Texas Department of Transportation

DESIGN-BUILD SPECIAL PROVISIONS

Items 10-30

August 22, 2019

Design-Build Special Provision to Item 10
General

Item 10, "General," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

10.1 Offices, Equipment, and Vehicles

Except where noted elsewhere in the DBA, DB Contractor and TxDOT shall co-locate until Final Acceptance to facilitate Project coordination and daily communication. The definition of "co-locate" for the Term of the DBA is office space meeting the conditions of these Design-Build Specifications that are within a half mile of the I-635 Project ROW, or as approved by TxDOT.

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 60 days following issuance of NTP1. 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 ten days after NTP1. The facility area layout plan shall include an office space floor plan; the layout of furniture, fixtures and equipment; lighting plan; wiring and circuitry plan; and a parking plan for TxDOT's project management and contract staff vehicles for review and approval prior to beginning tenant improvements. 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 sole discretion.

10.1.1.1 Office Condition

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

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

10.1.1.3 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 finish floor). Each office space shall have at least four duplex receptacles, with minimum circuit capacity of 20 amperes. In addition, each personal office area and conference room shall have a 1,500 Volt-ampere (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, the ADA 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.
- Pest Control. Provide pest control service to prevent and resolve pest infestation inside the office space.

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, ergonomic adjustable height desk (as requested by TxDOT), ergonomic desk chair, book case, file cabinet, credenza, and guest desk chair;
- Cubicles. Cubicle area spaces for TxDOT staff (nominal 64 SF each), ten total with ergonomic adjustable height desk (as requested by TxDOT), ergonomic 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 x 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'-19" 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' 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 or vinyl tile or engineered wood flooring (carpet not required in server 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 can 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 Office Condition

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

10.1.2.2 Loss or Damage

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

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 x 10 foot (minimum) covered entrance area, from each building or trailer. Each entrance/exit shall be secured with a door lock plus a deadbolt lock;
- 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, the ADA 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, L-shaped 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 (200 SF) and access to another common conference room (350 SF);
- Server room\Network/Telecommunications Room. One (1) Server 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 IQF laboratory required in Section 4.4 of the TxDOT QAP for DB 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 (one women's and one men's) 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/Vinyl/Engineered wood 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;
- 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, "Offices, Equipment, and Vehicles:"

- A 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 ®) coverage 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;
- Each office and cubicle space shall be equipped with a laptop docking station compatible with TxDOT staff's computers with a minimum of two flat panel monitors or three flat panel monitors if requested by TxDOT, including all necessary peripherals for each personal office area and the reception area in the Project office.
- Peripherals shall include at minimum, monitor stand, docking station, laptop computers, wireless mouse, wireless keyboard, 128 gigabyte 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;
- Four laptop computers shall be provided for use by TxDOT's field staff. The 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 eight GB internal ram, 500 GB hard drive, Core i7 quad-core 2.9 GHZ processors operating on a 64-bit platform. The system shall include not less than: internal wi-fi, Bluetooth, 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, in addition to the four laptop computers described above, 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 Pro (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;
- 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 Special Provisions;

- 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 office equipment meeting the following requirements, or multipurpose piece of equipment capable of meeting multiple parts of the following requirements:
    - Two high-speed color laser computer printers capable of handling 11 inches x 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 (core office only);
    - One high-speed color photocopy machine capable of handling 11 inches x 17 inches prints for core office; and
    - One high-speed color scanner capable of handling 11 inches x 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
- Copies of all applicable design manuals and standards as specified in the DBC 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, 10.5 inch iPad Pro (latest version available), or equal, with Wi-Fi + Cellular, minimum 256 gigabyte (GB) capacity along with 4G/LTE cellular service and protective case with key pad;
- Six iPhones (latest version available) minimum 256 GB, with 4G/LTE cellular service, Otterbox Defender Series cases, and wall and car chargers; and
- One GPS camera (to include compass/GPS module, minimum 64GB 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).

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.

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

The DB Contractor shall utilize 3-D methodologies and techniques to develop the geometric design, including all design features, 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 the Design-Build Specifications and Special Provisions.

10.2.2 Immersive 3-D Over-the-Shoulder Review Meetings

DB Contractor shall present the Project 3-D design model to TxDOT and stakeholders at review meetings if requested by TxDOT for design review and conflict resolution. The 3-D design model shall be completed to illustrate specific design information in sufficient level of detail as requested by TxDOT.

10.2.3 3-D Design Deliverables

Integrated design model deliverables 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 entire proposed project. Additional electronic design files to be submitted to TxDOT by the DB Contractor include but not limited to:

- OpenRoads: 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.;
- ITL: OpenRoads Template Libraries;
- XML: Output files of alignments, profiles, pertinent geometry, DTM for terrain surface and final surfaces;
- DXF: Output files of DTM for terrain surfaces and final surfaces;
- 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 surfaces
    - Final design surface

Preliminary design surfaces refer to surfaces in preliminary design state but not final, which are part of a surface model that represents the Project's existing and proposed terrain features.

10.3 [Reserved]

10.4 Transitions to Adjacent Infrastructure, Roadways, and Facilities

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

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

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

10.5 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 3-D 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.

10.5.1 Design Visualization Services

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.

10.6 Submittals

All submittals described in this Special Provision to Item 10 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in Table 10-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 10-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Preliminary TxDOT Facility Area Layout Plan	Within 10 days after NTP1	Review and comment	10.1.1
Final TxDOT Facility Area Layout Plan	Within 10 days after receipt of TxDOT comments	Review and approval	10.1.1
TxDOT core office space available for occupancy	Within 60 days after NTP1	N/A	10.1.1
Final wiring, circuitry, office furniture and equipment layout, office floor plan, lighting, and parking plans for TxDOT field office space	Prior to commencing construction of TxDOT's field office space	Review and approval	10.1.2
TxDOT field office space final completion	Before NTP2	N/A	10.1.2

Table 10-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
3-D Integrated Design Models, including 3-D MicroStation files, OpenRoads files, output files and all native files	As requested by TxDOT during Design and Construction	Review and comment	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	10.5

Design-Build Special Provision to Item 11
Public Information and Communications

Item 11, "Public Information and Communications," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

11.2 Administrative Requirements

Section 11.2 of the Design-Build Specifications, "Administrative Requirements," is replaced with the following:

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.

11.2.1 Public Information and Communication

Section 11.2.1 of the Design-Build Specifications, "Public Information and Communication," is replaced with the following:

- 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, Highway Conditions Reports (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.
- 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 stakeholders and community groups.

- Compile database of all Customer Group contacts and make readily available to TxDOT in an easily accessible format.

11.2.4 Public Information Office

Section 11.2.4 of the Design-Build Specifications, "Public Information Office," is replaced with the following:

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:

(a) Monday-Friday 8 a.m. – 5 p.m. and by appointment
(b) Saturday By appointment
(c) 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

Section 11.2.5 of the Design-Build Specifications, "Meetings with the Public and Customer Groups," is supplemented by the following:

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.

11.2.8 Disseminating Public Information

Section 11.2.8 of the Design-Build Specifications, "Disseminating Public Information," is supplemented by the following:

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

(a) DB Contractor contact information;
(b) Project maps;
(c) Frequently asked questions (FAQs);
(d) Current Project activities addressing design, construction, and maintenance;
(e) Timing of street and ramp closures and openings;
(f) Recommended route alternatives during closures;
(g) Newsletter and meeting materials;

(h) Meetings and special events announcements and calendar;
(i) Links to TxDOT Highway Conditions Reports;
(j) Links to other related sites as deemed appropriate by TxDOT;
(k) Job opportunities;
(l) Subcontractor information;
(m) Comment form;
(n) Mailing list request form;
(o) Historical archive of photos taken during construction;
(p) Renderings or video animations of the Project, as appropriate; and
(q) 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 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.

11.2.9 Third Party Claims

Section 11.2.9 of the Design-Build Specifications, "Third Party Claims," is replaced by the following:

11.2.9.1 Claims against Third Parties by DB Contractor

Section 11.2.9.1 of the Design-Build Specifications, "Claims against Third Parties by DB Contractor," is added:

As part of the PICP, DB Contractor shall prepare policies related to is 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

Section 11.2.9.2 of the Design-Build Specifications, "Third Party Claims against DB Contractor," is added:

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. The PICP shall include the following with regard to Third Party Claims:

(a) Procedures to respond immediately to public complaints related to damages and to act promptly to resolve claims for damage to vehicles, persons and property caused by the Work (e.g. construction activities) or as a result of the condition of the Project (e.g., broken windshields, damaged tires or damaged vehicle paint).

(b) Procedures for prompt response to complaints from the public related to dust, noise and other nuisance caused by the Work, and policies and procedures to mitigate public complaints, including carwash service vouchers, air filters, etc.

(c) Procedures to log all complaints, dates and times of claims and occurrences, contact information (including the name, address, telephone number, and e-mail address of complainant), name of the respondent, any requirements from the complainant, whether the complaint is satisfied, and whether the claim has been or will be forwarded to DB Contractor's insurance carrier.

11.2.10 Public Information and Communication Plan

Section 11.2.10 of the Design-Build Specifications, "Public Information and Communication Plan," is added:

DB Contractor shall implement the approved PICP that is developed in accordance with Item 4, "Scope of Work," of the General Conditions. The PICP shall be reviewed and updated in accordance with the requirements of the PMP described in Item 4.

DB Contractor shall use, but not be limited to, the implementation strategies described in Sections 11.2.1 through 11.2.2.

11.3 Submittals

Section 11.3 of the Design-Build Specifications, "Submittals," is replaced by the following:

All submittals described in this Special Provision to Item 11 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in 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
PICP	Prior to NTP 2	Approval	11.2.10 4.2.2
Updates to the PICP as listed in Section 11.2.10	As required, at least annually	Approval	11.2.10 4.2.2
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 publishing	For information	11.2.8
Public comment/inquiry log	Monthly	For information	11.2.8
Language assistance log	Quarterly	For information	11.2.8

Table 11-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Draft agenda for communication planning workshop	Following NTP1	Review and comment	4.2.2
Website design elements	Five business days prior to publishing	Review and approval	11.2.8
Copy of claims and complaints documentation, logs, and record of the actions	Upon request	For information	11.2.9

Design-Build Special Provision to Item 12 Environmental

Item 12, "Environmental," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

12.1.1 **Comprehensive Environmental Protection Plan**

Section 12.1.1 of the Design-Build Specifications, "Comprehensive Environmental Protection Plan," is added:

DB Contractor shall prepare a CEPP in accordance with this Item 12 and the requirements of the PMP contained in Item 4, "Scope of Work," of the General Conditions.

12.2.1 **New Environmental Approvals and Amended TxDOT-Provided Approvals**

Section 12.2.1 of the Design-Build Specifications, "New Environmental Approvals and Amended TxDOT-Provided Approvals," is supplemented by the following:

A document containing a summary of the NEPA commitments and mitigation measures is provided in the RIDs.

12.3.3 **Environmental Compliance Inspectors (ECIs)**

Section 12.3.3 of the Design-Build Specifications, "Environmental Compliance Inspectors (ECI)," is replaced by the following:

If applicable, the ECM shall designate 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**

Section 12.3.4 of the Design-Build Specifications, "Hazardous Materials Manager," is replaced by the following:

If applicable, the ECM shall designate Hazardous Materials Manager to provide expertise in the safe handling of Hazardous Materials required to perform the Work and those that may be discovered/impacted during the duration of the DBC. 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.

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**

Section 12.3.5 of the Design-Build Specifications, "Cultural Resource Management Personnel," is added:

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**

Section 12.3.6 of the Design-Build Specifications, "Natural Resource Biologist," is added:

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 requirements of TxDOT Work Category 2.6.1, "Protected Species Determination (Habitat)" and 2.6.3, "Biological Surveys".

12.3.7 **Water Quality Specialist**

Section 12.3.7 of the Design-Build Specifications, "Water Quality Specialist," is added:

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 SW3Ps and be able to demonstrate a working knowledge of the TPDES and MS4 permit requirements applicable to the Project.

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

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

Section 12.6.1 of the Design-Build Specifications, "Asbestos Containing Material/Lead Base Paint," is added:

Bridge and building demolition will be required for the Project. If testing is not provided by TxDOT, DB Contractor shall test for ACM and LBP on the existing bridge structures and building structures to be removed.

DB Contractor shall identify, inspect, notify TxDOT, amend notifications as necessary, pay notification fees, and abate asbestos found on any structure, including but not limited to bridges and buildings, in accordance with appropriate or relevant regulations or guidance.

DB Contractor shall provide TxDOT any inspection reports, proposed abatement plan, and/or report documenting abatement (as necessary).

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

12.7 **Submittals**

Section 12.7 of the Design-Build Standard Specifications, "Submittals," is replaced by the following:

All submittals described in this Special Provision to Item 12 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in 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	For Information	4.2.4.1 4.2.4.6
Investigative Work Plans	As necessary	Review and approval	4.2.4.1 4.2.4.4
SIRs	As necessary	Review and comment	4.2.4.1 4.2.4.4
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	For information	4.2.4.1
TPDES CGP/NOI	Prior to construction	For information	4.2.4.1 4.2.4.2.3
TPDES CGP NOT	Upon Substantial Completion	For information	4.2.4.1 4.2.4.2.3
SW3P	Upon request	For information	4.2.4.1 4.2.4.2.3
Pre-construction Inspection Report	Prior to construction	For information	4.2.4.1
Final Noise Analyses	As necessary	Review and approval	4.2.4.1 4.2.4.2.7
EPIC sheets	Prior to construction	Review and approval	4.2.4.1 4.2.4.2.1

Table 12-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
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	Review and approval	4.2.4.4
ACM/LBP inspection reports, proposed abatement plan, and report documenting abatement	As necessary	Review and comment	12.6.1

Design-Build Special Provision to Item 13
Third-Party Agreements

Item 13, "Third-Party Agreements," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

13.1 General Requirements

Section 13.1 of the Design-Build Specifications, "General Requirements," is replaced with the following:

TxDOT has existing 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.

13.3 Roadway Illumination

Section 13.3 of the Design-Build Specifications, "Roadway Illumination," is replaced with the following:

New construction or modifications to the existing illumination are defined in Item 24, "Signing, Delineation, Pavement Marking, Signalization, and Lighting."

13.4 Landscaping Enhancements

Section 13.4 of the Design-Build Specifications, "Landscaping Enhancements," is replaced with the following:

Some local Governmental Entities may request landscaping enhancements along sections of the Project Limits. Should this occur, additional agreements between TxDOT and the Governmental 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 landscaping enhancements by the DB Contractor will be handled in accordance with the terms of the DBC.

Design-Build Special Provision to Item 14
Utility Adjustments

Item 14, "Utility Adjustments," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

14.1.2.6 **Early Adjustments**

Section 14.1.2.6 of the Design-Build Specifications, "Early Adjustments," is added:

At TxDOT's discretion, there may be early Utility Adjustment Work accomplished by TxDOT through a direct contract with the utility company to coordinate Utility Adjustment Work that would progress the Project. TxDOT will coordinate with and notify the Proposers of all early Utility Adjustment Work during the procurement and negotiation phases.

14.1.5 **Utility Management Plan**

Section 14.1.5 of the Design-Build Specifications, "Utility Management Plan," is added

DB Contractor shall prepare and submit to TxDOT, a Utility Management Plan in accordance with the requirements of the PMP described in Item 4, "Scope of Work" of the General Conditions.

14.5 **Submittals**

Section 14.5 of the Design-Build Specifications, "Submittals," is supplemented by the following:

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	Review and approval	14.1.3.1 14.1.3.2
ROW-U-1818 (Buy America Material Statement), if applicable	Prior to the Utility Owners receiving final payment from DB Contractor or TxDOT	For information	14.1
Utility Management Plan	No later than 30 days after NTP1	Review and approval	14.1.5
PUAA	Prior to commencing utility relocation	Review and approval	14.1.3.1
Modification to a PUAA	As necessary	Review and approval	14.1.3.1
UAAA	Prior to commencing utility relocation	Review and 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	3 Business Days in advance of each scheduled meeting	For information	14.2.2.2

Table 14-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Meeting Minutes	Upon request	Review and comment	14.2.2.2
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
DB Contractor's Utility Strip Map	Upon completion	Review and comment	14.3.1
Utility Adjustment Concept Plan(s)	Upon completion	Review and, if applicable, comment	14.3.3
Utility Assemblies	Prior to start of the affected Utility Adjustment Work	Review and approval	14.3.4.5
Abbreviated Utility Assemblies	As necessary	Review and approval	14.3.4.5
Set of Record Drawings and overall plan view maps of final Utility locations	Prior to Final Acceptance	Review, comment, and if applicable, approval	14.4.9 14.5.3
Individual Record Drawing plans	Prior to Final Acceptance	Review and approval	14.4.9 14.5.3
UTR	Monthly	For information	14.5.2
Closeout information and documentation	Prior to Final Acceptance	For information	14.5.3
Alternate Procedure List	Prior to commencement of any demolition, removal or other construction work for any Utility Adjustment	Review and approval	14.5.4

Design-Build Special Provision to Item 15
Right of Way (ROW)

Item 15, "Right of Way (ROW)," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

15.2.3 **ROW Acquisition Management Plan**

Section 15.2.3 of the Design-Build Specifications, "ROW Acquisition Management Plan," is replaced with the following:

DB Contractor shall prepare a ROW Acquisition Management Plan in accordance with the requirements of the PMP contained in Item 4, "Scope of Work," of the General Conditions.

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

Section 15.4.10 of the Design-Build Specifications, "Right of Entry and Temporary Easement Construction," is added:

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**

Section 15.5 of the Design-Build Specifications, "Early ROW Acquisition," is supplemented by the following:

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

15.6 **Submittals**

Section 15.6 of the Design-Build Specifications, "Submittals," is added:

All submittals described in this Special Provision to Item 15 shall be in accordance with the schedule and for the purpose (e.g., 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
PMP – ROW Acquisition Management Plan	After NTP1 but prior to making offers	Review and approval	4.2.9
Updates for the projected acquisition of each parcel (as a part of the monthly Progress Report)	Monthly	Review and approval	15.2.4
Three samples of previous appraisal work for each appraiser	Prior to beginning appraisal process	For information	15.2.7
Meeting agendas and exhibits	3 Business Days prior to each meeting	For information	15.2.9

Table 15-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Meeting minutes	Upon request	Review and comment	15.2.9
All specific reports and supporting documentation during acquisition process	Prior to Acquisition Package submission, Condemnation Package submission, and as often as requested by TxDOT Final reports and supporting documentation to be provided with retirement of all acquisition, relocation, condemnation, and property management files	Review and approval	15.2.10
Cost summaries	Monthly	For information	15.2.10
Status reports	Monthly	For information	15.2.10
Status updates	Weekly or as requested	For information	15.2.10
Subcontractor status and performance report	Monthly or as requested	For information	15.2.10
ROWIS compatible spreadsheet of ROW data	Monthly	For information	15.2.10
Completed closeout files	Within 90 days of the completed ROW parcel activity	Review, comment, and approval	15.2.11
Project ROW Map	Part of the Acquisition Survey Document	Review and approval	15.3.1
Acquisition Survey Document	As part of any Acquisition Package	Review and 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 CADD files	Prior to submission of the first Acquisition Package	For information	15.3.2
TxDOT introduction letter and Landowner Bill of Rights to property owners and displacees	After ROW PMP approval but prior to ROW acquisition	Approval and signature	15.3.4

Table 15-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Appraisal reports	Prior to submission of the first Acquisition Package, and as requested	Review and approval	15.3.5
TxDOT form ROW-R-LOAS (Relocation Assistance Notification of Outdoor Advertising Signs) to Property Owners and Displacees, including supporting documentation	After ROW PMP approval but prior to ROW acquisition	Approval and signature	15.3.5.1
Acquisition Packages	Prior to delivering the offer to each property owner	Review and approval	15.3.6
Administrative Settlement Submittals	As necessary, within 15 Business Days following receipt of the administrative settlement request.	Review and 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	Review and approval	15.4.2
Relocation Plan	Within 90 Days after receipt of NTP1, as part of a ROW Acquisition Management Plan update prior to commencement of ROW acquisition	Review and approval	15.4.2
Closing Submittals	Minimum of 24 hours prior to closing	Review and approval	15.4.3
Condemnation Packages	Prior to TxDOT submission to TTC for a minute order	Review and approval	15.4.4
Payment Submittals	As necessary	Review and approval	15.4.6

Design-Build Special Provision to Item 16 Geotechnical

Item 16, "Geotechnical," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

16.1 General Requirements

DB Contractor shall perform all investigations, testing, research, and analysis necessary to effectively determine and understand the existing surface and subsurface conditions within the Project ROW needed to carry out the Work.

DB Contractor shall ensure the geotechnical investigations and analyses are both thorough and complete, to provide accurate information for the design of roadways, pavements, foundations, structures, embankments, excavations, slopes, temporary special shoring, 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, "Geotechnical," 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 analysis necessary to design a safe and reliable pavement foundation for the Project in accordance with TxDOT's geotechnical requirements in the TxDOT *Pavement Manual* and this Item 16. DB Contractor shall take all soil borings within and along the proposed roadbed alignment.

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 Registered Professional Engineer.

16.2.1.1 Soil Testing Requirements

DB Contractor shall use the TxDOT *Pavement Manual* to determine the frequency of subgrade soil survey exploration for use in determining plasticity index, liquid limit, moisture content, organic content, sulfate concentration, soil classification and calculating PVR (Tex-124-E) as it relates to pavement design. Borings shall terminate at the depth recommended in the PVR evaluation below the top of the proposed untreated subgrade elevation and sampling will be performed with Shelby tubes or a continuous sampler system.

The 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)	Subgrade Soil Shear Strength
Soil Classification (Tex-104-106-E, Tex-110-E, Tex-142-E)	Plasticity, Particle Distribution, Percent Binder and Soil Classification
Soil Mineralogy (Tex-145-E, Tex-148-E)	Sulfate Content (ppm) and Percent Organic Content
Soil Treatment Design (Tex-120-E, Tex-121-E, Tex-127-E)	Target Stabilizer Content, Compressive Strength, Max. Dry Density, and Optimum Moisture Content

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 a soil column 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 or 16 feet as measured from the proposed finished grade when using in-situ moisture conditions, in calculation of PVR. DB Contractor shall use 100.0 percent soil binder (minus No. 40 material) for each layer in Tex-124-E.

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 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 *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 Item 27, “Maintenance,” of the Design-Build Specifications and the CMA.

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 Manua*l. The scope of the subsurface geotechnical investigations shall include field and laboratory testing, research, and analysis that DB Contractor considers necessary to provide a safe and reliable roadway, embankment and cut slopes, bridge foundations, noise and sign structures, drainage structures, temporary and permanent retaining walls, excavation support systems, and any other facilities for the Project.

The depth of test hole should be adequate for the anticipated structure foundation type and loading, excavation depths, and scour.

Groundwater monitoring methods and durations should be adequate to determine groundwater levels and their impacts on the design and construction. DB Contractor shall employ field investigation measures that avoid groundwater contamination and shall be responsible for all mitigation and/or restoration associated with the geotechnical investigations.

DB Contractor shall prepare and amend, as needed, its Geotechnical Engineering Reports documenting the assumptions, conditions, and results of the geotechnical investigation and analyses, including the following:

- 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 Rock Quality Designation (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, 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. The design of retaining walls should be 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 will 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.

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.

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 *Guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures* and TxDOT *Standard Specification Items 260, 265 and 275* for testing and detection and integrate these procedures with construction practices.
- **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, Section 2, "Geotechnical Investigation for Pavement Structures," of the TxDOT *Pavement Manual*, considering soil variability within the Project limits. If the organic content of the soils is greater than 1%, DB Contractor will 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.

16.3.2 Treated Subgrade

For lime treatment, DB Contractor shall meet the requirements of Part I of Tex-121-E. For cement treatment, DB Contractor shall meet the requirements of Part I of Tex-120-E. For lime-fly ash treatment, DB Contractor shall meet the requirements of Tex-127-E. If subgrade treatment does not conform to these requirements, then the treated subgrade 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 *Guidelines for Modification and Stabilization of Soils and Base for Use in Pavement Structure*.

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.

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

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.

16.3.3 Treated Base

Treated base may either be modified with cement, lime, lime-fly ash, or asphaltic binders.

Base materials to be treated shall meet the specifications for the type and grade specified in accordance with TxDOT *Standard Specification Item 247*. Cement treatment wet/dry strengths must 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 unconfined compressive strength (UCS) and 24-hour submerged strength requirements shown in Table 16-2 when tested in accordance with Tex-120-E.

Table 16-2: Minimum and Maximum Strength Values to be Achieved When Using Cement for Treatment, 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.

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.

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

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

Treated base shall be compacted using density control.

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.

16.3.4 Tack Coat

For flexible pavements, DB Contractor shall place a non-tracking tack coat using an approved TxDOT Standard Specification directly beneath the final surface course in accordance to the applicable specification for the final surface. No tack will be required if hot mix asphaltic concrete pavement (HMACP) is on a freshly laid seal coat free of objectionable material such as moisture, dirt, sand, organic material, and other loose impediments as determined by the CQCM.

16.3.5 Surface Mix Type

Where flexible pavement structures are used, the surface mix for mainlanes, ramps, direct connectors, and tolled managed lanes shall be SMA, meeting TxDOT *Standard Specification Item 346*. 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 will have the same high temperature performance grade as the asphalt surface layer. The minimum thickness of this layer will be 2.0 inches.

16.3.6 Final Surface

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

16.3.7 **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 hot mix asphalt concrete overlays. A prime coat complying with TxDOT *Standard Specification Item 310* may be applied to any untreated or treated base layer as an alternative underseal for new HMA paving.

16.4 **Design**

16.4.1 **New Pavement**

16.4.1.1 **Subgrade Considerations**

For flexible pavement, DB Contractor shall be responsible for determining the design value for subgrade using testing as desired, only after they inform TxDOT of the method prior to commencement of construction.

For rigid pavement, the 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.

16.4.1.2 **Required Pavement Design Reports**

The pavement designs developed by DB Contractor shall be signed and sealed by a Registered Professional Engineer.

In addition to the 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;
- 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;
- Other considerations used in developing the pavement design(s), including subgrade preparations and stabilization procedures; and
- Description for selection of material types and grades.

DB Contractor shall include the proposed permanent and rehabilitated pavement designs for the Project in its Final Plans and shall indicate the applicable roadway and station limits for each pavement design.

16.4.1.3 **Flexible Pavement Design Requirements**

The 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.

16.4.1.3.1 Minimum Layer Thickness

Minimum layer thickness for all unbound materials used in flexible pavement designs shall be 6.0 inches.

16.4.1.3.2 Pavement Analysis Period (design life)

DB Contractor shall use 30 years for all pavement types.

16.4.1.3.3 Minimum time to first overlay

DB Contractor shall use 15 years for mainlane and ramp design, and 12 years for all other lanes.

16.4.1.3.4 Reliability Level

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

16.4.1.3.5 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 Specification(s)	Modulus for TxDOT FPS 21
Dense-Graded HMA	Item 341 (for permanent pavement)	Combined HMA thickness: ≤ 4.0” use 500 ksi > 4.0” use 650 ksi
PFC	Item 342	300 ksi
Superpave Mixtures	Item 344	Combined HMA thickness: ≤ 4.0” use 650 ksi 4.0” < T ≤ 6.0” use 750 ksi > 6.0” use 850 ksi
SMA	Item 346	Same as Item 344
TOM	Item 347	Same as Item 344 (maximum thickness of 1.0”)
Thin Bonded Friction Courses	Item 348	Same as Item 344
Flexible Base (Unbound Base)	Item 247, Grades 1-2 or 5	*75 ksi (no more than 4X the untreated subgrade modulus)
Treated Base	Item 275	*150 ksi.
	Item 276	*200 ksi.
	Foam or Emulsion	*150 ksi
	Item 292	*300 ksi.
Treated Subgrade or Subbase	Item 260	*35 ksi**
	Item 275	*35 ksi**

* Maximum design values.

**Minimum modulus value for perpetual pavement design must be 35 ksi

16.4.1.4 **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 continuously reinforced concrete pavement. DB Contractor shall use design values recommended by the TxDOT *Pavement Manual*, Chapter 8, and the applicable current TxDOT Standard Specifications for joint and

reinforcement design. Continuously reinforced concrete pavement design will require a maximum of 10 punch outs per mile. The 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, "Tolling," for the pavement design at Toll Zones.

16.4.1.4.1 Pavement Analysis Period (design life)

DB Contractor shall use 30 years 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-635: 123,628,000 I-30: 221,693,000
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.

16.4.1.5 **Design Traffic Considerations**

Corridor traffic data is provided in the RID. The corridor traffic data shall be deemed a minimum acceptable traffic volume and composition to be used by DB Contractor for the purpose of pavement design for the main lanes. The minimum ESAL values to be used for the I-635 mainlane and I-30 mainlane pavement design is 123,628,000 and 221,639,000, respectively. The minimum ESAL value to be used for the ramp pavement design shall be proportional to the mainlane pavement ESAL by comparing mainlane and ramp traffic volumes, but never less than the ESAL values used for the adjacent frontage road. 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 the 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.

16.4.1.6 **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:

16.4.1.6.1 Main Lanes

The mainlane and tolled managed lane pavement section (materials and depths including treated subgrade) shall be consistent throughout the I-635 Project limits.

The mainlane and tolled managed lane within the proposed and existing noise wall limits along I-635 Project limit shall consist of a Next Generation Concrete Surface on new pavement surfaces as described in TxDOT *Special Specification 3012* located in the RID. The Next Generation Concrete Surface shall apply to both eastbound and westbound directions of the noise wall limits.

The mainlane and reversible managed lane pavement section (materials and depths including treated subgrade) shall be consistent throughout the I-30 Project limits.

The mainlane and tolled managed lane shall have the same pavement sections (materials and depths including treated subgrade) throughout the I-635 Project limits.

The mainlane and reversible managed lane shall have the same pavement sections (materials and depths including treated subgrade) throughout the I-30 Project limits.

16.4.1.6.2 Frontage Roads

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

16.4.1.6.3 Ramps

The pavement section of the ramps may be designed for ramp specific traffic volumes, but the traffic volumes for ramp pavement section design shall not be less than the adjacent frontage road's traffic volumes.

The ramps within the proposed and existing noise wall limits along I-635 Project limit shall consist of a Next Generation Concrete Surface on new pavement surfaces as described in TxDOT *Special Specification 3012* located in the RID. The Next Generation Concrete Surface shall apply to the entrance and exit ramps in both eastbound and westbound directions of the noise wall limits.

16.4.1.6.4 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.

16.4.1.6.5 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 tolled managed lanes and be consistent throughout the I-635 limit. 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.

16.4.1.6.6 Shoulders

The shoulders pavement section 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-635 Project limits.

The shoulders within the proposed and existing noise wall limits along I-635 Project limit shall consist of a Next Generation Concrete Surface on new pavement surfaces as described in TxDOT *Special Specification 3012* located in the RID. The Next Generation Concrete Surface shall apply to both eastbound and westbound directions of the noise wall limits.

The shoulders pavement section 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-30 Project limits.

16.4.2 Pavement Widenings

The existing I-635 westbound frontage road from approximate station 833+22 to 891+00 may remain in place and widened for the proposed I-635 westbound frontage roads. The widened pavement section shall match with the pavement section per CSJ 2374-02-124 in 2009, including treated subgrade, treated subbase, treated base, pavement materials and pavement structure thickness.

The existing I-30 westbound frontage roads from approximate station 108+17 to 135+05 may remain in place and widened for the proposed I-30 westbound frontage roads. The widened pavement section shall match with the pavement section per CSJ 0009-11-138 in 1997, including treated subgrade, treated base, pavement materials and pavement structure thickness.

Cross streets may remain in place and be widened in accordance with the widening limits shown on the TxDOT Schematic Design. The widened pavement section shall match the existing pavement section, including treated subgrade, treated subbase, treated base, pavement materials and pavement structure thickness.

Longitudinal construction joints along the existing and new pavement sections shall be placed within six inches from the final in-service lane stripe or the center of the lane.

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, “Third-Party Agreements,” and Item 14, “Utility Adjustments.” 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 TxDOT *Guide Schedule of Sampling and Testing for Design-Build Projects by the IQF* (DB Guide Schedule) shall be conducted for each pavement layer except where superseded by these Design-Build Specifications. The DB Contractor shall also ensure that the design assumptions are met by the testing requirements described in this section.

16.5.1 [Reserved]

16.5.2 Smoothness Specification

Smoothness of the pavement constructed shall conform to the requirements of TxDOT *Standard Specification Item 585, Ride Quality for Pavement Surfaces,* amended as cited below:

Article 585.3.4. Acceptance Plan and Pay Adjustments. The entire section is voided and replaced by the following:

Only Surface Test Type B permitted; corrective action acceptable to TxDOT is required, at DB Contractor’s sole expense, for any 0.1-mile section that measures an average IRI in excess of 75 inches per mile for rigid pavements, in excess of 65 inches per mile for flexible pavements, or for correction of local roughness. After making corrections, re-profile the pavement section to ensure that corrections have achieved the required level of smoothness. It is recommended to conduct profiler measurements when a 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.

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 **[Reserved]**

16.7 **Submittals**

All submittals described in this Special Provision to Item 16 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in Table 16-5. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 16-5: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Preliminary Geotechnical Engineering Reports	With applicable design submittals	Review and comment	16.2.1 16.2.2
Final Geotechnical Engineering Report	With RFC Documents	Review and approval	16.2.1 16.2.2
Preliminary Pavement Design Reports	Prior to inclusion of pavement section in the design submittals	Review and comment	16.4.1.2
Final Pavement Design Report	With the RFC Documents	Review and approval	16.2.1 16.4.1.2

Design-Build Special Provision to Item 17
Land Surveying

Item 17, "Land Surveying," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

17.3.5 **Units**

Section 17.3.5 of the Design-Build Specifications, "Units," is added:

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

17.4.1 **Survey Records**

Section 17.4.1 of the Design-Build Specifications, "Survey Records," is replaced with the following:

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.

17.5 **Submittals**

Section 17.5 of the Design-Build Specifications, "Submittals," is replaced with the following:

All submittals described in this Special Provision to Item 17 shall be in accordance with the schedule and for the purpose (e.g., 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
Survey records as listed in Section 17.2.3	Upon request	For information	17.2.3
Verification of owner provided survey control	After NTP2	For information	17.3.1
All topographic mapping created by DB Contractor	Prior to signing maps	Review and comment	17.3.3
A horizontal and vertical control report	Upon request	For information	17.3.4
Survey records and reports as listed in Section 17.3.4	Upon request	For information	17.3.4
Copies of all field notebooks	Upon request	For information	17.3.4

Table 17-4: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Survey records as listed in Section 17.4.1	Prior to Final Acceptance	For information	17.4.1
ROW Surveying and Mapping documents	Upon completion but prior to Final Acceptance	Approval	17.4.4
Updated mapping with any ROW monument 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

Design-Build Special Provision to Item 18 Grading

Item 18, "Grading," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

18.1 General Requirements

Section 18.1 of the Design-Build Specifications, "General Requirements," is supplemented by the following:

Grading Work shall include 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.

18.3 Slopes and Topsoil

Section 18.3 of the Design-Build Specifications, "Slopes and Topsoil," is replaced with the following:

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.

For designated construction easements and other approved project specific locations 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 to final 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 riprap.

18.4 Sodding

Section 18.4 of the Design-Build Specifications, "Sodding," is replaced with the following:

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 the 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 within 21 days. The areas adjacent to creeks and drainage ways have priority followed by devices protecting storm sewer inlets.

Design-Build Special Provision to Item 19 Roadways

Item 19, "Roadways," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

19.1 General Requirements

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.

DB Contractor shall coordinate roadway design, construction, and maintenance with other elements of the Project to achieve 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 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 TxDOT Schematic Design.

DB Contractor shall coordinate its roadway design 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 applicable design criteria, design manuals, including but not limited to TxDOT *Roadway Design Manual*, AASHTO and TxDOT's policies, 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, noise attenuators, barriers, and hazard protection as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

All roadside safety devices used on the Project shall meet current crash test and other safety requirements in accordance with TxDOT Standard Specifications. 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.

DB Contractor shall design driveways to be functionally adequate for land use of adjoining property and in accordance with the guidelines, which TxDOT will consider requirements for the purpose of this Project, specified in TxDOT *Roadway Design Manual* – Appendix C, "Driveways Design Guidelines."

DB Contractor shall design the elements of the Project to meet or exceed the geometric design criteria shown in Table 19-1 (Design Speeds) and Table 19-2 (Geometric Design Criteria), with the exclusion of the roadway design deviations listed in Section 19.2.3, in order to meet the Project objectives.

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 TxDOT Schematic Design.

Table 19-1: Design Speeds

Roadway	Roadway Classification	Design Speed
I-635 & I-30 General Purpose Lane	Urban Freeway	60 MPH
I-635 Managed Lanes and Managed Lane Slip Ramp	Urban Freeway	60 MPH
I-30 Reversible HOV Lane and HOV Lane Slip Ramps	Urban Freeway	60 MPH
Direct Connector	Urban Freeway	40 MPH
Ramps	Urban Freeway	40 MPH
Frontage/Bypass Roads	Urban Arterial	40 MPH
Frontage Road Connector	Urban Arterial	30 MPH
Local Access Road	Urban Local	20 MPH
Cross Streets	Various (Urban)	40 MPH
U-turns	Urban Arterial	15 MPH
Shared Use Path	-	12 MPH

19.2.1 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 percent.

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

19.2.2 Control of Access

Unless shown to be denied in the TxDOT Schematic Design, DB Contractor shall maintain all existing property accesses, including those not shown on the TxDOT 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*.

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

Table 19-2: Geometric Design Criteria

Item [1]	I-635 and I-30 General Purpose Lane	I-635 Managed Lane	I-635 Manage Lane Slip Ramp	I-30 Reversible HOV Lane [16]	I-30 Reversible HOV Lane Slip Ramp [16]	Direct Connects	Ramps	Frontage & Bypass Roads [10][14]	Frontage Road Connector	Cross Streets[11][14]	Local Access Roads	U-turn	Shared Use Path [12]
Roadway Classification	Urban Freeway	Urban Freeway	Urban Freeway	Urban Freeway	Urban Freeway	Urban Freeway Ramp	Urban Freeway Ramp	Arterial	Arterial	Various	Local Access	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	Low-Speed	Low-Speed	Low Speed
Design Speed (mph)	60 mph	60 mph	60 mph	60 mph	60 mph	40 mph	40 mph	40 mph	30 mph	40 mph	20 mph	15 mph	12 mph
Horizontal Alignment													
Stopping Sight Distance (ft)	570	570	570	570	570	305	305	305	200	305	115	80	75
Min Radius NC (w/o superelevation)	11100	11100	11100	11100	11100	5230	5230	762	333	762	107	50	60
Min Radius RC	8060	8060	8060	8060	8060	3770	3770	593	273	593	92	44	60
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%	e(Max) = 4%	e(Max)=4%	N/A
Relative Grade for Super Transition	0.45% Relative Gradient	0.45% Relative Gradient	0.45% Relative Gradient	0.45% Relative Gradient	0.45% Relative Gradient	0.58% Relative Gradient	0.58% Relative Gradient	0.58% Relative Gradient	0.66% Relative Gradient	0.58% Relative Gradient	0.74% Relative Gradient	0.78% Relative Gradient	N/A
Vertical Alignment													
Type of Terrian	Level	Level	Level	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 3% Max	0.50% Min 3% Max	0.50% Min 3% 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	0.35% Min 5% Des Max, 8% Max (Commercial)	0.35% Min 7% Max	5% Max
K Value for Crest Curves, Min	151	151	151	151	151	44	44	44	19	44	7	3	7
K Value for Sag Curves, Min **[15]**	136	136	136	136	136	64	64	64	37	64	17	10	N/A
Grade Change without a Vertical Curve	0.50 % Max	0.50 % Max	0.50 % Max	0.50 % Max	0.50 % Max	1.0 % Max	1.0 % Max	1.0 % Max	1.0 % Max	1.0 % Max	1.0 % Max	1.0% Max	N/A
Vertical Clearance													
Roadways underneath	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART: 18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART: 18'-4"	Roadway: 16'-6" KCS: 17'-6" DART:18'-4"	Roadway: 16'-6" KCS: 17'-6" DART: 18'-4"	Roadway: 16'-6" KCS: 17'-6" DART: 18'-4"	Roadway: 16'-6" KCS: 17'-6" DART: 18'-4"	10'-0"
Railroads **[17]**	23'-6"	23'-6"	23'-6"	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%	2.5%	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'	14'	20' Min	14 Min	1-lane:14', 2-lane: 24'	1-lane:14', 2-lane: 24'	11' Min 14' Outside Shared Use	1-lane:14', 2-lane: 24'	11' Min, 14' Outside Shared Use	11' Min 14' Outside Shared Use	20' Min	12' Min
Shoulder Width **[4]**													
Inside	10'	14' Min, 16' Des from US 75 to La Prada Drive 2' Min, 4' Des from La Prada Drive to I-30	2' Rdwy, 4' Str	N/A	2'	2' Rdwy, 4' Str	2' Rdwy, 4' Str	N/A	2' Rdwy, 4' Str	N/A	N/A	N/A	N/A
Outside	10'	10'	6' Min, 8' Des	N/A	2'	8'	6' Min, 8' Des	N/A	6' Min, 8' Des	N/A	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	N/A	10' Min	9' Min	N/A	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	N/A	1' Min, 2' Des	1' Min, 2' Des	1' Min; 2' Des	N/A
Clear Zone Width	30'	30'	16'	30'	16'	16'	16'	Curb: 4' Min, Curb: 6' Des Curb: 6' from face of column Min Uncurbed: 10'	16'	Curb: 4' Min, Curb: 6' Des Curb: 6' from face of column Min Uncurbed: 10'	Curb: 4' Min, Curb: 6' Des Curb: 6' from face of column Min Uncurbed: 10'	Curb: 4' Min, Curb: 6' Des Curb: 6' from face of column Min Uncurbed: 10'	2'
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	25' Min	25' Min	25' Min
Side Slopes **[6]**													
Within Clear Zone	4:1 Max	4:1 Max	N/A	4:1 Max	N/A	4:1Max	4:1 Max	4:1 Max	4:1 Max	4:1 Max	4:1 Max	4:1 Max	6:1 Max
Outside Clear Zone	3:1 Max	3:1 Max	N/A	3:1 Max	N/A	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	3:1 Max	1:1 w/ a drop of 1' 2:1 w/ a drop of 4' or greater 3:1 w/ a drop of 6' or greater
Through guard rail	10:1 Max	N/A	N/A	N/A	N/A	10:1 Max	10:1 Max	10:1 Max	10:1 Max	10:1 Max	10:1 Max	10:1 Max	N/A
Sidewalk Width **[7]**	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)	N/A	5' Min (with 4' to 6' buffer) 6' Min (Adjacent to Curb) 10' (Along cross streets between prop FR Rds.)	5' Min (with 4' to 6' buffer) 6' Min (Adjacent to Curb)	N/A	N/A
Border Width **[13]**	15' Min, 20' Des	15' Min, 20' Des	N/A	15' Min, 20' Des	N/A	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	15' Min, 20' Des	N/A	N/A
Intersections [8]													
Major Cross Streets Radii Design Vehichles	N/A	N/A	N/A	N/A	N/A	N/A	N/A	WB-62	N/A	WB-62	N/A	N/A	N/A
Minor Cross Streets Radii Design Vehicles	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P	N/A	P	N/A	N/A	N/A
Driveways Corner Radii **[9]**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15' Min Residental, 25' - 30' Min Commercial	N/A	15' Min Residental, 25' - 30' Min Commercial	15' Min Residental, 25' - 30' Min Commercial	N/A	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.				N/A	N/A

Notes:

[1] References: TxDOT *Roadway Design Manual* (April 2018); AASHTO *A Policy on Geometric Design of Highways and Streets* (2004); TxDOT *Bridge Project Development Manual* (December 2012); AASHTO *HOV Guide* (2004); AASHTO *A Policy on Geometric Design of Highways and Streets* (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. KCS requires a minimum of 6-foot crash wall along columns immediate adjacent to existing and future railroad track as shown in KCS Exhibit As regardless of meeting minimum horizontal clearance requirement. Refer to Preliminary Exhibit A for KCS additional requirements.

[6] Share Use Path side slopes shall follow AASHTO *Guide for the Development of Bicycle Facilities* (2012).

[7] Sidewalk designs including street and driveway crossing should be ADA compliant.

[8] Criteria are minimum guidelines. Intersection design should be based on expected driver/vehicle usage, constraints, and geometrics.

[9] Driveway Corner Radii shall not be less than the existing radii.

[10] Sidewalk along NB frontage road from La Prada intersection (STA 942+00) to approximately station 946+54 shall be designed to a minimum of 12'.

[11] Proposed sidewalk width along all cross streets crossing I-635 between the proposed frontage road shall be designed to a minimum of 10 ft. Exceptions: Gus Thomasson Rd - 6ft, along WB La Prada Dr between frontage roads (approximately from STA 20+00 to 24+50) - 12 ft, and along EB La Prada Drive from SB frontage road to the end of La Prada western reconstruction limit (approximately from STA 13+80 to 19+50) - 8ft. See TxDOT Schematic Design.

[12] K value (crest curve) was calculated by using Table 5-5 on the AASHTO *Guide for the Development of Bicycle Facilities* (2012). No information is provided for the value for a sag curve, however, the guide lists L Min = 3 feet.

[13] Border width less than the minimum requirement of 15 feet will be allowed only at locations shown on TxDOT Schematic Design.

[14] Cross slope may be transitioned using less than 2% at intersections.

[15] Comfort control criteria for sag curve would be allowed for vertical curve with continuous lighting condition only when it is approved by TxDOT.

[16] The I-30 Reversible HOV lane and its access shall be reconstructed to its existing condition as shown on TxDOT Schematic Design. Sub-standard shoulder width for the reversible HOV lane approved by the existing design exception under CSJ 0009-11-202 may be reused.

[17] The 23'6" vertical clearance for KCS railroad track is measured from the future/corrected track profile as shown in KCS Exhibit As.

19.2.3 Roadway Design Deviations

The approved TxDOT Schematic Design contains design exceptions to the geometric design criteria stated in Table 19-2. TxDOT will only allow design exceptions at these locations as further described in the Design Exception and Design Waiver Reports included in the RIDs.

19.2.3.1 Design Exceptions for Proposed Construction

The following is a list of approved design exceptions for the Project:

(a) Stopping Sight Distance

(i) 259-foot of Stopping Sight Distance on I-30 eastbound to I-635 southbound direct connector PDE30S635-2 curve

19.2.3.2 Design Exception Documentation for Existing Conditions within Project Limits

Design Exceptions – I-30 Reversible HOV CSJ 0009-11-202 (2005)		
Element	**Begin STA**	**End STA**
Freeway		
11' Mainlane Width	0+00	349+14.25
8' Outside Shoulders (EB)	43+48.47	70+92.12
8' Outside Shoulders (WB)	43+05.77	95+90.93
1' Inside Shoulders (WB)	9+88.54	26+55.94
2' Inside Shoulders (EB)	9+88.54	11+52.94
3' Inside Shoulders (EB)	11+52.94	12+06.38
1' Inside Shoulders (EB)	24+85.89	26+56.72
4' Min -7' Max Inside Shoulders (WB)	33+11.13	38+74.38
0.5' Min -2' Max Inside Shoulders (EB)	33+17.71	38+74.38
4' Min -10' Max Inside Shoulders (WB)	38+74.38	68+92.12
4' Min -9' Max Inside Shoulders (EB)	38+74.38	69+92.12
4' Inside Shoulders (WB)	68+92.12	86+31.01
5' Min -6' Max Inside Shoulders (EB)	68+92.12	93+90.93
9' Inside Shoulder (WB)	96+90.93	295+00
9' Inside Shoulder (EB)	86+31.01	299+85.23
0' Inside Shoulder (WB)	295+00	306+22.82
0' Inside Shoulder (EB)	295+00	307+41.87
HOV Shoulders		
West of Jim Miller	26+56.72	33+17.22

19.2.4 Miscellaneous Roadway 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 TxDOT 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 eastbound and westbound directions, as described further in Item 25, “Intelligent Transportation Systems,” for the I-635 tolled managed lanes to allow emergency vehicles access.

DB Contractor shall design and construct the I-635-I-30 interchange to accommodate the future I-30 reversible managed lanes as shown in TxDOT Schematic Design. The I-30 mainlanes shall be designed to accommodate the future reversible managed lanes such that no future widening will be required on the

mainlane structures. DB contractor shall replace the existing I-30 reversible HOV lane automatic barrier gates impacted by the reconstruction of I-30 general purpose lanes.

DB contractor may reuse the removable barrier for the I-30 reversible HOV lane impacted by the reconstruction of I-30 general purpose lanes.

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

Design-Build Special Provision to Item 20
Drainage

Item 20, "Drainage," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

20.2.1 **Data Collection**

Section 20.2.1 of the Design-Build Specifications, "Data Collection," is replaced with the following:

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 environmental document, 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.

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

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

- Any existing drainage facilities outside of pavement reconstruction limits;
- The existing bridge class culverts crossing the westbound frontage road at station 837+50;
- The new culvert extension constructed by the noise barrier project (CSJ 2374-01-180 and CSJ 2374-02-144) for the existing bridge class culvert crossing I-635 at station 572+22; and
- The existing multiple box culvert crossing NW Hwy at station 13+50.

DB Contractor shall inspect and verify that the existing drainage facilities and structures identified to remain in this Item 20 or Item 21, "Structures," 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, "Structures," the DB Contractor shall improve or replace those elements in order to meet the requirements of this Item 20 and Item 21, "Structures." 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.

Within 30 days of Substantial Completion, DB Contractor shall submit to TxDOT, as part of the Record Documents, a Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system. At a minimum, the Drainage Design Report shall include:

- Record set of all drainage computations, both hydrologic and hydraulic, and all support data;

- Hydraulic notes, models, and tabulations;
- Storm drain drainage report;
- Bridge and culvert designs and reports for major stream crossings;
- Pond designs, including graphic display of treatment areas and maintenance guidelines for operation;
- Correspondence file; and
- Drainage system data (location, type, material, size, and other pertinent information) in a suitable electronic format.

20.2.2 Coordination with Other Agencies

Section 20.2.2 of the Design-Build Specifications, "Coordination with Other Agencies," is replaced with the following:

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.

DB Contractor shall meet with the local floodplain administrator and submit all drainage crossings and outfalls for their review.

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 TxDOT and the appropriate railroad owner in accordance with Item 22, "Rail."

20.3 Design Requirements

Section 20.3 of the Design-Build Specifications, "Design Requirements," paragraph seven (7), is replaced with the following:

DB Contractor shall utilize the TxDOT Statewide Precast Drainage Standard Sheets (https://www.dot.state.tx.us/business/standardplanfiles.htm) and TxDOT Dallas District Drainage Standard Sheets (https://www.txdot.gov/inside-txdot/district/dallas/design-standards.html), in that order of preference, for inlets, manholes, and additional details.

20.3.1.2 Hydrologic Analysis

Section 20.3.1.2 of the Design-Build Specifications, "Hydrologic Analysis," is supplemented by the following:

DB Contractor shall use the National Oceanic and Atmospheric Administration (NOAA) updated precipitation frequency for Texas and proper analysis methods in accordance with TxDOT's memo released on November 21, 2018 as shown in the RID.

DB Contractor shall design for future changes in land use allowable under current City of Dallas, Garland and Mesquite development policy 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, Garland and Mesquite 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, Garland and Mesquite 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.

20.3.2 Storm Drain Systems

Section 20.3.2 of the Design-Build Specifications, "Storm Drain Systems," is replaced with the following:

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 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 one foot below:

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

Existing offsite SWSF located at DART's Garland Transit Center shall be ignored when designing storm drain systems. The downstream storm drain system shall be designed to accommodate the discharge from the existing DART's offsite SWSF without using SWSF and causing a rise in water surface elevation.

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 for temporary conditions during construction. DB Contractor will not be allowed to mitigate impacts by using restrictor plates for in-line detention facilities.

20.3.2.1 Pipes

Section 20.3.2.1 of the Design-Build Specifications, "Pipes," is replaced with the following:

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, excluding the drainage pipes on bridge structures, shall be RCP. 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, "Structures." The minimum box culvert height, inside dimension, shall be three feet.

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

20.3.4 Stormwater Storage Facilities

Section 20.3.4 of the Design-Build Specifications, "Stormwater Storage Facilities," is supplemented by the following:

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

20.3.5.1 Culverts

Section 20.3.5.1 of the Design-Build Specifications, "Culverts," is replaced with the following:

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:

- The 100-YR ARI head water elevation will be no higher than then top of crown of the treated subgrade for all roadways.
- The design year ARI head water elevation will be no higher than the top of curb of the headwall.

As feasible, culverts shall be designed to achieve a minimum tailwater velocity of two (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 receive approval from TxDOT 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 a single or multiple installations. A major culvert may consist of a single round pipe, pipe arch, open or closed-bottom box, bottomless arch, or multiple installations of these structures placed adjacent or contiguous as a unit. 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.

20.3.5.4.1 Design Frequency

Section 20.3.5.4.1 of the Design-Build Specifications, “Design Frequency,” is supplemented with the following:

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

20.3.5.4.4 Bridge Deck Drainage

Section 20.3.5.4.4 of the Design-Build Specifications, “Bridge Deck Drainage,” paragraph two (2), is replaced by the following:

Open deck drains and slotted rail are not permissible for new bridges passing over waterways or other roadways. If ponding width limits are exceeded on the new bridges, then the runoff must be conveyed in a closed system through the bridge columns to the roadway drainage system below. The bridge deck drainage system shall outlet at the bottom of the substructure either into a storm drain system or into an open channel. In no case shall stormwater be discharged against any part of the structure.

Design-Build Special Provision to Item 21 Structures

Item 21, "Structures," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

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, AASHTO *LRFD Bridge Design Specifications* except where directed otherwise by TxDOT *Bridge Design Manual – LRFD*, TxDOT *Preferred Practices for Steel Bridge Design, Fabrication, and Erection*, TxDOT *Geotechnical Manual*, and TxDOT bridge design policy and information listed at https://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, "Aesthetics and Landscaping."

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, "Tolling."

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 Lead Structural Engineers 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 Engineers or PEs reporting directly to the Lead Structural Engineer shall be the EOR for the design of all structural elements on the Project. DB Contractor may employ separate EOR and Lead Structural Engineers for different construction stages throughout the Project duration.

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 100-year service life for 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 noise barriers that are being constructed under separate projects (CSJ 2374-01-180 and CSJ 2374-02-144), anticipated to be completed by May 2019;
- The noise barrier constructed in 2016 under a separate project (CSJ 2374-01-176);
- DART Blue Line Rail Cross to Skillman Station;

- The pedestrian bridge located at approximate station 622+00, east of the Skillman/Audelia bridge;
- The existing bridge class culvers outside of the pavement reconstruction limits;
- The existing bridge class culverts crossing the westbound frontage road at station 837+50; and
- The new culvert extension constructed by the noise barrier project (CSJ 2374-01-180 and CSJ 2374-02-144) for the existing bridge class culvert (NBI # 18-057-0-2374-01-053) crossing I-635 at station 572+22.

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 National Bridge Inventory Reporting Procedures

Upon completion of the bridge layout during the design phase, DB Contractor shall coordinate with the appropriate TxDOT District Bridge Engineer to obtain NBI numbers for all bridges and bridge class culverts. This will require an approved bridge layout and completion of the Permanent Structure Number (PSN) Request Form. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Documents.

DB Contractor shall stencil NBI numbers on all bridge structures. DB Contractor shall stencil NBI numbers and bent number for bridges with four or more spans. The NBI numbers and bent numbers shall be placed at locations 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 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 foundations shall be in compliance with provisions of TxDOT *Geotechnical Manual*.

Rehabilitation or modification of existing structures is not allowed for the Project, unless approved by TxDOT. If approved by TxDOT, rehabilitation or modification of existing structures not originally designed to LRFD provisions will be governed by their original design requirements as defined in AASHTO *Standard Specifications for Highway Bridges,* but never less than HS-20 loading. Design of widening of existing structures shall be based on the LRFD methodology included in TxDOT *Bridge Design Manual- LRFD*, HL-93 loading and the AAHTO *LRFD Bridge Design Specification*. For widening of structures, the existing service, operating, and inventory load rating of all existing bridge component shall not 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 TxDOT Schematic Design. Bridge span lengths shall span the typical section widths of the roadways below including appropriate clear distance except if otherwise shown on the TxDOT 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 TxDOT Bridge Division and Dallas District's practices. Specific corrosion protection measures can be found at https://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 AASHTO *Guide Specifications for Design and Construction of Segmental Concrete Bridges*.

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

Structural design of signs, luminaires, and traffic signals shall be in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

Falsework, shoring, and other temporary supports shall be designed in accordance with AASHTO *Guide Design Specifications for Bridge Temporary Works*.

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

DB Contractor shall proportion bridge spans to prevent uplift at supports.

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 *Hydraulic Engineering Circulars* are met as they relate to 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.

All electronic and hard copies of files and design calculations shall be made available at TxDOT's request during design and construction. 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 *Bridge Design Manual – LRFD* 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 TxDOT Schematic Design and in accordance with the provisions of Item 19, "Roadway," and Item 28, "Bicycle and Pedestrian Facilities." 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 HS 20 Operating or replaced using LRFD design and HL-93 loading.
- Existing Bridge Widenings: HL-93 for widening and HS 20 Operating minimum 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.

Pedestrian bridges and sidewalks of vehicular bridges shall be loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications.* and the AASHTO *Guide Specifications for the Design of Pedestrian Bridges*. In addition, all pedestrian bridges shall also be designed for an AASHTO H-10 truck live load as defined in the AASHTO *Standard Specifications for Highway Bridges*, to account for maintenance and emergency vehicles.

21.2.4 Bridge Decks and Superstructures

Fracture critical members shall not be used for bridges within the Project limit. Multi-beam bridges shall include a minimum of four beam lines. The type of bridge shall be restricted to those typically used by TxDOT.

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 7 days is required between initial coating and bridge deck placement, the contractor shall apply a second coat of the same material used initially to the bars approximately 1 day prior to placement of the concrete.

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. No exposed conduit will be allowed on bents, columns, outer face of exterior bridge beams, 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 box beams, caps and tub girders shall meet the guidelines in 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 permitted 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, except at Shiloh Road. 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.

The design of wall structures shall take into account live load surcharges. DB Contractor shall apply the appropriate live loading condition (vehicular, heavy rail, transit, etc.) that each wall is subjected to. These live load surcharges shall be based on AASHTO *LRFD Bridge Design Specifications*, 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 will not be allowed to run longitudinally within the MSE retaining wall earth reinforcement zone.

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

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

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

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 top of the retaining wall leveling pad shall be located a minimum of 2 feet below ground.

The length of earth reinforcements for MSE retaining walls shall be a minimum of either 8'-0" 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. 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 at-grade or riprap shall be used to avoid soil erosions.

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

21.2.8 Noise Barriers

DB Contractor shall design and construct all noise barriers to achieve the decibel reduction requirements in the NEPA approval(s) and the aesthetic requirements in Item 23, "Aesthetics and Landscaping."

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.

DB Contractor shall design and construct the remaining noise barriers, including the aesthetic end panel, in the I-635 LBJ East and Skillman/Audelia Interchange NEPA approval documents that are not part of the separate noise wall construction project (CSJ 2374-01-180 and CSJ 2374-02-144). An overall corridor noise wall exhibit for this Project's noise wall construction is located in the RID.

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 limit.

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 as necessary retrofit or replace elements to accommodate any additional loads, settlements, and/or other structural impacts associated with the Project.

21.2.10 Sign, Illumination, and Traffic Signal Supports

DB Contractor shall design toll gantries if applicable, overhead 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. Supports for bridge mounted illumination poles shall not be located more than 10'-0" away from centerline bearing of a bridge bent or abutment

Large sign as defined by 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

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, lengthened, 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. The inspectors shall confirm rehabilitation has achieved a minimum condition rating of 7 for each structural component at Substantial Completion. Any substandard or obsolete rail shall be upgraded for structures to be reused.

DB Contractor shall clean and repair existing expansion joints and provide new full width seals for existing and widened structures 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, concrete delaminations, clean and repair exposed reinforcing, seal cracks and repair or replace structurally damaged elements of existing structures.

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. 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.

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 Section 21.2.3.

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 to accommodate the I-635 westbound and eastbound managed lane access ramps:

Table 21-1: Bridges to be Rehabilitated

Structure Number (NBI #)	Feature Crossed	Facility Carried
18-057-0-2374-01-478	DART rail track at TI Blvd	From I-635 WB to US 75 Direct Connector
18-057-0-2374-01-476	Eastbound Frontage Road Exit Ramp to TI Boulevard	From US 75 Direct Connector to I-635 EB

Bridge Inventory, Inspection and Appraisal Program (BRINSAP) reports located in the RIDs provide the most current condition ratings for structures.

21.3 Construction Requirements

DB Contractor shall conduct all Work necessary to 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. Paint or coating, where required as an aspect of the aesthetic treatment of the concrete, shall be uniform in

appearance. Where aesthetic treatments as identified in Item 23, “Aesthetics and Landscaping,” are not applicable, DB Contractor shall provide Ordinary Surface Finish as defined by the TxDOT Standard Specifications to the surface defined in Item 420.4.13 and Item 427.4.1.1 as a minimum.

21.3.2 Steel Finishes

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 TxDOT *Standard Specification Item 446*.

21.4 Submittals

All submittals described in this Special Provision to Item 21 shall be in accordance with the schedule and for the purpose (e.g., 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 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
Structural design calculations	Upon request	For information	21.2.2
load rating calculation input and output files	Upon request	For information	21.2.2
Bridge design notes	Upon request	For information	21.2.2
Bridge Rehabilitation Report	60 Days prior to performing rehabilitation activities on the bridge	Approval	21.2.11
Recommendations to leave any existing coatings intact	Along with Bridge Rehabilitation Report	Approval	21.2.11

Design-Build Special Provision to Item 22
Rail

Item 22, "Rail," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

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 numerous rail corridor crossings within the Project ROW as depicted on the TxDOT 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.

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.

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 manuals 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, including but not limited to preliminary engineering coordination, flagging and inspection, but excluding costs of the KCS Work. These agreements shall be between DB Contractor and the railroad.

KCS Work shall be performed by KCS, or its contractors, and TxDOT will pay KCS directly for the cost of the KCS Work pursuant to an agreement between KCS and TxDOT. Notwithstanding the foregoing, and without limiting DB Contractor's other obligations set forth in the Contract Documents, DB Contractor shall be responsible for design of the KCS track alignment (temporary and permanent) and for all coordination with KCS for the KCS Work, including all scheduling activities and any related sign and signal work. DB Contractor also shall be responsible for all design and construction activities required up to the limits shown in exhibit A in the folder entitled "Railroad Coordination" in the RID. If the limits shown in exhibit A are changed due to DB Contractor's design and construction, DB Contractor shall be responsible for coordination with the railroad company, and design and construction of proper tie-ins in accordance with the railroad design requirements. The only relief available to DB Contractor with respect to the KCS Work is the relief set forth in Section 4.6.9.3.2(j) of the DB General Conditions as amended by Section 6.2.2 of the DBA.

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.

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 (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 6.2 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 6.2.1 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.

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;

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;

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; and

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 License Agreement.

All executed agreements shall be submitted to TxDOT 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 or 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 Right of Entry Agreement

DB Contractor shall cooperate and coordinate with all operating railroads for access by the operating railroad and/or their agents to the rail ROW as necessary for rail maintenance and operations activities, inspection, repair and emergency responses.

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 Special Provision to Item 22 shall be in accordance with the schedule and for the purpose (e.g., 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

Design-Build Special Provision to Item 23
Aesthetics and Landscaping

Item 23, "Aesthetics and Landscaping," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

23.1.1 **Aesthetics Concepts**

Section 23.1.1 of the Design-Build Specifications, "Aesthetics Concepts," is supplemented by the following:

DB Contractor shall adhere to the approved I-635 LBJ East Aesthetic Technical Guidelines, located in the RIDs, and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange which are hereby incorporated by this reference.

DB Contractor may develop an alternate 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 of the Design-Build Specifications. 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**

Section 23.1.2 of the Design-Build Specifications, "Aesthetics and Landscaping Plan," is replaced with the following:

All unpaved areas and areas not covered by permanent structures or concrete rip-rap shall be sodded.

DB Contractor may prepare an alternative Aesthetics and Landscaping Plan in conformance with the Project's approved aesthetic concept shown in the I-635 LBJ East Aesthetic Technical Guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange 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:

23.1.2.2 **Landscaping**

Section 23.1.2.2 of the Design-Build Specifications, "Landscaping," is supplemented by the following:

DB Contractor's establishment program must meet the requirements of TxDOT *Standard Specification Item 193, Landscape Establishment*.

Other than sodding, landscaping is not anticipated for the Project. If landscaping is incorporated into the project, DB Contractor's maintenance program must be approved by TxDOT, City of Dallas, City of Garland and City of Mesquite.

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.

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

23.1.3 **Personnel**

Section 23.1.3 of the Design-Build Specifications, "Personnel," is replaced with the following:

DB Contractor shall provide a landscape architect, registered in the State of Texas, if DB Contractor develops an alternative Aesthetics and Landscaping Plan. DB Contractor 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 Plans and applicable TxDOT and TxDOT District office standards and these Design-Build Specifications.

DB Contractor's landscape architect developing the alternative Aesthetics and Landscaping plan, if approved by TxDOT, must have experience in designing aesthetics and landscaping elements for roadway projects of similar scope and size.

DB Contractor's landscape architect shall coordinate with the District's landscape architect, or the otherwise TxDOT appointed designee, for the TxDOT Dallas 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.

23.2.1 Aesthetics Principles and Strategies

Section 23.2.1 of the Design-Build Specifications, "Aesthetics Principles and Strategies," is replaced with the following:

DB Contractor shall follow the guidelines and requirements of the approved I-635 LBJ East Aesthetic Technical Guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange, 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, and 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-635 LBJ East Aesthetic Technical guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for Skillman/Audelia Interchange or an alternative Aesthetic 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 concurrence 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 Aesthetic and Landscaping Plan.

23.2.2 Walls, Sign Columns, and Toll Gantry Supports

Section 23.2.2 of the Design-Build Specifications, "Walls, Sign Columns, and Toll Gantry Supports," is replaced with the following:

DB Contractor shall design noise/sound walls and the retaining walls with the color, texture, style, and aesthetic treatment presented in the approved I-635 LBJ East Aesthetic Technical Guidelines, or an alternative Aesthetic and Landscaping Plan, if approved by TxDOT. DB Contractor shall apply aesthetic treatments to the vertical surfaces of retaining and noise/sound walls where the surface is visible from the roadway or adjacent residential dwelling units. Consistent treatments shall be used for retaining and noise/sound walls and exposed concrete column sign and toll gantry support structures that articulate the design themes established. DB Contractor shall clearly detail and identify how wall patterns shall be incorporated into the chosen design solution.

The roadside face of noise/sound walls and the side of the noise/sounds walls facing away from the roadway shall follow the aesthetic appearance in the approved I-635 LBJ East Aesthetic Technical Guidelines.

23.2.3 Bridges and Other Structures

Section 23.2.3 of the Design-Build Specifications, "Bridges and Other Structures," is replaced with the following:

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-635 LBJ East Aesthetic Technical Guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange, or an alternative Aesthetic and Landscaping Plan if approved by TxDO*T.*

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

Section 23.2.4 of the Design-Build Specifications, "Trees, Shrubs, and Other Plant Materials," is supplemented by the following:

Landscaping is not anticipated for the Project. 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

Section 23.2.5 of the Design-Build Specifications, "Riprap, Paving and Pavers," is replaced with the following:

Concrete paving or landscape pavers shall be used in hard-to-reach mowing areas, less than 2-foot 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 maintenance operations.

Concrete riprap and landscape pavers shall be applied per the approved I-635 LBJ East Aesthetic Technical Guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange, or the alternative Aesthetic and Landscaping Plan if approved by TxDOT.

23.2.6 Color Palette

Section 23.2.6 of the Design-Build Specifications, "Color Palette," is added:

DB Contractor shall submit a plan that indicates where each color is to be applied based on the I-635 LBJ East Aesthetic Technical Guidelines and the aesthetic requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange. 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

Section 23.2.7 of the Design-Build Specifications, "Lighting Aesthetics," is added:

DB Contractor shall utilize TxDOT standard roadway illumination poles for the entire corridor, except at Skillman/Audelia Interchange. DB Contractor shall follow Skillman-Audelia Lighting Concept and Fixtures, located in the RIDS, and the requirements listed in DB Special Specification Item 10,000 for the Skillman/Audelia Interchange.

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., LED lighting, point source lighting, and High Intensity Discharge lamps).

23.3 Construction Requirements

Section 23.3 of the Design-Build Specifications, "Construction Requirements," is replaced by the following:

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

DB Contractor shall provide TxDOT sample panels in accordance with the timeframe shown in Table 23-1. DB Contractor shall construct sample panels in accordance with TxDOT *Standard Specification Item 427.4.3.5, Form Liner Finish,* that comply with the principles, requirements, and strategies established by TxDOT and the approved I-635 LBJ East Aesthetic Technical Guidelines 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 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

Section 23.4 of the Design-Build Specifications, "Aesthetic and Landscaping Enhancements," is supplemented by the following:

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.

23.4.1 Local Enhancements

Section 23.4.1 of the Design-Build Specifications, "Local Enhancements," is added:

The City of Dallas has requested Local Enhancements on the bridge crossing I-635 at the Skillman/Audelia Interchange. The bridge shall be designed and constructed as a tie arch structure with single span crossing the I-635 mainlanes and managed lanes. The aesthetic and lighting aesthetic requirements for the bridge and cross streets at Skillman/Audelia Interchange are listed in DB Special Specification Item 10,000. Skillman-Audelia Lighting Concept and Fixtures and Skillman-Audelia Hardscape and Landscape Concept are provided in the RIDs for aesthetic and lighting aesthetics concepts of the bridge and cross streets.

23.5 Submittals

Section 23.5 of the Design-Build Specifications, "Submittals," is supplemented by the following:

All submittals described in this Special Provision to Item 23 shall be in accordance with the schedule and for the purpose (e.g., 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
Preliminary aesthetic concepts	As needed	Review and comment	23.1.1
Final aesthetic concept	As needed	Approval	23.1.1
Alternate Aesthetics and Landscaping Plan	As needed	Approval	23.1.2

Design-Build Special Provision to Item 24

Signing, Delineation, Pavement Marking, Signalization, and Lighting

Item 24, "Signing, Delineation, Pavement Marking, Signalization, and Lighting," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

24.1 General Requirements

This Item 24 includes requirements with which DB Contractor shall design, construct, 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, in its discretion, may attend such meetings.

DB Contractor shall arrange and coordinate all meetings with requesting 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 *Standard Highway Sign Designs for Tex*as (SHSD), TxDOT *Freeway Signing Handbook,* TxDOT *Sign Crew Field Book,* TxDOT *Toll Road Signing Guidelines,* if applicable, TxDOT *Traffic Signals Manual*, TxDOT Traffic 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* (HIM), National Electrical Code (NEC), AASHTO *Roadway Lighting Design Guide*, TxDOT Traffic Engineering Standard Sheets, TxDOT Standard 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 Final Design

DB Contractor shall submit, for TxDOT's review and 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 when appropriate, DB Contractor shall review with TxDOT all requests for new signs, including traffic generators, or modifications of existing sign text. Such requests are subject to TxDOT's approval.

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

Signs shall meet the requirements of TxDOT 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 roadways cross city limits.

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 the 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. 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 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, "Structures," and Item 23, "Aesthetics and Landscaping."

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, "Managed Lanes."

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 any 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 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 TxDOT 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, "Structures," Item 23, "Aesthetics and Landscaping," Item 29, "Tolling," 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 and TxDOT Traffic Engineering Standard Sheets.

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

DB Contractor shall incorporate into its design the requirements of Dallas District SOP 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 the Accessible Pedestrian Signal (APS) Guidelines as outlined in the TxDOT *Traffic Signals Manual*.

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 Standard Specifications;
- Comply with the Utility Accommodation Rules for proper cover of conduit;
- Comply with Electrical Detail (ED) sheets for the TxDOT Engineering Standard Sheets;

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

(a) DB Contractor shall provide pedestrian detectors at all traffic signals within the Site complying with TMUTCD Section 4E and the APS Guidelines as outlined in the TxDOT *Traffic Signals Manual*.

(b) For City of Dallas traffic signals, use black polycarbonate signal heads (no fewer than one signal head per lane) with LED signal indications and black aluminum, non-vented backplates.

(c) For City of Garland traffic signals, use yellow aluminum signal heads (no fewer than one signal head per lane) with LED signal indications and black aluminum, non-vented backplates.

(d) For City of Mesquite traffic signals, use yellow polycarbonate signal heads (no fewer than one signal head per lane) with LED signal indications and black aluminum, non-vented backplates.

(e) Use timber poles only for temporary signals.

(f) For City of Dallas traffic signals, install radar presence and advance detection systems, with advance detection required for approaches with posted speed limits greater than or equal to 45 mph, all arterial street approaches, and all approaches for intersections involving ramps and/or frontage roads.

(g) For City of Garland traffic signals, install inductive-loop presence and advance detection systems.

(h) For City of Mesquite traffic signals, install video presence and radar advance detection systems, with advance detection only required for approaches with posted speed limits greater than or equal to 45 mph.

(i) Use LED safety lighting on traffic signal poles for City of Dallas and City of Garland intersections.

(j) Intersections requiring new (or full replacement) permanent traffic signals, subject to the requirements of Section 24.3.8.3, are:

(i) EB I-635 Frontage Road at Greenville Avenue (City of Dallas);
(ii) WB I-635 Frontage Road at Greenville Avenue (City of Dallas);
(iii) EB I-635 Frontage Road at Abrams Road (City of Dallas);
(iv) WB I-635 Frontage Road at Abrams Road (City of Dallas);
(v) EB I-635 Frontage Road at Forest Lane (City of Dallas);
(vi) WB I-635 Frontage Road at Forest Lane (City of Dallas);
(vii) EB I-635 Frontage Road at Skillman Street (City of Dallas);
(viii) WB I-635 Frontage Road at Skillman Street (City of Dallas);
(ix) Skillman Street at Audelia Road/Whitehurst Drive (City of Dallas);
(x) Skillman Street at Audelia Road/Adleta Court (City of Dallas);
(xi) EB I-635 Frontage Road at Royal Lane/Miller Road (City of Dallas);
(xii) WB I-635 Frontage Road at Royal Lane/Miller Road (City of Dallas);
(xiii) EB I-635 Frontage Road at Plano Road (City of Dallas);
(xiv) WB I-635 Frontage Road at Plano Road (City of Dallas);
(xv) EB I-635 Frontage Road at Walnut Hill Lane/Kingsley Road (City of Garland);
(xvi) WB I-635 Frontage Road at Walnut Hill Lane/Kingsley Road (City of Garland);
(xvii) EB I-635 Frontage Road at Jupiter Road (City of Garland);
(xviii) WB I-635 Frontage Road at Jupiter Road (City of Garland);
(xix) EB I-635 Frontage Road at SH 78/Garland Road (City of Garland);
(xx) WB I-635 Frontage Road at SH 78/Garland Road (City of Garland);
(xxi) I-635 Express Lane Ramps at Shiloh Road (City of Garland);
(xxii) Shiloh Road at Cinemark/I-635 Connector (City of Garland);
(xxiii) EB I-635 Frontage Road at Spur 244/Northwest Highway (City of Garland);
(xxiv) WB I-635 Frontage Road at Spur 244/Northwest Highway (City of Garland);
(xxv) EB I-635 Frontage Road at Ferguson Road/Centerville Road (City of Garland);
(xxvi) WB I-635 Frontage Road at Ferguson Road/Centerville Road (City of Garland);
(xxvii) SB I-635 Frontage Road at La Prada Drive (City of Garland);
(xxviii) NB I-635 Frontage Road at La Prada Drive (City of Garland);
(xxix) SB I-635 Frontage Road at Oates Drive (City of Mesquite);
(xxx) NB I-635 Frontage Road at Oates Drive (City of Mesquite);
(xxxi) SB I-635 Frontage Road at Galloway Avenue (City of Mesquite);
(xxxii) NB I-635 Frontage Road at Galloway Avenue (City of Mesquite);
(xxxiii) EB I-30 Frontage Road at Gus Thomasson Road (City of Mesquite);
(xxxiv) WB I-30 Frontage Road at Gus Thomasson Road (City of Mesquite);
(xxxv) EB I-30 Frontage Road at Galloway Avenue (City of Mesquite);
(xxxvi) WB I-30 Frontage Road at Galloway Avenue (City of Mesquite); and
(xxxvii) Additional intersections that may be required by TxDOT subject to Sections 24.3.8.3.

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 signal at Galloway Avenue and Wooded Lake Drive and removing the existing signal at Royal Lane and the existing EB I-635 ramps.

(k) New or modified traffic signal equipment shall be compatible with existing equipment currently used by the City of Dallas, City of Garland, or City of Mesquite, as appropriate.

(l) DB Contractor shall purchase and install traffic signals that meet the requirements of TxDOT, the City of Dallas, City of Garland, and City of Mesquite. DB Contractor shall install controller cabinets,

controller cabinet assemblies, and battery backup units furnished by the City of Dallas, City of Garland, and City of Mesquite (with agreed upon advance notice provided to City of Dallas, City of Garland, and City of Mesquite). Signal related equipment designated to be furnished by the City of Dallas, City of Garland, and City of Mesquite will be provided at no cost to DB Contractor. City furnished signal related equipment is included in the draft signals force account agreement located in the RID. DB Contractor shall install all signal related equipment furnished by the City of Dallas, City of Garland, and City of Mesquite and shall purchase and install any additional signal related equipment necessary for traffic signal operation that is not furnished by the City of Dallas, City of Garland, and City of Mesquite.

(m) Use 1"-4" conduits for electrical and communications as required by design and as recommended by City of Dallas and City of Garland. Use 4" conduits for City of Mesquite traffic signals.

(n) Install communications hardware/equipment provided by the City of Dallas, City of Garland, and City of Mesquite in order for the City of Dallas, City of Garland, and City of Mesquite, as appropriate, to communicate with each new or modified signal from their respective traffic management centers.

(o) Install emergency vehicle pre-emption hardware and equipment, if provided by the City of Dallas, City of Garland, and/or City of Mesquite.

(p) DB Contractor shall submit its signal timing plan design for all new and modified traffic signals to City of Dallas, City of Garland, and City of Mesquite, as appropriate, for review.

(q) Provide training for city staff on all new APS units.

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 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 corridors throughout the construction duration. To the extent the work is not undertaken by a Governmental Entity, DB Contractor shall be responsible for updating signal timing as necessary to maintain optimized flow. Signal timing and phasing plans at diamond interchanges shall conform to the coordinated signal phasing and timing of the corridor.

DB Contractor shall provide copies of all proposed signal timing plans to the appropriate Governmental Entity.

24.3.8.3 Traffic Signal Warrants

Prior to commencing Final Design, DB Contractor shall collect traffic data and prepare traffic warrant studies for proposed signalized intersections not signalized at the time of NTP1, including those proposed signalized intersections listed in Section 24.3.8.1 that are not signalized at the time of NTP1. DB Contractor shall submit these signal warrant studies to TxDOT for review prior to advancing Final Design and prior to submitting traffic signal plans to TxDOT for review. The warrant studies shall address all signal warrant criteria in the TMUTCD. DB Contractor shall make recommendations for new signal installations based on these warrant studies in consultation with TxDOT and the appropriate Governmental Entities. TxDOT will reasonably determine if a signal or modification is required, based upon the warrant study.

All requests for signals within the Project ROW throughout the Term of the DBA shall be subject to TxDOT approval. Requests for signals shall include supporting traffic warrant studies. Traffic signal plans prepared in accordance with the TMUTCD and TxDOT Engineering Standard Sheets and TxDOT Standard Specifications shall be submitted to TxDOT for review if TxDOT approves the request.

Signal warrant studies shall be based on actual traffic volumes if available or obtainable through data collection by the DB Contractor. If actual traffic volumes are neither available nor obtainable through data collection by the DB Contractor, and opening year traffic projections are available, then DB Contractor shall use the procedure in Chapter 3, Section 5 of the TxDOT *Traffic Signals Manual* to determine the volumes to be analyzed. DB Contractor shall conduct additional traffic signal warrant studies for all intersections located in the Project ROW, commencing six months after the Project is opened for traffic. 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 use traffic signal support structures and substructures for all City of Mesquite traffic signal locations that meet the 100 mph wind standard. 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, "Structures."

24.3.8.5 Traffic Signal Systems

DB Contractor shall provide to TxDOT an Acceptance Test Plan (ATP) for all traffic signals. This ATP shall also be submitted to the appropriate Governmental Entity. DB Contractor shall conduct testing in accordance with the ATP and document those results to show conformance.

DB Contractor shall provide interconnection between new or modified signals and the City of Dallas, City of Garland, and City of Mesquite, as appropriate, for traffic signal monitoring and control. DB Contractor shall ensure continuous communication with these new or modified signals. Existing City of Dallas traffic signals utilize local cable company and/or cellular modems; existing City of Garland traffic signals utilize fiber-optic cable, wireless radio, and/or copper; and existing City of Mesquite traffic signals utilize fiber-optic cable and/or wireless radio. Proposed City of Dallas traffic signals shall utilize cellular modems, proposed City of Garland traffic signals shall utilize fiber-optic cable, and proposed City of Mesquite traffic signals shall utilize fiber-optic cable.

24.3.9 Lighting

All third-party requests for lighting within the Site shall be subject to TxDOT approval.

DB Contractor shall perform locates on existing, temporary, and proposed illumination infrastructure.

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 latest TxDOT Traffic Engineering Standard Sheets and TxDOT Standard Specifications. At all times during the Term of the DBA, 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*. 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 ensure that lighting structures comply with Federal Aviation Administration (FAA) height restrictions near airport facilities. In the event that proposed or existing luminaires, mast arms, or poles infringe into an airport's or heliport's base surface, DB Contractor shall coordinate with the FAA and TxDOT to permit or relocate such structures. If FAA restrictions prohibit lighting structures from being placed in certain areas near an airport facility, DB Contractor shall find alternative ways of providing the required level of lighting.

DB Contractor shall provide to TxDOT an ATP for all illumination. This ATP shall also be submitted to the appropriate Governmental Entity. DB Contractor shall conduct testing in accordance with the ATP and document those results to show conformance.

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, subject to approval by TxDOT, or there are FAA height restrictions. The existing high mast lighting in the I-30/I-635 interchange area and along I-635 between I-30 and Ferguson Road/Centerville Road shall be fully replaced, including foundations, by the DB Contractor. The existing high mast lighting in the I-30/I-635 interchange area shall not be reused in-place or elsewhere on the Project, nor shall the existing high mast lighting along I-635 between I-30 and Ferguson Road/Centerville Road be reused in-place or elsewhere on the Project.

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 percent 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.

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, interchanges, ramps, ramp terminals, and frontage road intersections with cross streets.

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 guard fence; and
- Placing high mast lighting outside the clear zone, especially in roadway horizontal curves.

24.3.9.1 Lighting Infrastructure

At a minimum, underground conduit in interchange areas or temporary detours shall not be less than two inches in diameter or of lower standard than Schedule 40 PVC; all other underground conduit installations shall not be less than two inches in diameter or of lower standard than Schedule 40 PVC.

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.

Minimum dimensions for ground boxes shall be as shown on TxDOT Standard 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 with two exceptions: HM poles at the I-30/I-635 interchange with modified ring assemblies and NFHM poles between I-30 and Centerville/Ferguson along I-635. These poles and ring assemblies shall be removed by the DB Contractor and salvaged to the DB Contractor.

24.3.10 Visual Quality

Notwithstanding the requirements of Section 24.3.8, 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 in accordance with the requirements of this Item 24 and 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 Maintenance Management System (MMS).

All installed signs are required to meet the minimum retro-reflectivity values specified in TMUTCD Table 2A-3 (Minimum Maintained Retroreflectivity Levels).

Existing signs located adjacent to existing frontage roads are not subject to meet the minimum retro-reflectivity values specified in TMUTCD Table 2A-3 (Minimum Maintained Retroreflectivity Levels) unless they are impacted by construction.

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

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.

DB Contractor shall provide TxDOT with copies of all signal warrant studies as required in this Item 24. DB Contractor shall also provide copies of all final signal timing.

Before placing any permanent traffic signals, DB Contractor shall provide TxDOT a layout indicating the proposed location of such items.

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 as temporary lighting during construction and restore or replace prior to Substantial Completion. At all times during the Term of the DBA, safe lighting conditions shall be maintained along the Project roadway.

DB Contractor shall remove all old illumination-related cable and conduit that does not have existing pavement or riprap above it; any existing illumination-related 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 affix an identification decal 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.

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 Texas Reference Marker 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 Special Provision to Item 24 shall be in accordance with the schedule and for the purpose (e.g., 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	At least 48 hours prior to the start of the meeting	For information	24.2.1
Preliminary operational signing schematic	Prior to commencing Final Design	Review and approval	24.3.1
Preliminary lighting layout	Prior to commencing Final Design	Review and approval	24.3.1
Copies of all proposed signal timing plans	With Record Drawings	For information	24.3.8.2
Signal warrant studies	Prior to commencing Final Design	Review and comment	24.3.8.3
ATP for all traffic signals and illumination	As part of the Final Design Submittal	Review and comment	24.3.8.5 24.3.9
Temporary illumination plans	As part of the Final Design Submittal	Review and approval	24.3.9
Lighting plan and light spillage measurements	As part of the Final Design Submittal	Review and approval	24.3.9
A computer generated light level array for all lighted areas within the Project limits	As part of the Final Design Submittal	Review and comment	24.3.9

Design-Build Special Provision to Item 25
Intelligent Transportation Systems

Item 25, "Intelligent Transportation Systems," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

25.1 General Requirements

An ITS is necessary for monitoring the Project's traffic flow and performance both during construction and as a permanent installation. The Project ITS must accurately detect traffic and traffic operational conditions throughout the Project limits, and clearly communicate relevant and useful travel information to the Users.

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 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 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 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. This includes connectivity with the City of Garland via a fiber connection near I-635 at Northwest Highway and connectivity with the City of Mesquite via a fiber connection near I-635 at Oates Drive.

The functionality of the ITS shall be such that command and control of appropriate field devices is shared and exchanged with appropriate Governmental Entities.

DB Contractor shall be responsible for the planning, design, installation, testing, and operations support of safe and functional ITS for the Project using Good Industry Practice. All components of the ITS shall conform to the provisions of the NTCIP.

The Project ITS shall conform to the Regional ITS Architecture. 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 Project ITS shall conform to TxDOT statewide Standards, TxDOT Dallas District Standards, the Regional Data and Video Communications System, and have physical connections with the existing TxDOT ITS communications network on major freeways.

DB Contractor shall maintain ITS interoperability over the Term of the Agreement with TxDOT DalTrans TMC and other Governmental Entities. The ITS shall be coordinated with the ETCS such that the communication requirements of the ETCS are accommodated.

DalTrans shall be the main TMC for this Project. 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).

DB Contractor shall incorporate into its design the following list of TxDOT special specifications, and any replacements, as of the date of design work:

- ITS System Support Equipment – SS6003;
- Networking ITS Comm Cable – SS6004;
- Testing, Training, Documentation, Final Acceptance & Warranty – SS6005;
- Electronic Components – SS 6006;
- Fiber Optic Cable – SS6007;
- ITS Ground Mounted Cabinet – SS6008;
- Rack Mounted Electronic Equipment Cabinets – SS6009;
- CCTV Field Equipment – SS6010;
- Fiber Optic RS-232 Data Modem – SS6015;
- Multi-duct Conduit System – SS6016;
- Communication Hub Building – SS6017;
- Dynamic Message Sign System – SS6028;
- Radar Vehicle Sensing Device – SS6304;
- ITS System Integration – SS6032;
- Computerized Transportation Management System Relocation – SS6033;
- Fiber Optic Video Transmission Equipment – SS6035;
- Battery Backup System for Signal Cabinets – SS6058;
- ITS Radio – SS6062;
- ITS Pole with Cabinet – SS6064;
- Environmentally Controlled Communication Building – SS6128;
- ITS Media Converter – SS6183;
- Fiber Optic Transceiver – SS6184;
- ITS Ground Box – SS6186; and
- Automated Barricade Gate – 2004 SS2055.

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 (locking of ground boxes, 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 concurrence 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.

Any recommended modifications to the specifications shall be presented by DB Contractor to TxDOT and shall be subject to TxDOT approval.

DB Contractor is responsible for designing and constructing lightning protection, grounding, and surge suppression for each ITS structure and equipment cabinet.

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.

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 shorter CCTV poles are needed for 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.

All components of the ITS shall conform to the provisions of the NTCIP and be compatible with the latest version of TxDOT LoneStar Software that is operational at DalTrans.

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 most current TxDOT statewide Standards 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 Standard Specifications 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.

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.

New or relocated electrical services for general purpose and tolling ITS equipment and devices can be consolidated into the same service to reduce service points. 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.

DB Contractor shall submit proposed fiber termination charts to TxDOT for approval.

The current TxDOT communications network backbone is a ten Gigabit multiple protocol label switching Ethernet network.

Each field network switch shall provide a primary and secondary fiber path of two fibers each from the field cabinet to separate satellite buildings. The maximum number of Layer 2 field network switches forming a network path between an end device (TxDOT ITS) and a satellite building based data aggregating Layer 3 network switch shall not exceed 12. The calculated data throughput assigned to any sub-network path shall not exceed 50% of the path's throughput capacity. Calculations for band usage shall be provided during the preliminary design efforts.

New devices and any existing devices interconnected during Project implementation shall not be assigned within the same network path or otherwise daisy-chained to avoid possible inconsistencies in communication protocols.

DB Contractor shall install three 48-strand single mode fiber optic cables in the duct bank. One shall be utilized as main trunkline, one for hub-to-hub, and one for the tolling elements. If one 48-strand tolling-specific cable is insufficient to meet the requirements of Item 29, "Tolling," DB Contractor shall increase the size of the cable 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 trunkline fiber is allowed unless approved by TxDOT. Pull boxes shall be spaced at each ITS device location, Toll Zone, satellite building and a maximum of every 700 feet along the Project corridor. DB Contractor is responsible for confirming that the two cables of 48 strands of general purpose fiber (back bone 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 seek TxDOT approval for the method/mechanism to be used for securing ground box lids.

DB Contractor shall provide terminal servers, video encoders, media converters, Ethernet switches, associated cabling, and modems to establish communications as required. Video encoding shall meet MPEG-4 standards and be compatible with TxDOT's traffic management system software requirements for TxDOT CCTV.

The fiber optic cable and duct bank shall be installed and tested no later than 180 days prior to turnover of the toll and toll-related ITS locations to the Systems Integrator.

25.2.2 Conduit

DB Contractor shall recommend, 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. 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 repair each existing communication cable or electrical conductor that is severed or otherwise rendered not usable within 72 hours.

DB Contractor shall provide conduit at all Toll Zones in accordance with Item 29, "Tolling," and at any speed / volume detection locations in accordance with Item 30, "Managed Lanes."

ITS devices shall be powered by dedicated services which are separate from traffic signals, illumination, and other devices.

DB Contractor shall provide separate conduits for tolling and toll-related ITS communication, tolling and toll-related ITS power, general ITS communication and general ITS power. For trunk lines, three 3-inch Schedule 40 conduits and one 4-inch multiduct shall be used, with the multiduct 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.

With TxDOT's concurrence, additional conduits or increased conduit dimension shall be provided should the capacity requirements be exceeded. The location of the spare conduits shall be coordinated with TxDOT during design. A #8 insulated (orange color-coded) electrical conductor wire for detection shall be placed in all three trunk lines.

Specifications for the conduit and other communications infrastructure needed for tolling are located in Item 29, "Tolling."

Lateral communication conduits from trunk line to ITS devices shall be three-inch diameter. Power to ITS devices shall be 2-inch minimum diameter.

Within the proposed tolling and ITS duct bank, the general purpose ITS multiduct conduit shall support a minimum of two 48-strand fiber optic cables and be in a separate multiduct conduit from the toll fiber optic cable. DB Contractor's proposed duct banks shall be separate from any other entity's installation for construction, maintenance, and repair.

DB Contractor shall provide materials and use construction methodology that, at a minimum, meets the most current or applicable TxDOT Standard Specifications and/or 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. DB Contractor shall provide alternatives to TxDOT to improve TxDOT's current practices for securing ground box lids and are subject to TxDOT approval.

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 dedicated structures unless otherwise approved by TxDOT. DB Contractor shall not mount CCTV cameras on DMS structures.

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 approved otherwise by TxDOT.

Distance between CCTV cameras shall not exceed 0.5 miles. 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. Permanent locations of CCTV camera poles shall be subject to TxDOT approval.

25.2.3.3 Video Requirements

DB Contractor shall provide state-of-the-art CCTV cameras that meet the requirements of the applicable TxDOT statewide Standards and TxDOT Dallas District Standards. At any time prior to Final Acceptance,

should any CCTV cameras fail to meet the latest TxDOT statewide or TxDOT 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:

- Ambient temperature range of -35 degrees Fahrenheit to +140 degrees Fahrenheit;
- Wind load of 80 mph without permanent damage to mechanical and electrical equipment;
- Relative humidity range not to exceed 95 percent within the temperature range of +40 degrees Fahrenheit to +110 degrees Fahrenheit; and
- Humidity range of 0 to 100 percent condensing.

25.2.3.5 Control Requirements

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 tested must be fully assembled and in a fully operational condition. Configure all equipment for testing in the same manner as is intended for use on the Project. Prototype equipment will not be allowed. The equipment will be interconnected to the existing CCTV control system and must be fully operational using that system. No modifications to the existing CCTV control system will be made to accommodate the submitted CCTV equipment. To be considered fully operational, as a minimum, the equipment must correctly respond to the following commands:

- Pan left
- Focus far
- Pan right
- Iris override
- Tilt up
- Iris open
- Tilt down
- Iris close
- Zoom in
- Camera power (latching)
- Zoom out
- Pan tilt position preset
- Focus near

Upon completion of installation, DB Contractor shall test the communications link installed between the satellite building and the CCTV field equipment locations. DB Contractor shall perform the test at all CCTV locations on the Project.

DB Contractor shall use a test signal generator and a video monitor to demonstrate the ability of the video signal link to transmit a National Television System Committee compliant video signal from the CCTV cabinet to the satellite building. After completion of testing with the signal generator, connect the CCTV camera to the link and use a video monitor at the satellite building to verify the presence of a National Television System Committee compliant video signal. No degradation of the video signal must be discernible using the video monitor.

Connect a laptop computer containing TxDOT-supplied CCTV control software on the link and use to demonstrate the ability to control all CCTV functions outlined in the specifications.

DB Contractor shall supply all test equipment, cabling, and connectors necessary for performing the tests by DB Contractor.

Equipment which does not pass the test will be allowed one opportunity for retesting. The retest must occur within 30 days after the initial test. All issues of non-compliance and all discrepancies must be resolved before commencing the second test. Equipment which is not able to be retested within 30 days, or which does not pass the second test, will be rejected and cannot be used on the Project. 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.

DB Contractor shall supply CCTV equipment on this Project which is fully compatible with the existing CCTV control systems operated from DalTrans. 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.

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.

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 in each highway lane in the Project, and, at a minimum, provide detection for all highway lanes at one location between interchanges, 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 of 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 shall install a mounting pole solely for the vehicle detector, or a vehicle detector and CCTV may share a pole. Any mounting poles placed specifically for ITS items 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 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 Dynamic Message Signs

DB Contractor shall provide a comprehensive network of electronic DMS as needed to satisfy the operational requirements using only LED display technology. The DMS shall operate as part of an overall regional system. DB Contractor shall provide TxDOT 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 DMS which use LED display technology and support full matrix color, excluding existing DMS being relocated within the Project. DMS used shall conform to the provisions of the NTCIP for DMS and shall demonstrate compliance to TxDOT before installation of DMS by DB Contractor.

DB Contractor shall provide all necessary dynamic message signs, support structures, and equipment, including, but not limited to, DMS devices, controls, cables, and connections.

DB Contractor shall 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.

All DMS shall be visible and legible via CCTV cameras.

DMS shall have the ability to be controlled using the latest TxDOT DMS operating system being used at DalTrans.

Existing DMS are located near the following locations:

- EB I-635 at Abrams;
- WB I-635 at Abrams (not TxDOT-owned/operated);
- EB I-635 at Jupiter (full replacement);
- SB I-635 at La Prada (full replacement);
- NB I-635 at Centerville (full replacement);
- WB I-635 at Forest (full replacement);
- SB I-635 at Town East;
- WB I-30 at Gus Thomasson;
- WB I-30 at Galloway (HOV); and
- WB I-30 at Northwest Dr. (HOV).

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 WB I-635 at Abrams (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 #1 at US 75 or existing Satellite #11 at I-30 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 Toll Rate DMS cabinets (including existing cabinets, if applicable).

25.2.8 Access Control System (ACS)

I-30 features an existing reversible HOV Lane facility. The ACS at each location shall consist of a series of automated barricade gates and a manual gate, similar to existing. DB Contractor shall replace the existing ACS, including at entry points as well as to accommodate movable barrier.

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 and positioned so that a vehicle will encounter at least one gate if trying to enter or exit the reversible HOV Lane facility against the flow of traffic.

Modifications to concrete traffic barrier, pavement, or other civil elements may be required to accommodate the gate 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.

Communications equipment for the gates at a given entrance or exit location may be housed in the same cabinet. The maximum proximity of the communication cabinet to the gates shall be 300 feet.

25.3 Construction Requirements

25.3.1 General

DB Contractor shall conduct all Work in accordance with the requirements of this Item 25 and 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.

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.

An existing high mast pole in the northwest portion of the I-635/I-30 interchange area contains an antenna system and cameras. DB Contractor shall maintain the existing functionality of the system and cameras.

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; 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.

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 to allow for end-to-end testing for the ITS. Testing will occur during the 21-calendar day period prior to Substantial Completion and DB Contractor shall provide TxDOT Dallas District 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 and TxDOT shall have completed all their testing, training of TxDOT staff, and DB Contractor has met all acceptance requirements for DB Contractor installed ITS devices, satellite buildings, communication and electrical networks, and generators prior to the start of end-to-end testing.

DB Contractor shall be responsible, at a minimum, for the following:

- 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 at all necessary locations for a maximum of five full Days, which could include evenings and weekends and may not 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 Calendar Day unless otherwise approved by TxDOT.

DB Contractor shall not expect to have access to, nor conduct work within, the Project during the end-to-end testing, with the exception of providing services as described above, or to meet other maintenance, safety or emergency requirements of the DB Contract. TxDOT may, at its own discretion, provide DB Contractor access to the Project to conduct work outside the services above.

25.3.5 Record Documents

The Record Documents shall include the construction drawings, as well as catalog sheets for all equipment and components. DB Contractor shall maintain for the 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 Submittals

All submittals described in this Special Provision to Item 25 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in Table 25-1. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 25-1: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
Temporary ITS plans	With Final Design Submittal	Review and approval	25.1
Preliminary ITS layout	Prior to Final Design Submittal	Review and concurrence	25.2

Proposed fiber termination charts	Prior to Final Design Submittal	Review and approval	25.2.1
Proposed CCTV equipment test procedure	30 days prior to testing	Review and comment	25.2.3.5
DMS Location and Placement	With ITS Implementation Plan	Review and approval	25.2.5
ITS Implementation Plan	With Final Design Submittal	Review and approval	25.3.3
Certification that ITS meets the functional requirements	Prior to Substantial Completion	For information	25.3.3
CCTV secondary control equipment and design	Six months prior to Substantial Completion	Review and approval	25.3.3
Notice of readiness for end-to-end testing	45 days prior to Substantial Completion	For information	25.3.4

Design-Build Special Provision to Item 26
Traffic Control

Item 26, "Traffic Control," of the Design-Build Specifications is replaced in its entirety with the clauses cited below.

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 or existing Intelligent Transportation System (ITS) equipment, street lights, and traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system.

26.1.1 Lead Maintenance of Traffic (MOT) Design Engineer

DB Contractor shall employ a Lead MOT Design Engineer responsible for ensuring the MOT plans are completed and design criteria are met. The Lead MOT Design Engineer shall be a PE with relevant experience overseeing the development of MOT plans during the design and construction phase of highway projects similar in size and scope. Individual will 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 MOT plans are implemented in the field and are adhered to during their implementation. The Lead MOT Implementation Manager shall have relevant experience overseeing the implementation of MOT plans during the construction phase of highway projects similar in size and scope as the Project. Individual will work with the Lead MOT Design Engineer and coordinate with TxDOT, DB Contractor, and appropriate Governmental Entities.

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 of the DBA and for the duration of the Warranty Term.

DB Contractor shall provide TxDOT with a TCP concept presentation for approval at or near 30% design status but prior to TCP plan sheet development. DB Contractor shall utilize PowerPoint and roll plots to convey this concept at a TCP concept presentation meeting. 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 in the State of Texas.

Design Vehicle. Turning movements on all 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 of Interstate and US Highways, 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, "Roadways," 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 26.2.2.1. 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. If requested by DB Contractor, TxDOT may, in its discretion, allow a minimum lane width of 10 feet for cross-streets during construction. TxDOT will consider requests for these narrower cross-street lanes on a case-by-case basis. DB Contractor shall have no expectation of approval from TxDOT and DB Contractor shall only implement lane widths less than 11 feet (and only for cross-streets) 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, including setting of barrier during peak hours, constitutes a Lane Closure and requires TxDOT approval.

26.2.2 Traffic Control Plan Requirements and Restrictions

Each TCP shall be submitted to TxDOT for review and approval a minimum of fourteen days prior to implementation. This requirement is increased to twenty-one 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. For the limited access general purpose lanes of Interstate and US Highways, the minimum design speed shall be 10 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. TCPs meeting this design speed standard do not require a change in the posted speed limit. Advisory speed plaques shall be used as appropriate.

Opposing traffic on a divided roadway shall be separated with appropriate traffic control devices in accordance with Good Industry Practice and TMUTCD based on roadway design speed**.** Approved traffic control devices can be found in 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 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 design and install signing compliant with TMUTCD, Freeway Signing Handbook, and Item 24, "Signing, Delineation, Pavement Marking, Signalization, and Lighting," requirements.

Throughout the Term, DB Contractor shall ensure all streets and intersections remain open to traffic to the greatest extent possible by constructing the Work in phases except as shown on pre-approved TCP. DB Contractor shall maintain access to all adjacent streets and shall provide for ingress and egress to public and private properties at all times during the 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 previously provided by TxDOT.

DB Contractor shall prepare public information notices, in accordance with Item 11, "Public Information and Communications," in advance of the implementation of any Lane Closures or traffic switches. These notices shall be referred to as Traffic Advisories. DB Contractor shall also notify the traveling public by placing changeable message signs a minimum of seven Days in advance of 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.

26.2.2.1 Minimum Number of Lanes and Allowable Lane and Roadway Closures

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 Governmental Entities, TxDOT will give priority to the closure submitted first. DB Contractor shall gain approval from local Governmental Entities for closures on city streets and seek TxDOT's approval for such Lane Closures.

The safety of workers and the traveling public must be the first consideration when determining the appropriate time to implement a Lane Closure. At a minimum, DB Contractor shall inform the PIO of all Lane Closures that will affect mobility so they can inform the public, Emergency Services, schools, etc. as needed.

The following TxDOT standards, specifications, procedure manuals, and references apply for all Lane Closures:

- Texas Manual of Uniform Traffic Control Devices (TMUTCD);
- TxDOT Traffic Control Plan (TCP) standards;
- TxDOT Barricade and Construction (BC) standards; and
- TxDOT *Standard Specifications Item 502, Barricades Signs and Traffic Handling*.

For planned Lane Closures, 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. DB Contractor shall provide advance notification of all Lane Closure notices to the appropriate TxDOT Project staff.

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 to 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 26.2.2.4 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.

Eastbound/Southbound I-635:

1. Five continuous general purpose lanes shall remain open throughout construction from US 75 to the exit to Greenville Avenue, where one of the lanes shall exit.
2. Four continuous general purpose lanes shall remain open throughout construction from the exit to Greenville Avenue to a location approximately 1200 feet after the exit to Greenville Avenue, where the right-most lane may end by merging into the adjacent lane.
3. Three continuous general purpose lanes shall remain open throughout construction from a location approximately 1200 feet after the exit to Greenville Avenue to the location where the Express Lane (LBJ TEXpress) terminates by becoming an additional general purpose lane.
4. Four continuous general purpose lanes shall remain open throughout construction from the location where the Express Lane (LBJ TEXpress) terminates to the entrance from US 75, where the entrance from US 75 becomes an additional general purpose lane.
5. Five continuous general purpose lanes shall remain open throughout construction from the entrance from US 75 to the exit to Skillman Street, where one of the lanes shall exit.
6. Four continuous general purpose lanes shall remain open from the exit to Skillman Street to the entrance from Oates Drive, where the entrance becomes an additional general purpose lane.
7. Five continuous general purpose lanes shall remain open from the entrance from Oates Drive to the last exit to I-30, where one of these lanes shall exit.
8. Four continuous general purpose lanes shall remain open from the last exit to I-30 to the last entrance from I-30, where the entrance from I-30 becomes an additional general purpose lane.
9. Five continuous general purpose lanes shall remain open from the last entrance from I-30 to beyond the exits to US 80.
10. The HOV/Express Lane and its associated ramps to and from the I-635 eastbound/southbound general purpose lanes may be closed once construction begins to conflict with ongoing operations. The Express Lane (LBJ TEXpress) shall remain open throughout construction.
11. The general purpose lane exit to TI Boulevard shall remain open throughout construction.
12. The general purpose lane exit to Greenville Avenue shall remain open throughout construction and may remain as one lane while the exit to Abrams Road is open.
13. The frontage road exit to TI Boulevard may be closed for up to 120 days. At all other times throughout construction, the frontage road exit to TI Boulevard shall remain open. During the closure of the frontage road exit to TI Boulevard, the u-turn from the eastbound frontage to the westbound frontage road at Greenville Avenue shall remain open.
14. The US 75 direct connector exit to Greenville Avenue shall remain open throughout construction.
15. The general purpose lane entrance from US 75 shall remain open throughout construction.
16. The frontage road between US 75 and Greenville Avenue shall remain open throughout construction with at least two lanes. Three lanes shall be open on the approach to the signalized intersection at Greenville Avenue, with one lane designated as right turn only.
17. The general purpose lane exit to Abrams Road/Forest Lane may be closed permanently once construction begins to conflict with ongoing operations. Prior to closing the exit to Abrams Road/Forest Lane, DB Contractor shall reconfigure the general purpose lane exit to Greenville Avenue so that it has two lanes. Prior to closing the exit to Abrams Road/Forest Lane, the eastbound frontage road approaching Greenville Avenue must be in its permanent, proposed configuration and the frontage road must be open to at least two lanes between Greenville Avenue and Forest Lane.
18. The general purpose lane entrance ramp from Greenville Avenue may be closed for up to 365 days. At all other times throughout construction, the general purpose lane entrance ramp from Greenville Avenue shall remain open. During the closure of the general purpose lane entrance ramp from Greenville Avenue, the general purpose lane entrance ramp from Forest Lane shall remain open.
19. The frontage road between Greenville Avenue and Abrams Road shall remain open throughout construction with at least two lanes available for 250 feet leading to, and at, the signalized intersection.

20. The frontage road between Abrams Road and Forest Lane shall remain open throughout construction with a minimum of two lanes.
21. The general purpose lane entrance from Abrams Road/Forest Lane shall remain open throughout construction.
22. The general purpose lane exit to Skillman Street shall remain open throughout construction. Three lanes must be maintained for 200 feet leading to, and at, the signalized intersection.
23. The general purpose lane entrance from Skillman Street may be closed for up to 365 days. The general purpose lane entrance from Royal Lane must remain open during this period.
24. The general purpose lane exit to Royal Lane shall remain open throughout construction. Three lanes must be maintained for 200 feet leading to, and at, the signalized intersection.
25. The general purpose lane entrance from Royal Lane shall remain open throughout construction.
26. The general purpose lane exit to Plano Road shall remain open throughout construction.
27. The general purpose lane entrance from Plano Road shall remain open throughout construction.
28. The general purpose lane exit to Walnut Hill Lane/Kingsley Road shall remain open throughout construction. Two lanes must be maintained for 100 feet leading to, and at, the signalized intersection.
29. The frontage road between Walnut Hill Lane and Jupiter Road shall remain open throughout construction. Three lanes must be maintained for 200 feet leading to, and at, the signalized intersection.
30. The general purpose lane entrance from Jupiter Road shall remain open throughout construction.
31. The frontage road between Jupiter Road and the u-turn shall remain open throughout construction, but may be reduced to one lane. The existing u-turn from eastbound frontage road to westbound frontage road may be closed if the McCree Road connection to the westbound frontage road is open or if the permanent, proposed configurations of the eastbound and westbound frontage roads are open between Jupiter Road and Garland Road including the eastbound to westbound u-turn at Garland Road.
32. The general purpose lane exit to Garland Road shall remain open throughout construction. Two lanes must be maintained for 150 feet leading to, and at, the signalized intersection.
33. The general purpose lane exit to Northwest Highway may be closed once construction begins near the existing exit. The general purpose lane exit to Garland Road must remain open.
34. The general purpose lane entrance from Northwest Highway shall remain open throughout construction.
35. The general purpose lane exit to Centerville Road/Ferguson Road shall remain open throughout construction. Two lanes must be maintained for 200 feet leading to, and at, the signalized intersection.
36. The general purpose lane entrance from Centerville Road/Ferguson Road shall remain open throughout construction.
37. The general purpose lane exit to La Prada Drive may be closed only once and for a duration not to exceed 365 days. Other than during this one closure, the general purpose lane exit to La Prada Drive shall remain open throughout construction. During the closure of the general purpose lane exit to La Prada Drive, the general purpose lane exit to Centerville Road/Ferguson Road and the general purpose lane exit to Oates Drive must remain open.
38. The general purpose lane exit to Oates Drive shall remain open throughout construction.
39. The general purpose lane entrance from Oates Drive shall remain open throughout construction.
40. The frontage road between Oates Drive and Galloway Avenue shall remain open throughout construction. Two lanes must be maintained for 100 feet leading to, and at, the signalized intersection.
41. The frontage road between Galloway Avenue and the I-30 westbound frontage road shall remain open throughout construction. One lane must be maintained.
42. The general purpose lane exit (direct connectors) to I-30 eastbound and I-30 westbound general purpose lanes shall remain open throughout construction.

43. The general purpose lane entrance (direct connectors) from I-30 eastbound and I-30 westbound general purpose lanes shall remain open throughout construction.
44. The general purpose lane exit to Town East Boulevard shall remain open throughout construction.
45. The frontage road may be closed for up to 365 days between the I-30 eastbound frontage road and the first exit ramp to Town East Boulevard south of I-30. This closure is not permitted once the general purpose lane exit to Town East Boulevard is relocated to north of I-30.
46. The frontage road between the general purpose lane exit to Town East Boulevard and Town East Boulevard shall remain open at all times. Two lanes must be maintained.

Northbound/Westbound I-635:

1. Five continuous general purpose lanes shall remain open throughout construction from Towne Centre Drive to the northernmost exit to I-30, where one of the lanes shall exit.
2. Four continuous general purpose lanes shall remain open throughout construction from the northernmost exit to I-30 to the exit to US 75, where one of the lanes shall exit and one of the lanes shall have the option to exit or remain on I-635.
3. Three continuous general purpose lanes shall remain open throughout construction from the exit to US 75 to a location approximately 300 feet after the exit to US 75, where an additional lane begins on the right.
4. Four continuous general purpose lanes shall remain open throughout construction from a location approximately 300 feet after the exit to US 75 to the entrance from Greenville Avenue where the entrance becomes an additional two general purpose lanes.
5. Six continuous general purpose lanes shall remain open throughout construction from the entrance from Greenville Avenue to the exit to Coit Road, where one of the lanes shall exit and one of the lanes shall have the option to exit or remain on I-635.
6. Five continuous general purpose lanes shall remain open throughout construction from the exit to Coit Road to the exit to Hillcrest Road/Park Central Drive where one lane shall exit.
7. The HOV/Express Lane and its associated ramps to and from the I-635 northbound/westbound general purpose lanes may be closed once construction begins to conflict with ongoing operations. The Express Lane (LBJ TEXpress) shall remain open throughout construction with its existing number of lanes and configuration, including the entering lanes from the general purpose lanes.
8. The general purpose lanes entrance from Town East Boulevard shall remain open throughout construction and shall have access to both I-635 and each direction of I-30.
9. The general purpose lanes exit to I-30 eastbound and westbound shall remain open throughout construction.
10. The general purpose lanes entrance from I-30 eastbound and westbound shall remain open throughout construction.
11. The frontage road between Galloway Avenue and Oates Drive shall remain open throughout construction with two lanes available for 300 feet leading to, and at, the signalized intersection.
12. The general purpose lanes exit to Oates Drive shall remain open until the exit to Galloway Avenue is open to traffic.
13. The general purpose lanes entrance from Oates Drive shall remain open throughout construction.
14. The general purpose lanes entrance from La Prada Drive shall remain open throughout construction. During the La Prada Drive closure, DB Contractor shall maintain entrance ramp access from southwestbound La Prada Drive.
15. The general purpose lanes exit to Centerville Road/Ferguson Road shall remain open throughout construction with at least three lanes available for 500 feet leading to, and at, the signalized intersection.
16. The general purpose lanes exit to Northwest Highway shall remain open throughout construction.
17. The general purpose lanes entrance from Centerville Road shall remain open throughout construction.
18. The frontage road between Centerville Road and Northwest Highway shall remain open throughout construction with at least one lane plus one auxiliary lane between the exit ramp to Northwest

Highway and the entrance ramp from Centerville Road. Three lanes shall be available for 350 feet leading to, and at, the signalized intersection.

19. The general purpose lanes entrance from Northwest Highway shall remain open throughout construction.
20. The frontage road between Northwest Highway and Shiloh Road shall remain open throughout construction with at least two lanes available for 150 feet leading to, and at, the unsignalized intersection with Shiloh Road.
21. The general purpose lanes entrance from Garland Road shall remain open throughout construction.
22. The general purpose lanes exit to Jupiter Road shall remain open throughout construction.
23. The general purpose lanes entrance from Jupiter Road shall remain open until the entrance from Jupiter Road and Walnut Hill Lane/Kingsley Road is open to traffic along with the frontage road between Jupiter Road and Plano Road open to traffic in its permanent, proposed configuration.
24. The frontage road between McCree Road and the exit to Jupiter Road shall remain open throughout construction.
25. The frontage road between the exit to Jupiter Road and the signalized intersection at Jupiter Road shall remain open throughout construction with at least two lanes available to traffic.
26. The general purpose lanes exit to Plano Road shall remain open throughout construction with at least two lanes available for 150 feet leading to, and at, the signalized intersection.
27. The general purpose lanes entrance from Plano Road shall remain open throughout construction.
28. The general purpose lanes exit to Royal Lane/Miller Road shall remain open throughout construction with at least three lanes available for 300 feet leading to, and at, the signalized intersection.
29. The general purpose lanes entrance from Royal Lane/Miller Road shall remain open throughout construction.
30. The frontage road between Royal Lane/Miller Road and Skillman Street shall remain open throughout construction with at least two lanes available for 200 feet leading to, and at, the signalized intersection.
31. The general purpose lanes exit to Skillman Street may be closed for up to 365 days.
32. The general purpose lanes entrance from Skillman Street shall remain open throughout construction.
33. The general purpose lanes exit to Forest Lane/Abrams Road shall remain open throughout construction.
34. The general purpose lanes exit to Greenville Avenue shall remain open throughout construction.
35. The frontage road between Forest Lane and Greenville Avenue shall remain open throughout construction with at least two lanes available for 200 feet leading to, and at, the signalized intersections.
36. The general purpose lanes entrance from Greenville Avenue shall remain open throughout construction with two lanes available to traffic.
37. The general purpose lanes exit to US 75 direct connector shall remain open throughout construction.
38. The frontage road between Greenville Avenue and US 75 shall remain open throughout construction in its existing configuration.
39. The US 75 direct connector entrance from the frontage road shall remain open throughout construction.

Eastbound I-30:

1. Three continuous general purpose lanes shall remain open throughout construction from the exit to Gus Thomasson Road to Northwest Drive. The auxiliary lane shall be maintained between the entrance from southbound I-635 and the exit to Northwest Drive, until the exit to Northwest Drive is closed. A minimum of 600 feet merging taper shall be provided for the entrance from southbound

I-635 once the auxiliary lane is closed. A minimum of 600 feet merging taper shall be provided for the entrance from northbound I-635.

2. The reversible HOV lane and its entrance/exit to and from the I-30 eastbound general purpose lanes may be closed throughout construction beyond the eastbound exit to the general purpose lanes to traffic wishing to exit to I-635 and Loop 12. In the afternoon, the HOV lane shall exit into its own lane at this location.
3. The general purpose lanes exit to Gus Thomasson Road shall remain open throughout construction.
4. The general purpose lanes exit to I-635 southbound and northbound shall remain open throughout construction.
5. The general purpose lanes entrance from I-635 southbound and northbound shall remain open throughout construction.
6. The general purpose lanes exit to Northwest Drive may be closed permanently.
7. The general purpose lanes entrance from Galloway Avenue shall remain open throughout construction.
8. The frontage road between Gus Thomasson Road to Northwest Drive shall remain open throughout construction with two lanes available for 200 feet leading to, and at, the signalized intersection at Galloway Avenue.
9. The frontage road connection to the I-635 southbound frontage road may be closed for up to 365 days.

Westbound I-30:

1. Four continuous general purpose lanes shall remain open throughout construction from Northwest Drive to the furthest west exit to I-635. The auxiliary lane between the general purpose lanes entrance from Northwest Drive and the exit to I-635 southbound shall remain open until the entrance from Northwest Drive is closed.
2. Three continuous general purpose lanes shall remain open throughout construction from the furthest west exit to I-635 to Gus Thomasson Road.
3. The reversible HOV lane and its entrance/exit to and from the I-30 westbound general purpose lanes may be closed throughout construction. In the morning, the reversible HOV lane shall begin at the existing entrance near Jim Miller Road.
4. The general purpose lanes exits to I-635 southbound and I-635 northbound shall remain open throughout construction.
5. The general purpose lanes entrances from I-635 southbound and I-635 northbound shall remain open throughout construction.
6. The general purpose lanes exit to Galloway Avenue shall remain open throughout construction.
7. The general purpose lanes entrance from Northwest Drive may be closed permanently.
8. The general purpose lanes entrance from Gus Thomasson Road shall remain open throughout construction.
9. The frontage road between Northwest Drive and Gus Thomasson Road shall remain open throughout construction with at least two lanes available for 200 feet leading to, and at, the signalized intersection with Galloway Avenue.
10. The frontage road between the I-635 southbound frontage road and Motley Drive shall remain open throughout construction with two lanes available.
11. The frontage road connection from the I-635 southbound frontage road shall remain open throughout construction.

Cross-Streets:

1. TI Boulevard – Two through lanes shall remain open in each direction throughout construction. The northbound left turn bay to the Express Lane (LBJ TEXpress) shall remain open throughout construction.

2. Greenville Avenue – Two through lanes shall remain open in each direction throughout construction. The left turn bay to each frontage road shall remain open throughout construction.
3. Abrams Road – Two through lanes shall remain open in each direction throughout construction.
4. Forest Lane – Two through lanes in each direction shall remain open throughout construction. The left turn bay and right turn lane to each frontage road shall remain open throughout construction.
5. Skillman Street – Two through lanes in each direction shall remain open throughout construction. A schedule-related incentive, payable to DB Contractor, will be made available by TxDOT, should DB Contractor make available to motorists the full proposed Skillman Street, prior to the Substantial Completion Deadline, as shown in Exhibit 15 of the DBA. For an incentive to apply, DB Contractor make available to motorists the full widths and lengths of Skillman Street and Audelia Road in the proposed, permanent configuration without any temporary traffic control measures. Additionally, for an incentive to apply, DB Contractor make available to motorists the full width of 300 feet length of each frontage road leading to Skillman Street and the full width of 300 feet length of each frontage road leading from Skillman Street in the proposed, permanent configuration without any temporary traffic control measures.
6. Audelia Road (southwest of I-635) – Two lanes in each direction shall remain open throughout construction as well as one lane from northbound Audelia Road to northbound Skillman Street.
7. Whitehurst Drive – Two lanes in each direction shall remain open throughout construction.
8. Audelia Road (northeast of I-635) – Two lanes in each direction shall remain open throughout construction along with two lanes from southbound Audelia Road to southbound Skillman Street.
9. Adleta Court – One lane in each direction shall remain open throughout construction.
10. Royal Lane/Miller Road – Two through lanes in each direction shall remain open throughout construction. The eastbound Royal Lane right turn lane to the I-635 eastbound general purpose lanes entrance shall remain open throughout construction. The westbound Miller Road right turn lane to the I-635 westbound frontage road shall remain open throughout construction.
11. Plano Road – Two through lanes in each direction shall remain open throughout construction. Left turn bays to the general purpose lanes entrance ramps shall remain open throughout construction. A northbound right turn lane to the eastbound general purpose lanes entrance shall be provided throughout construction.
12. Church Road – One through lane in each direction shall remain open throughout construction with two lanes available for 160 feet leading to, and at, the signalized intersection with Plano Road.
13. Estate Lane – One lane eastbound shall remain open throughout construction where the roadway conflicts with proposed construction. Elsewhere, one lane in each direction shall remain open throughout construction. The intersections with Plano Road and with Walnut Hill Lane shall remain fully open throughout construction.
14. Walnut Hill Lane/Kingsley Road – One through lane in each direction shall remain open throughout construction. The eastbound right turn lane and westbound left turn lane leading to the eastbound frontage road shall remain open throughout construction.
15. Jupiter Road – Two through lanes in each direction shall remain open throughout construction. The left and right turn lanes in each direction leading to the eastbound frontage road and westbound general purpose lanes entrance shall remain open throughout construction.
16. Garland Road (SH 78) – Two northbound through lanes shall remain open throughout construction. One northbound left turn bay shall remain open leading to the westbound general purpose lanes entrance, while the entrance is open. One southbound through lane shall remain open throughout construction. One southbound right turn lane shall remain open leading to the westbound general purpose lanes entrance, while the entrance is open. Three lanes shall be available in the southbound direction beginning at the eastbound general purpose lanes exit.
17. Shiloh Road – Two through lanes in each direction shall remain open throughout construction.
18. Northwest Highway – Three lanes in each direction shall remain open throughout construction. The eastbound right turn lane and westbound right turn bay leading to the general purpose lanes entrances shall remain open throughout construction.
19. Centerville Road/Ferguson Road – Two northbound through lanes shall remain open throughout construction with a third lane being maintained beginning at the westbound frontage road

intersection. Two southbound through lanes shall remain open throughout construction with a third lane being maintained beginning at the eastbound exit intersection. Left turn lanes from each direction to the eastbound general purpose lanes entrance and the westbound frontage road shall remain open throughout construction. Right turn bays from each direction to the eastbound general purpose lanes entrance and the westbound frontage road shall remain open throughout construction.

20. La Prada Drive – Two through lanes in each direction shall remain open throughout construction, except that La Prada Drive may be closed only once for a duration of no more than 365 days. During the closure, the southwestbound La Prada Drive movement to the northbound I-635 general purpose lane entrance shall remain open, as it shall at all times throughout construction. During the closure, Centerville Road/Ferguson Road and Oates Drive shall remain open. When Woodmeadow Parkway is open, La Prada Drive shall be open to the extent necessary to provide access to and from Woodmeadow Parkway connecting to the southwest construction limits on La Prada Drive. A schedule-related incentive for making available to motorists the full width and full length of the proposed, permanent La Prada Drive, which shall not be directly paid to DB Contractor, but shall increase the Lane Rental Bank amount available to DB Contractor, will be made available by TxDOT as shown in Exhibit 15 of the DBA. To receive this incentive, DB Contractor must reduce the duration of the full closure and make available to motorists the full width and length of La Prada Drive in the proposed, permanent configuration without any temporary traffic control measures. Liquidated Damages, as shown in Exhibit 15 of the DBA, will be levied against DB Contractor, if La Prada Drive does not open by the end of the allowable closure period.
21. Woodmeadow Parkway – Woodmeadow Parkway may be closed only once for a duration of no more than 120 days which shall take place only during the La Prada Drive closure. Access to all properties shall be maintained.
22. Oates Drive – Two through lanes in each direction shall remain open throughout construction. The turn bays in each direction to the southbound frontage road and to the northbound general purpose lanes entrance shall remain open throughout construction.
23. Galloway Avenue – Two through lanes in each direction shall remain open throughout construction. Three lanes shall be maintained between Wooded Lake Drive and 300 feet south of Republic Parkway. The turn bays in each direction to each frontage road shall remain open throughout construction.
24. Gus Thomasson Road – Two through lanes in each direction shall remain open throughout construction, except for one closure of no more than 270 days. Connectivity in each and every direction between Gus Thomasson Road and the eastbound and westbound I-30 frontage roads shall remain in place and open throughout construction, except during the one allowable closure of Gus Thomasson Road, during which time northbound Gus Thomasson shall have access to the eastbound I-30 frontage road, northbound Gus Thomasson shall have access from the westbound I-30 frontage road, southbound Gus Thomasson shall have access to the westbound I-30 frontage road, and southbound Gus Thomasson shall have access from the eastbound I-30 frontage road. In order to begin the one allowable closure of Gus Thomasson Road, the u-turn connecting the eastbound I-30 frontage road to the westbound I-30 frontage road at Galloway Avenue must be open to motorists. A schedule-related incentive for making available to motorists the full width and full length of the proposed, permanent Gus Thomasson Road, which shall not be directly paid to DB Contractor, but shall increase the Lane Rental Bank amount available to DB Contractor, will be made available by TxDOT as shown in Exhibit 15 of the DBA. To receive this incentive, DB Contractor must reduce the duration of the full closure and make available to motorists the full width and length of Gus Thomasson Road in the proposed, permanent configuration without any temporary traffic control measures. Liquidated Damages, as shown in Exhibit 15 of the DBA, will be levied against DB Contractor, if Gus Thomasson Road does not open by the end of the allowable closure period.

26.2.2.2 Holiday Restrictions

No Lane Closure that restricts or interferes with traffic shall be allowed during the following holiday schedule. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual, or expected, traffic conditions may warrant.

- Christmas, New Year's Eve, and New Year's Day (12:00pm on the earlier of December 23 and Friday prior to Christmas Day 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)

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.

No Lane Closure that restricts or interferes with traffic shall be allowed during Time Period D beginning 12:00 pm on Friday before the Thanksgiving Holiday through the New Year's Day.

26.2.2.3 Event Restrictions

No Lane Closure that restricts or interferes with traffic shall be allowed for the regional events set forth below. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant. TxDOT also has the right to modify the list of major events as they are added, renamed, rescheduled, or as warranted.

- State Fair of Texas (no lane closures after 6:00am on Fridays through 9:00pm on Sundays; no full closures for any direction of any facility from opening day through the closing day except for at night during hours that the State Fair of Texas is closed)
- The University of Texas vs. University of Oklahoma Football Game (no lane closures beginning four hours prior to the event and ending three hours following event completion)

Major events are events currently unknown to TxDOT and will be handled on an individual basis as they arise. This category could include, but is not limited to, parades for sports championships, major political events, and large athletic events (such as marathons).

Should any Lane Closures violate the event-related restrictions above, Liquidated Damages for Lane Closures and Lane Rental Fees, as appropriate, will be assessed based on the next higher Time Period than what would otherwise apply based upon those shown in Section 26.2.2.4 (that is, a Time Period B violation will be assessed as a Time Period A closure, etc.).

26.2.2.4 Lane Closures and Liquidated Damages for Lane Closures

Except for Incidents or Emergencies, or for Lane Closures implemented by DB Contractor as directed by TxDOT related to Systems Integrator work, Liquidated Damages for Lane Closures and Lane Rental Charges, as appropriate, will be levied against DB Contractor, as defined in the Contract Documents.

DB Contractor shall not reduce the number of roadway controlled access lanes, including general purpose lanes, entrance ramps, exit ramps, and direct connectors, below the number of roadway controlled access lanes required above in Section 26.2 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 shows the Time Periods for each of the hours of the day for general purpose 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: Period Per Hour of the Day

Hour/Day	Sunday	Monday-Thursday	Friday	Saturday
0:00	C	C	C	C
1:00	C	C	C	C
2:00	C	C	C	C
3:00	C	C	C	C
4:00	C	C	C	C
5:00	C	A	A	C
6:00	C	A	A	C
7:00	C	A	A	C
8:00	C	A	A	A
9:00	B	A	A	A
10:00	B	A	A	A
11:00	B	A	A	A
12:00	D	A	A	A
13:00	D	A	A	A
14:00	D	A	A	A
15:00	D	A	A	A
16:00	D	A	A	A
17:00	D	A	A	A
18:00	D	A	A	A
19:00	D	A	A	A
20:00	C	B	B	C
21:00	C	B	B	C
22:00	C	C	C	C
23:00	C	C	C	C

Liquidated Damages for Lane Closures and Lane Rental Charges, as appropriate, will be assessed for all Lane Closures, in accordance with Section 7.3 of the DBA, based upon the time periods shown in the above tables and corresponding amounts given in Exhibit 15 of the DBA.

26.2.2.5 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 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

Existing bicycle and pedestrian access and mobility shall be maintained. 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. A pavement transition, suitable for the posted speed and accounting for the vertical and horizontal geometry of the section shall be provided at all detour interfaces.

DB Contractor shall 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 user costs and schedule risk that may be assessed for the use of these existing roads. This may include traffic operation analysis, temporary traffic control devices, and road user costs. DB Contractor is responsible for obtaining the necessary approvals from agencies having jurisdiction over the routes used.

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, the pavement shall be restored to a structure acceptable to TxDOT or the Governmental Entity having jurisdiction over the affected area and restore it to a riding surface equal to or better than the existing surface.

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.

Rubber-tired equipment shall be used for moving dirt or other materials along or across paved surfaces. Excess dirt or debris shall be swept or removed from the job site with regular cleaning and sweeping 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.

All haul routes utilizing any street of an adjacent Governmental Entity shall be used only after coordinating with the appropriate Governmental Entity.

26.3.8 Final Clean-Up

DB Contractor shall clear and remove from the site all surplus and discarded materials and debris of every kind and leave the entire Project in a clean, smooth, and neat condition after each construction process.

26.3.9 Stockpiles

Barricades and warning signs are to be placed at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT Traffic Engineering Standard sheets and the TMUTCD. All material stockpiles shall not be located within the clear zone of any traveled lane, unless positive protection is provided.

26.4 Submittals

All submittals described in this Special Provision to Item 26 shall be in accordance with the schedule and for the purpose (e.g., approval, review and comment, for information) set forth in Table 26-2. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat files, unless otherwise indicated.

Table 26-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
TCP concept presentation (meeting)	Prior to TCP plan sheet development	Approval	26.2.1
Notice of a Lane Closure to TxDOT PIO	By 3:15 p.m. the day prior to all road closures	For information	26.2.2.1

Table 26-2: Submittals to TxDOT

Submittals	Submittal Schedule	TxDOT Action	Reference Section
TMP	Prior to NTP2	Approval	4.2.10
TCPs	At least 14 Days prior to implementation	Approval	26.2.2
Requests for a Lane Closure	At least 48 hours in advance of the proposed closure	Approval	26.2.2
Lane Closure Notice (LCN) for: (i) full roadway closures, and (ii) Lane Closures and/or traffic switches planned to be in effect longer than 24 hours	At least 7 Days prior to the publication of any notices or placement of any traffic control devices	Approval	26.2.2.1

Design-Build Special Provision to Item 28
Bicycle and Pedestrian Facilities

Item 28, "Bicycle and Pedestrian Facilities," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

28.1 General Requirements

Section 28.1 of the Design-Build Specifications, "General Requirements," is replaced with the following:

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 TxDOT Schematic Design. DB Contractor shall design and construct all bicycle and pedestrian facilities consistent with TxDOT policies and guidelines and AASHTO *Guide to the Development 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.

28.3.1 Bicycle Facilities

Section 28.3.1 of the Design-Build Specifications, "Bicycle Facilities," is replaced with the following:

The DB Contractor shall design and construct 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 TxDOT Schematic Design. DB Contractor shall coordinate with Governmental Entities and TxDOT to ensure consistency with 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 approved I-635 Aesthetic Technical Guidelines and aesthetic requirements listed in Item 10,000 for the Skillman/Audelia Interchange, or the alternative Aesthetic and Landscaping Plan if approved by TxDOT.

28.3.2 Pedestrian Facilities

Section 28.3.2 of the Design-Build Specifications, "Pedestrian Facilities," is replaced with the following:

DB Contractor shall design, construct, and maintain pedestrian facilities where required by state and federal regulations and as shown on the TxDOT Schematic Design. 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 the 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.

The DB Contractor shall design and construct pedestrian facilities to 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 approved I-635 Aesthetic Technical Guidelines and aesthetic requirements listed in Item 10,000 for the Skillman/Audelia Interchange, or the alternative Aesthetics and Landscaping Plans, if approved by TxDOT.

Design-Build Special Provision to Item 29
Tolling

Item 29, "Tolling," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

29.1.1 **DB Contractor's Coordination Responsibilities**

Section 29.1.1 of the Design-Build Specifications, "DB Contractor's Coordination Responsibilities," is replaced with the following:

DB Contractor shall coordinate the design and construction with TxDOT and Systems Integrator to accommodate the design and systems operating software, and ensure the Project schedule incorporates the time required to design, construct, procure, install, integrate and test 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 construction activities for the Systems Integrator to construct the ETCS Elements for the Toll Zones.

DB Contractor shall incorporate the Toll Zone and ETCS Element Milestones into the Project schedule and provide regular updates in accordance with Item 8, "Prosecution and Progress."

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.

29.3 **Design Requirements**

Section 29.3 of the Design-Build Specifications, "Design Requirements," is replaced with the following:

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, and riprap around concrete pads, for the roadside ETCS Elements
- Conduit
- Power and communications services
- General grading
- Earthwork
- Flexible base
- Embankment

- Retaining walls
- Drainage
- SW3P
- Other typical roadway items included in DB Contractor's Work to support the Systems Integrator's ETCS

DB Contractor shall construct concrete traffic barrier for roadways adjacent to backup power systems. 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). Geometric constraints may dictate that the design deviates from the general guidance. In these instances, DB Contractor's design shall be coordinated with TxDOT to ensure that the design and construction meets the Systems Integrator's specifications.

TxDOT shall be responsible for the Systems Integrator's work. TxDOT shall provide the 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 RIDs provide the DB Contractor requirements for the following: toll gantry; concrete pads for roadside equipment cabinets, generators, and fuel tanks; rip-rap, ETCS equipment power and communications; and conduit and other elements identified in Attachment 29-2 (Typical 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. For general guidance on equipment pad design, see Attachment 29-5 (Toll 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 will 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

Section 29.3.1 of the Design-Build Specifications, "Toll Signing," is replaced with the following:

DB Contractor shall be responsible for all signing (with the exception of Toll Zone maintenance drive signing) including toll rate signs, toll entrance ramp signs, and advance toll information signs in accordance with Item 24, "Signing, Delineation, Pavement Marking, Signalization, and Lighting." DB Contractor shall coordinate with TxDOT and all local toll entities in the area in determining the locations for advance toll information signs to be installed within the project limits. At a minimum, advance toll information signs shall be installed 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
- At locations consistent with the Dallas Fort Worth (DFW) managed lane signing guidelines located in the RIDs

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

Section 29.3.2 of the Design-Build Specifications, "Toll Gantry and Overhead Support for Toll Equipment," is replaced with the following:

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. Toll gantry locations shall be coordinated with TxDOT and the Systems Integrator throughout the design process. 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 toll gantries shall 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 Practices. Designs for gantry support structures shall also comply with requirements in Item 21, "Structures," Item 23, "Aesthetics and Landscaping," and Item 24, "Signing, Delineation, Pavement Marking, Signalization, and Lighting."

Lightning protection shall be installed immediately following the construction of each gantry in accordance with the Toll Zone and ETCS Element Milestones. 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.

29.3.7.1 Mainlane and Ramp Tolling

Section 29.3.7.1 of the Design-Build Specifications, "Mainlane and Ramp Tolling," is deleted.

29.4 Construction Requirements

Section 29.4 of the Design-Build Specifications, "Construction Requirements," is replaced with the following:

DB Contractor shall remove all existing civil, electrical, and communications infrastructure at each Toll Zone and shall also remove all existing TxDOT-owned Toll Rate DMSs. DB Contractor is not responsible for removal of existing TxDOT-owned ETCS Elements. DB Contractor shall provide TxDOT 75 days advance notice prior to Toll Rate DMS removal effort to accommodate the removal of existing ETCS Elements by others.

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 coordinate construction schedules with TxDOT and Systems Integrator for Work taking place within the Toll Zones and limits of ETCS Elements 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 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)

29.4.2 Communications Requirements

Section 29.4.2 of the Design-Build Specifications, "Communications Requirements," is replaced with the following:

The tolling communication cable shall be tested end to end and bi-directionally by Optical Time Domain Reflectometer (OTDR) and light meter. DB Contractor shall complete all testing and provide testing results to TxDOT prior to Substantial Completion.

29.4.3 Tolling Communication Cable End-to-End Testing

Section 29.4.3 of the Design-Build Specifications, "Tolling Communication Cable End-to-End Testing," is replaced with the following:

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. 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 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 (1) 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

Section 29.4.4 of the Design-Build Specifications, "Tolling Electrical Service," is replaced with the following:

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 and maintained for all Toll Zones and ETCS Elements prior to Substantial Completion. DB Contractor shall have completed all testing and acceptance requirements for electrical networks prior to Substantial Completion and prior to the start of end-to-end testing.

Design-Build Special Provision to Item 30
Managed Lanes

Item 30, "Managed Lanes," of the Design-Build Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

30.1.1 **DB Contractor's Coordination Responsibilities**

Section 30.1.1 of the Design-Build Specifications, "DB Contractor's Coordination Responsibilities," is replaced with the following:

Coordinate construction activities for Systems Integrator to construct and install the ETCS Elements for the managed lanes project.

DB Contractor shall incorporate the Toll Zone and ETCS Element Milestones in the Project schedule and provide regular updates in accordance with Item 8, "Prosecution and Progress" of the General Conditions. The Toll Zone and ETCS Element Milestones shall include completion of all ETCS speed/volume detection milestones and Toll Rate DMS milestones set forth in the DBA.

30.3 **Design Requirements**

Secton 30.3 of the Design-Build Specifications, "Design Requirements," is replaced with the following:

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 Zone 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 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. ETCS speed / volume detection equipment shall be placed, at a minimum, at all entrance access points. Distance between ETCS speed / volume detection equipment shall not exceed 0.5 miles along the facility. 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.