing lights on the entrances into the Managed Lanes and exits from the Managed Lanes within the Maintenance Limits.

DB Contractor shall repair major structural damage to VAB frames if it is impacted by a vehicle in such a way that the frame is bent and routine replacement of the safety net cannot be performed.

DB Contractor shall maintain all safety devices for the managed lanes, including all related manual gates, Automated Barricade Gates, and Vehicle Arresting Barrier that are within the Maintenance Limits. DB Contractor will visually inspect all manual gates, automated gates, and vehicle arresting barriers for proper operation and repair immediately upon the finding of any malfunction, damage, or missing safety device. If any safety device is not operable or missing DB Contractor is required to have a TMA in place to prevent traffic from entering the reversible Managed Lanes in the wrong direction of traffic flow until the safety device can be repaired.

DB Contractor will clean and maintain manual gates, Automated Barricade Gates, Automated Barricade Gates with flashing lights, Vehicle Arresting Barriers including pin and/or motors. DB Contractor will perform routine maintenance according to each device specifications. DB Contractor will repair/replace any malfunctions, damaged, or missing safety devices needed for proper operation of the Managed Lanes as required.

DB Contractor shall be required to coordinate with TxDOT's contractor for the operation of the reversible Managed Lanes throughout the Maintenance Limits. TxDOT's contractor will be responsible for daily routine operations including the daily opening and closing of the Managed Lanes according to the Time Periods outlined in Table 26-2 in order to switch the direction of traffic for the reversible operations.

If DB Contractor has a lane closure during the Switch Period that TxDOT's Contractor is performing daily operations for opening or closing the reversible direction, DB Contractor must coordinate with TxDOT's contractor to ensure lane closure is adjusted appropriately for the direction of traffic flow during the Time Period. DB Contractor must perform the following within the limits of the portion of the Managed Lanes which DB Contractor had a lane closure and TxDOT's Contractor was unable to complete at time of the Switch Period:

- Removal of any debris from the Managed Lanes;
- Proper ABG and/or manual gate positioning;

- Proper vehicle arresting barrier activation/de-activation, where applicable,
- Proper Open/Close DMS display, where applicable;
- Proper Type III barricade and channelizing devices positioning, where applicable, and
- Coordination of removal of any stranded vehicle from the Managed Lanes prior to opening to traffic.

27.5 Submittals

All Submittals described in this Item 27 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth on Table 27-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise required.

Table 27-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Maintenance Limits Drawings	After NTP1	Approval	27.1.3
Maintenance Management Plan (MMP)	After NTP1	Approval	27.2.1
MMP Updates	As required	Approval	27.2.1
Information on weather-related events	As required	For information	27.4.2
Maintenance Records kept throughout the Term	Upon Final Acceptance	For information	27.4.4
Maintenance Records during Warranty Term	At end of Warranty Term	For information	27.4.4

Item 28
Bicycle and Pedestrian Facilities

28.1 **General Requirements**

This Item 28 includes requirements with which DB Contractor shall design and construct all bicycle and pedestrian facilities for the Project as shown on the Schematic Design. DB Contractor shall design and construct all bicycle and pedestrian facilities consistent with TxDOT policies and guidelines and *AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities*. Sidewalk designs shall comply with ADA requirements, the *Texas Accessibility Standards* and TDLR and meet the requirements of AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. 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.

28.2 **Administrative Requirements**

DB Contractor shall maintain equivalent connectivity on all bicycle and pedestrian facilities during construction and throughout the Term.

28.3 **Design Requirements**

28.3.1 **Bicycle Facilities**

DB Contractor shall design and construct bicycle facilities to 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 design and construct all bicycle facilities for the Project as shown on the Schematic Design. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure the bicycle facility design results in consistency between existing and proposed bicycle facilities.

Facilities shall meet the requirements of the AASHTO *Guide for the Development of Bicycle Facilities* and shall incorporate the following Elements, where applicable, relating to bicycle facilities into the Design:

- Alignment, profile, cross-section, and materials;
- Points of connection to existing and proposed bicycle facilities;
- Crosswalk and pedestrian ramp locations and details;
- Signing, signalization, and pavement markings;
- Separation between bicycle facilities and the nearest travel lane;
- Methods of illumination indicating light fixture locations and types;
- Methods of separation, including barrier and/or fence type and height; and
- Requirements of the Aesthetics and Landscaping Plans.

28.3.2 **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 within Project limits and as impacted by Project construction. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure consistency with existing and proposed pedestrian 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, where applicable, relating to pedestrian facilities:

- Alignment, profile, cross-section, and materials;
- Points of connection to existing and proposed pedestrian facilities;
- Crosswalk and pedestrian ramp locations and details;

- Signing, signalization, and pavement markings;
- Separation between pedestrian facilities and the nearest travel lane;
- Methods of illumination indicating light fixture locations and types;
- Methods of separation, including barrier and/or fence type and height; and
- Requirements of the Aesthetics and Landscaping Plans.

DB Contractor is responsible for obtaining TDLR reviews and approvals of pedestrian facility design and construction.

28.4 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 28 in accordance with the requirements of this Item 28 and TxDOT Standard Specifications.

Item 29
Tolling

29.1 **General Requirements**

TxDOT will enter into a separate contract with a tolling Systems Integrator to provide the Electronic Toll Collection System (ETCS) and ETCS Elements for the Project. DB Contractor shall support the installation of the ETCS as described herein. DB Contractor shall perform all work necessary to remove, relocate, construct and install the temporary and permanent ETCS, providing continuous access to the Project.

A listing of DB Contractor and Systems Integrator responsibilities is provided in Attachment 29-1 (Toll Facility Responsibility Matrix).

29.1.1 **DB Contractor's Coordination Responsibilities**

DB Contractor shall coordinate the design and construction with TxDOT and Systems Integrator to accommodate the design and toll systems operating software, and ensure the Project Schedule incorporates the time required to design, procure, install, integrate, test, and implement all equipment to be used during tolling operations and maintenance of the Project.

DB Contractor's facilities coordination responsibilities include, but are not limited to, the following:

DB Contractor shall coordinate closely with TxDOT and Systems Integrator to ensure the DB Contractor's design corresponds with the Systems Integrator's requirements.

DB Contractor shall coordinate with TxDOT and the Systems Integrator during the design and construction phases of the Project and shall provide notice of any changes in design within and in close proximity to the Toll Zones.

DB Contractor shall coordinate installation activities for the Systems Integrator to implement the ETCS Elements for the Toll Zone Work Sections concurrent with the DB Contractor's Work.

DB Contractor shall incorporate the Toll Zone Work Section Completion Milestones into the Project Schedule and provide regular updates in accordance with Item 8 of the General Conditions.

DB Contractor shall provide traffic control plans, devices and safe working conditions for the Systems Integrator during the installation of all ETCS and ETCS Elements.

Prior to Substantial Completion and Toll Zone Work Section Opening Readiness, TxDOT, in concert with the Systems Integrator, will perform a controlled test of all ETCS Elements as they relate to the tolling operations. DB Contractor shall be responsible for incorporating a period of time, according to the timelines outlines in DBA Section 2.1.2, for controlled testing of all system elements related to toll operations into the Project Schedule.

29.2 **Administrative Requirements**

DB Contractor shall meet regularly with TxDOT and the Systems Integrator to coordinate design and construction of Toll Zones and infrastructure needed to support the ETCS and ETCS Elements.

29.3 **Design Requirements**

Throughout the design phase DB Contractor shall coordinate Design Work at the Toll Zones and other ETCS Elements with TxDOT and Systems Integrator to determine design requirements specific to the Toll Zones and ETCS Elements.

DB Contractor shall be responsible for designing all civil, electrical, and communications infrastructure at each Toll Zone and ETCS Elements at locations to be determined by TxDOT in coordination with DB Contractor. DB Contractor responsibilities include, but are not limited to the following:

- Pavement design (Toll Zone pavement, transition areas, and Toll Zone maintenance driveways)
- Striping

- Concrete traffic barrier and foundation
- End treatments
- Toll gantry structures, foundations, and lightning protection
- Concrete pads, riprap around concrete pads and lightning protection, for the roadside ETCS Elements
- Electrical conduit and conductors
- Tolling communication conduit
- Concrete encased duct bank
- Power and communications services
- General grading
- Earthwork
- Flexible base
- Embankment
- Retaining walls
- Drainage
- SW3P
- Traffic Control
- Other typical roadway items included in DB Contractor's Work to support the Systems Integrator's ETCS

DB Contractor shall construct concrete traffic barrier or provide positive barrier for backup power systems adjacent to for roadways. The maintenance drive shall permit safe use by maintenance personnel and their vehicles. The toll maintenance area shall be free of ditches or other obstructions which could damage or diminish the function of the ETCS Elements. For general guidance, details, and responsibilities, see Attachment 29-2 (Typical Toll Zone Layout) and Attachment 29-6 (Typical Temporary Toll Zone Layout). Design and geometric constraints may dictate that the design deviates from the general guidance. In these instances, DB Contractor's design shall be coordinated with TxDOT in advance to ensure that the design and construction meets the Systems Integrator's specifications.

TxDOT shall be responsible for the Systems Integrator's work. TxDOT will provide the applicable Systems Integrator's Toll Zone in-pavement loop sensors layouts for each Toll Zone to DB Contractor during design and work closely with DB Contractor to coordinate design. For use in the DB Contractor's Toll Zone design, this Item 29 and supporting attachments provide the DB Contractor requirements for the following: toll gantry; toll zone maintenance drive; concrete pads for roadside equipment cabinets, generators, and fuel tanks; riprap, ETCS equipment power and communications; and electrical and communication conduit and other elements identified in Attachment 29-2 (Typical Toll Zone Layout) and Attachment 29-6 (Typical Temporary Toll Zone Layout) as being performed by DB Contractor.

The concrete pad foundation for roadside toll equipment cabinet shall be designed and placed to provide for a maximum cable run length of 150 feet between roadside toll equipment cabinet pad and the furthest Managed Lane solid stripe. The maximum cable run length shall account for both the horizontal and vertical distance that is spanned. Cable runs which exceed the stated maximum shall require TxDOT approval during design. The location of the concrete pad foundation for roadside toll equipment cabinet shall be coordinated throughout the design process with TxDOT and Systems Integrator. The equipment cabinet pad foundation shall, where possible, be within line of sight to the toll gantry. For general guidance on equipment pad design, see Attachment 29-5 (Toll Zone Equipment Pad Details). The Systems Integrator shall be responsible for providing and installing the roadside toll equipment cabinets.

The tolling communication termination cabinet shall be placed to provide for a maximum cable run length of 150 feet between roadside toll equipment cabinet and tolling communication termination cabinet. The maximum cable run length shall account for both the horizontal and vertical distance that is spanned. Cable runs which exceed the stated maximum shall require TxDOT approval during design.

DB Contractor shall work closely with the Systems Integrator to identify the detailed specifications for each element of work. DB Contractor shall incorporate the Systems Integrator's ETCS requirements into the civil,

electrical, and communications designs and submit the designs to TxDOT and the Systems Integrator for concurrent review.

29.3.1 **Toll Signing**

DB Contractor shall be responsible for all signing including static toll rate signs, toll entrance ramp signs maintenance drive signs and advance toll information signs in accordance with Item 24. DB Contractor shall coordinate with TxDOT and all local regional toll entities in determining the locations for advance toll information signs to be installed within the project limits. At a minimum, DB Contractor shall install advance toll information signs at the following locations:

- At all locations where there is a change in toll policy such as the transition between TxDOT operated segments of the facility and abutting non-TxDOT operated segments of the facility
- At all locations where an existing roadway provides public access to the Project
- Prior to all entrance ramps to the Project

DB Contractor shall provide TxDOT with the preliminary and final operational signing schematic for review and approval. DB Contractor shall submit any signing design revisions to TxDOT for review and approval.

29.3.2 **Toll Gantry and Overhead Support for Toll Equipment**

DB Contractor shall provide toll gantries and overhead support for ETCS Elements in accordance with Attachment 29-4 (Toll Gantry Requirements). Each toll zone shall include a pair of toll gantries consisting of simple span or cantilevered overhead sign bridges. DB Contractor shall coordinate toll gantry locations with TxDOT and the Systems Integrator throughout the design process. Toll gantries shall not be placed on elevated sections unless approved by TxDOT. TxDOT shall provide approval of the final toll gantry locations. Any change to the final toll gantry locations shall be approved by TxDOT. All design and construction of structural foundations, geotechnical analysis, lightning protection, aesthetic treatment, columns/towers and overhead spans shall be the responsibility of the DB Contractor. DB Contractor shall ensure toll gantries meet Systems Integrator's specifications for:

- Spacing between toll gantries
- Vertical clearance
- Conduit on/within the gantry column
- Spacing and placement of toll gantries relative to the roadside equipment cabinet
- Weight of overhead toll equipment, mounting apparatus and conduit
- Avoiding interference by any devices or signing mounted to the toll gantry span
- Vibration
- Equipment mounting brackets and locations

DB Contractor shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practice. Designs for gantry support structures shall also comply with requirements in Item 21, Item 23, and Item 24.

Lightning protection shall be installed immediately following the construction of each gantry in accordance with the Toll Zone Work Section Milestone Completions. DB Contractor shall provide TxDOT and Systems Integrator with lightning protection shop drawings for review. Lightning protection certifications meeting UL standards shall be provided to TxDOT and Systems Integrator upon completion of each gantry.

DB Contractor shall either provide barrier for the toll gantries or shall integrate the toll gantries directly into the barrier as needed based on physical constraints.

29.3.3 **Pavement**

DB Contractor shall provide Toll Zone pavement sections in accordance with Attachment 29-3 (Toll Zone Pavement Details). All non-pavement reinforcing steel within the 110-foot Toll Zone pavement shall be epoxy-coated; this includes items such as barriers, retaining wall, ties, chairs, etc. Pavement reinforcement within the 110-foot Toll Zone may be epoxy-coated steel that is separated from the in-pavement loop sensors per Systems Integrator specifications or glass fiber reinforced polymer bar which has no spacing requirement from the in-pavement loop sensors. No grooved pavement shall be allowed within the Toll Zone.

DB Contractor shall provide conduit stub-ups in the pavement and in-pavement loop sensor conduit. TxDOT will provide Systems Integrator's in-pavement loop sensor layout with stub-up locations for DB Contractor to incorporate into Toll Zone pavement design. Pavement joint locations in the Toll Zone pavement shall be coordinated with TxDOT and Systems Integrator and shall not interfere with in-pavement loop sensors.

29.3.4 **Tolling Conduit**

DB Contractor shall provide all conduit for tolling communication cable and electrical conductor at each Toll Zone in accordance with Item 25.

DB Contractor shall provide concrete encased duct banks for the length of the corridor in conformance with applicable TxDOT Statewide and District-wide Standards and Specifications and shall include a minimum of two 3-inch dedicated conduits for tolling. DB Contractor shall provide 3-inch tolling communication cable conduit from the fiber trunk line to each of the Systems Integrator's ETCS element. All loop sensor conduit and stub ups shall be 2-inch.

29.3.5 **Tolling Communications Requirements**

DB Contractor shall provide tolling communication cable consisting of a minimum of 4 strands of single mode communication fiber per Toll Zone (e.g., 24 Toll Zones would require 96 fiber strands). To access the existing TxDOT District tolling communications network, when applicable, DB Contractor shall coordinate with TxDOT and provide a connection of the proposed tolling communication cable to TxDOT hub buildings, existing or new, throughout the Project. Daisy-chaining of fiber, defined as having the same fibers going into multiple Toll Zones and carrying the data for multiple Toll Zones, will not be allowed.

DB Contractor shall provide tolling communication cable from the duct bank to a termination cabinet located on the roadside equipment pad. The fiber trunk line shall be terminated inside a termination cabinet with an appropriately sized fiber optic patch panel. DB Contractor shall provide a minimum of 100 feet of tolling communication cable coiled at each ETCS Element's final Point of Termination. When applicable, the TxDOT approved termination cabinet shall 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 duplex LC connectors.

DB Contractor shall provide physically redundant infrastructure, including conduit and communication cable, for the tolling communications network.

Systems Integrator shall be responsible for providing tolling communication cable from the termination cabinets to Systems Integrator's ETCS equipment. Systems Integrator shall terminate all tolling communication cable from roadside equipment cabinets to Systems Integrator's ETCS equipment.

All tolling communication cable and conduit designed and 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. DB Contractor shall be allowed to place both tolling conduit and ITS conduit in the same concrete encased duct bank.

DB Contractor shall not use wireless connectivity to maintain the ITS for Tolling ITS components during construction.

29.3.6 **Tolling Electrical Service**

At each Toll Zone, DB Contractor shall be responsible for providing the electrical conductor between the metered power service and the Systems Integrator's roadside equipment as shown in Attachment 29-2 (Typical Toll Zone Layout) and Attachment 29-6 (Typical Temporary Toll Zone Layout). The Systems Integrator power requirements are 125A, 120/240VAC single phase, 60 Hz power for each Toll Zone.

DB Contractor shall provide a minimum of 25 feet of electrical conductor coiled at each ETCS Element's final Point of Termination. The length of electrical conductor in the ground box will be dependent on the placement of the ground box and its proximity to the ETCS Element.

Systems Integrator shall be responsible for providing electrical conductor from the ground box adjacent to the roadside equipment pad to Systems Integrator's ETCS equipment as shown in Attachment 29-2 (Typical Toll Zone Layout). Ground box type and other requirements are detailed in Item 25. DB Contractor shall provide GPS coordinates for any buried ground boxes. Systems Integrator will terminate all electrical conductor from roadside equipment cabinets to the Systems Integrator's ETCS equipment.

29.3.7 **ETCS Infrastructure Requirements**

29.3.7.1 **Mainlane and Ramp Tolling**

Mainlane and ramp tolling shall consist of ETCS at the tolling locations indicated on the Schematic Design and in the RID documents.

29.4 **Construction Requirements**

DB Contractor shall coordinate Construction Work at Toll Zones and ETCS Elements with TxDOT and Systems Integrator to determine construction requirements specific to the Toll Zones and ETCS Elements. DB Contractor shall provide and maintain continuous and useable access and coordinate with Systems Integrator during construction to allow for Systems Integrator's work to occur concurrently with DB Contractor's Work, in accordance with the Contract Documents.

DB Contractor shall coordinate construction schedules with TxDOT and Systems Integrator for Work taking place within the Toll Zone Work Section with specific regard for conduit, toll gantry overhead structures, and grounding under structures and in-pavement loop sensors.

DB Contractor shall coordinate with Systems Integrator to ensure that there are no power lines or radio frequency (RF) elements that could cause interference to the ETCS Elements and toll systems. The clearance between power lines and ETCS Elements shall meet NEC requirements. DB Contractor shall provide Systems Integrator with a list of RF elements and their associated frequencies to ensure no conflict exists.

Additionally, DB Contractor shall coordinate with Systems Integrator to ensure that the following do not exist in the 110' Toll Zone pavement areas reserved for in-pavement loop sensors:

- Surface drains or grates within 6 feet of sensors
- Buried drains or water pipes in the area reserved for sensors to a depth of 6 feet
- Underground power lines or buried utilities beneath the Toll Zone that could cause interference to the toll systems
- Non-coated rebar (glass fiber reinforced polymer bar or epoxy-coated steel with separation requirements are acceptable)

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 29 in accordance with the requirements of this Item 29 and TxDOT Standard Specifications.

29.4.1 **Pavement**

DB Contractor shall provide and maintain usable unobstructed access for Systems Integrator at each ETCS Element during Systems Integrator's pavement sensor / equipment installation and toll systems testing. DB Contractor shall provide a minimum of 500 feet of unobstructed access, as illustrated in Attachment 29-2 (Typical Toll Zone Layout), from each end of the 110' Toll Zone pavement section to allow for Systems Integrator's testing of the toll systems for the main lane Toll Zones. These 500-foot sections are not required to be constructed using the special Toll Zone pavement section defined in Attachment 29-3 (Toll Zone Pavement Details). During the Systems Integrator's testing of the toll systems, the pavement within the limits of the unobstructed access shall be free of DB Contractor equipment, materials, or other obstacles in the DB Contractors control. At each ETCS element, an area of 30 feet around all equipment enclosures, equipment pads, and structures shall be clear of DB Contractor equipment, materials, or other obstacles in the DB Contractors control, unless previously cleared with the System Integrator's onsite personnel. For Toll Zones on ramps, unobstructed access shall be provided for the entire length of the ramp.

29.4.2 **Communications Requirements**

The tolling communication cable shall be tested end to end and bi- directionally by Optical Time Domain Reflectometer (OTDR) and light meter according to SS Item 6007. DB Contractor shall complete all testing and provide testing results to TxDOT prior Substantial Completion and prior to turnover of the toll and toll-related ETCS Element locations, at each Toll Zone Work Section, to the Systems Integrator.

29.4.3 **Tolling Communication Cable End-to-End Testing**

DB Contractor shall provide notice and coordinate with TxDOT and Systems Integrator to allow for end-to-end testing of the tolling communication cable prior to Substantial Completion and prior to turnover of the toll

and toll-related ETCS Element locations, at each Toll Zone Work Section, to the Systems Integrator. DB Contractor shall provide end-to-end testing results within 10 days of completion. DB Contractor shall be responsible, at a minimum, for the following:

- Coordinating the end-to-end testing with TxDOT to ensure that there will be no conflicts between TxDOT, their affiliated contractors, and DB Contractor's staff
- Providing temporary advance signing (if needed) stating that the facility is closed, and testing is occurring
- Providing maintenance of traffic/traffic control (if needed) at all necessary locations for a maximum of five full days, which could include evenings, nights and weekends and may not be consecutive
- Providing access to the facility for authorized TxDOT staff and contractors
- Repairing any issues found with DB Contractor's work within one 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.

29.4.4 **Tolling Electrical Service**

DB Contractor shall be responsible for the installation and access to power required to operate the toll system devices including all utility costs until Substantial Completion and Final Acceptance by TxDOT. DB Contractor shall coordinate with the Utility Owner(s) and ensure power service is initiated, energized and maintained for all ETCS Elements prior to Substantial Completion. DB Contractor shall have completed all testing and acceptance requirements for electrical networks prior to the Substantial Completion and prior to the start of end-to-end testing.

29.5 **Submittals**

All submittals described in this Item 29 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 29-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 29-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Civil, electrical, and communications designs that incorporate the Systems Integrator's ETCS requirements.	As required	Review and Comment	29.3
Notice of any changes in design within and in close proximity to the Toll Zones	As required	For Information	29.1.1 29.3
Preliminary and final operational toll signing schematic	As required	Approval	29.3.1
Toll signing design revisions	As required	Approval	29.3.1
Toll gantry locations	As required	Approval	29.3.2
Lightning protection shop drawings and certification	As required	Review and Comment	29.3.2
List of RF elements and their associated frequencies	As required	Review and Comment	29.4
Tolling communication cable testing results	As required	For Information	29.4.2

Table 29-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Notice of tolling communication cable end-to-end testing	As required	For Information	29.4.3
Results of the Tolling Communication Cable end-to-end testing	10 days after testing is completed	For information	29.4.3

Item 30
Managed Lanes

30.1 **General Requirements**

All requirements contained in Item 29 shall apply in addition to the requirements specified in this Item 30. In the event of a conflict between Item 29 and this Item 30, the requirements of Item 29 shall take precedence.

A listing of DB Contractor and Systems Integrator responsibilities is provided in Attachment 29-1 (Toll Facility Responsibility Matrix) and Attachment 30-1 (Managed Lane Facility Responsibility Matrix).

30.1.1 **DB Contractor's Coordination Responsibilities**

Coordinate construction activities for Systems Integrator to remove, relocate, implement the temporary and permanent ETCS Elements for the Project concurrent with DB Contractor's Work.

DB Contractor shall incorporate the Toll Zone Work Section Completion Milestones in the Project Schedule and provide regular updates in accordance with Item 8 of the General Conditions. The Toll Zone Work Section Completion Milestones for the Project shall include completion of all ETCS speed / volume detection milestones and Toll Rate DMS milestones set forth in the DBA.

Prior to Substantial Completion, TxDOT, in concert with Systems Integrator, will perform a controlled test of all system elements for the Managed Lanes as they relate to the tolling operations. DB Contractor shall be responsible for incorporating a period of time, according to timelines outlined DBA Section 2.1.2, for controlled testing of all system elements related to toll operations into the Project Schedule.

30.2 **Administrative Requirements**

DB Contractor shall meet regularly with TxDOT and Systems Integrator to coordinate the design and construction of each Toll Zone Work Section and infrastructure needed to support the ETCS Elements for the Project.

30.3 **Design Requirements**

For ETCS locations with only ETCS speed / volume detection equipment or a Toll Rate DMS, maintenance drives are not required. Support infrastructure for the Toll Rate DMS and ETCS speed / volume detection equipment to be provided by DB Contractor at these locations includes, but is not limited to: concrete pads for the controller cabinets, all conduit for electrical conductor and tolling communication cable, ground boxes, tolling communication cable and electrical conductor to the controller cabinet as identified in Attachment 30-2 (Typical Details ETCS Speed/Volume Detection and Toll Rate DMS Sites).

DB Contractor's support infrastructure for ETCS Elements shall meet Systems Integrator's specifications. The location for the controller cabinet pad at the Toll Rate DMS shall be determined by DB Contractor and shall be designed in accordance with Systems Integrator's specifications for maximum cabling distance of 300 feet between the Toll Rate DMS and controller cabinet. The maximum cabling run shall account for both the horizontal and vertical distance spanned. The controller cabinet pad shall, where possible, be within line of sight to the front of the Toll Rate DMS. The location of the controller cabinet shall be coordinated throughout the design process with TxDOT and Systems Integrator. Toll Rate DMS design shall be consistent with the requirements included in Section 25.2.5.

The locations for the ETCS speed / volume detection sites shall be determined by DB Contractor based on the requirements below. At a minimum, ETCS speed / volume detection equipment infrastructure shall be placed, along the Managed Lanes at 0.5 mile spacing at every Toll Rate DMS site and at each entrance and each managed lane exit ramp including direct connector access points to the Managed Lanes. DB Contractor shall reference the RID for approximate locations of ETCS speed and volume detection sites. The location for the controller cabinet pad at the site shall be determined by DB Contractor and shall be coordinated throughout the design process with TxDOT and Systems Integrator. The controller cabinet pad shall be designed and placed to provide for a maximum cabling run of 150 feet between cabinet pad and the furthest ETCS speed / volume detection equipment. The maximum cabling run shall account for both the horizontal

and vertical distance spanned. Cabling distances which exceed the stated maximum shall require TxDOT approval during design.

30.3.1 Toll Signing

DB Contractor shall be responsible for location, design, and construction of the Toll Rate DMS foundation, sign support structure, concrete pad foundation for controller cabinet and the static portion of the Toll Rate DMS and advance toll signs in accordance with Item 24. DB Contractor shall provide TxDOT with the preliminary and final operational signing schematic for review and approval. DB Contractor shall submit any signing design revisions to TxDOT for review and approval.

Systems Integrator shall be responsible for providing, installing, integrating, and testing controller cabinets, dynamic LED modules, and electronics for the Toll Rate DMS.

30.3.2 Overhead Support for ETCS Speed / Volume Equipment and Toll Rate DMS

At the ETCS locations for ETCS speed / volume detection, DB Contractor shall design and construct the complete overhead support structure and/or mounting poles for the ETCS speed / volume detection equipment in accordance with Systems Integrator's requirements. DB Contractor shall ensure mounting poles and / or overhead support structures meet Systems Integrator's specifications for:

- Vertical clearance
- Conduit on/within the support structure (i.e., column/pole)
- Support structure needed to achieve adequate lane coverage in accordance with Systems Integrator's specifications
- Maximum cabling distance between the ETCS speed / volume detection equipment and roadside equipment cabinet
- Weight of overhead ETCS speed / volume detection equipment, mount and conduit
- Avoiding interference by any non-toll appurtenances or signing mounted to the overhead support structure

DB Contractor may, at its discretion and expense, install a mounting pole solely for the ETCS speed / volume detection elements. Any mounting poles placed specifically for ETCS speed / volume detection elements shall conform to TxDOT Standard Specifications and Good Industry Practice for CCTV mounting poles and must adhere to minimum vertical clearance requirements. DB Contractor shall provide all necessary support structures and foundations.

30.3.3 Tolling Conduit

DB Contractor shall provide conduit for tolling communication cable and electrical conductor at each ETCS Element and throughout the corridor for the Managed Lanes in accordance with Item 25.

DB Contractor shall provide concrete encased duct banks for the length of the corridor in conformance with applicable TxDOT Statewide and District-wide Standards and Specifications and shall include a minimum of two 3-inch dedicated conduits for tolling in the concrete encased duct bank. DB Contractor shall provide 2-inch tolling communication cable conduit from the fiber trunk line to each of the Systems Integrator's ETCS elements.

30.3.4 Tolling Communications Requirements

DB Contractor shall provide tolling communication cable consisting of a minimum of 4 strands of single mode communication fiber per ETCS speed / volume detection site and 4 strands of single mode communication fiber per Toll Rate DMS for the Managed Lanes. To access the existing TxDOT District tolling communications network, when applicable, DB Contractor shall coordinate with TxDOT and provide a connection of the proposed tolling communication cable to TxDOT hub buildings, existing or new, throughout the Project. Daisy-chaining of fiber, defined as having the same fibers going into multiple Toll Zones, ETCS speed / volume detection sites and Toll Rate DMS sites will not be allowed.

DB Contractor shall provide tolling communication cable from the duct bank to a ground box adjacent to the controller cabinet pad. The fiber trunk line shall be terminated inside the ground box to Lucent connector (LC) for testing. DB Contractor shall provide a minimum of 100 feet of tolling communication cable coiled at each

ground box adjacent to the roadside equipment pad. The System Integrator will be responsible for pulling the fiber from the ground box into the System Integrators equipment enclosure using the DB provided conduit.

DB Contractor shall provide physically redundant infrastructure, including conduit and communication cable, for the tolling communications network.

All tolling communication cable and conduit designed and 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. DB Contractor shall be allowed to place both tolling conduit and ITS conduit in the same concrete encased duct bank.

DB Contractor shall provide a minimum of 100 feet of tolling communication cable coiled at each ETCS Element's final point of termination.

DB Contractor shall not use wireless connectivity to maintain the ITS for Tolling ITS components during construction.

30.3.5 ETCS Infrastructure Requirements

30.3.5.1 Managed Lane Tolling

Managed Lane and slip ramp tolling shall consist of ETCS at the tolling locations indicated in the DBA.

30.3.6 Tolling Electrical Service

At each ETCS Element for the Managed Lanes, DB Contractor shall be responsible for providing the electrical conductor between the electrical service connection and the designated DB Contractor provided electrical conductor ground boxes adjacent to Systems Integrator's controller cabinet pad, in accordance with Systems Integrator's specifications. The Systems Integrator power requirements are 125A, 120/240VAC single phase, 60 Hz power for each ETCS Element site location (metered power service). DB Contractor shall provide a minimum of 25 feet of electrical conductor coiled at each ETCS Element's final point of termination.

30.3.7 Tolling Communication Cable End-to-End Testing

The communication cable shall be installed and tested end to end and bi- directionally by Optical Time Domain Reflectometer (OTDR) and light meter according to SS Item 6007. DB Contractor shall complete all testing and provide testing results to TxDOT prior to Substantial Completion and prior to turnover of the toll and toll-related ETCS Element locations, at each Toll Zone Work Section, to the Systems Integrator.

DB Contractor shall provide notice and coordinate with TxDOT and Systems Integrator to allow for end-to-end testing of the tolling communication cable prior to Substantial Completion and prior to turnover of the toll and toll-related ITS locations, at each Toll Zone Work Section, to the Systems Integrator. DB Contractor shall provide end-to-end testing results within 10 days of completion. DB Contractor shall be responsible, at a minimum, for the following:

- Coordinating the end-to-end testing with TxDOT to ensure that there will be no conflicts between TxDOT, their affiliated contractors, and DB Contractor's staff
- Providing temporary advance signing (if needed) stating that the facility is closed, and testing is occurring
- Providing maintenance of traffic/traffic control (if needed) at all necessary locations for a maximum of five full days, which could include evenings, nights and weekends and may not be consecutive
- Providing access to the facility for authorized TxDOT staff and contractors
- Repairing any issues found with DB Contractor's work within one 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.

30.4 **Construction Requirements**

DB Contractor shall conduct all Work necessary to meet the requirements for this Item 30 in accordance with the requirements of this Item 30 and TxDOT Standard Specifications.

30.5 **Submittals**

All submittals described in this Item 30 shall be in accordance with the schedule and for the purpose (approval, review and comment, for information) set forth in Table 30-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 30-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Preliminary and final operational toll signing schematic	As required	Approval	30.3.1
Toll signing design revisions	As required	Approval	30.3.1
Notice of tolling communication cable end-to-end testing	As required	For Information	30.3.7
Results of the Tolling Communication Cable end-to-end testing	10 days after testing is completed	For information	30.3.7