Texas Department of Transportation

Technical Provisions

For

SH 183 MANAGED LANES PROJECT

April 9, 2014

1 Table of Contents

1 Table of Contents 1
1 GENERAL 1-1
1.1 Project Scope 1-1
1.2 Work Description 1-2
1.3 Project Requirements 1-16
1.4 Operations and Maintenance Requirements 1-18
1.5 Ultimate Project 1-18
2 PROJECT MANAGEMET 2-1
2.1 Administrative Requirements 2-2
2.1.1 Project Schedule 2-2
2.1.2 Document Management 2-16
2.2 Quality Management Plan 2-20
2.2.1 General Requirements 2-20
2.2.2 Quality Terminology 2-21
2.2.3 Quality Management Organization 2-21
2.2.4 Quality Policy 2-22
2.2.5 Inspection and Testing 2-22
2.2.6 Responsibility and Authority of Developer Staff 2-23
2.2.7 Design Quality Management Plan 2-23
2.2.8 Construction Quality Management Plan 2-31
2.2.9 O&M Quality Management Plan 2-35
2.3 Safety and Health Plan 2-37
2.4 TxDOT-Developer Communications Plan 2-40
2.5 Public Information and Communications Plan 2-40
2.6 Comprehensive Environmental Protection Plan 2-40
2.7 Affected Third Parties Plan 2-40
2.8 Right of Way Acquisition Plan 2-41
2.9 Maintenance Management Plan 2-41
2.10 Operations Management Plan 2-41
2.11 Emergency Management Plan 2-41
2.12 Cost Management Plan 2-41
2.13 Risk Management Plan 2-42

2.14 TxDOT Offices, Equipment 2-42
2.14.1 Computers and Equipment 2-42
2.14.2 Core Office 2-44
2.14.3 Field Offices 2-48
3 PUBLIC INFORMATION AND COMMUNICATIONS 3-1
3.1 General Requirements 3-1
3.2 Administrative Requirements 3-1
3.2.1 Public Information and Communications Plan 3-1
3.2.2 Public Information Coordinator 3-4
3.2.3 Public Information Office 3-4
3.2.4 Customer Groups 3-5
3.2.5 Public Meetings 3-5
3.2.6 Meeting Summaries 3-6
3.2.7 Emergency Event Communications 3-7
4 ENVIRONMENTAL 4-1
4.1 General Requirements 4-1
4.2 Environmental Approvals 4-2
4.2.1 New Environmental Approvals and Amended TxDOT-Provided Approvals 4-2
4.2.2 Responsibilities Regarding Environmental Studies 4-2
4.2.3 TxDOT Review and Approval of Developer Submissions 4-2
4.2.4 TxDOT-Provided Approvals 4-2
4.3 Comprehensive Environmental Protection Program (CEPP) 4-3
4.3.1 Environmental Management System (EMS) 4-4
4.3.2 Environmental Compliance and Mitigation Plan (ECMP) 4-5
4.3.3 Environmental Protection Training Plan (EPTP) 4-9
4.3.4 EPTP Participation 4-11
4.3.5 Hazardous Material Management Plan (HMMP) 4-11
4.3.6 Communication Plan (CP) 4-12
4.3.7 Construction Monitoring Plan (CMP) 4-13
4.3.8 Recycling Plan 4-14
4.3.9 Operations Monitoring Plan (OMP) 4-14
4.4 Environmental Personnel 4-14
4.4.1 Environmental Compliance Manager (ECM) 4-14

4.4.2 Environmental Training Staff 4-15
4.4.3 Environmental Compliance Inspectors (ECIs)....4-15
4.4.4 Cultural Resource Management Personnel 4-16
4.4.5 Natural Resource Biologist 4-16
4.4.6 Water Quality Specialist 4-16
4.4.7 Hazardous Materials Manager 4-16
4.5 Property Access 4-17
4.6 Dust Control....4-17
4.7 Asbestos Containing Material (ACM) 4-17
4.8 Lead Based Paint (LBP)....4-17
5 THIRD PARTY AGREEMENTS 5-1
5.1 General Requirements....5-1
5.2 Traffic Signals....5-1
5.2.1 Red Light Cameras....5-1
5.3 Roadway Illumination....5-1
5.4 Municipal Maintenance Agreements 5-1
5.5 Other Affected Third Parties....5-1
6 UTILITY ADJUSTMENTS 6-1
6.1 General Requirements....6-1
6.1.1 When Utility Adjustment is Required....6-1
6.1.2 Certain Components of the Utility Adjustment Work 6-2
6.1.3 Agreements Between Developer and Utility Owners 6-3
6.1.4 Recordkeeping 6-4
6.2 Administrative Requirements 6-4
6.2.1 Standards....6-4
6.2.2 Communication....6-4
6.2.3 Utility Adjustment Team 6-5
6.2.4 Real Property Matters 6-5
6.3 Design 6-7
6.3.1 Developer's Responsibility for Utility Identification 6-7
6.3.2 Technical Criteria and Performance Standards....6-7
6.3.3 Utility Adjustment Concept Plans....6-8
6.3.4 Utility Adjustment Plans....6-8

6.4 Construction 6-10
6.4.1 Reserved 6-10
6.4.2 General Construction Criteria 6-10
6.4.3 Inspection of Utility Owner Construction 6-11
6.4.4 Scheduling Utility Adjustment Work 6-11
6.4.5 Standard of Care Regarding Utilities 6-12
6.4.6 Emergency Procedures 6-12
6.4.7 Utility Adjustment Field Modifications 6-12
6.4.8 Switch Over to New Facilities 6-12
6.4.9 Record Drawings 6-12
6.4.10 Maintenance of Utility Service 6-13
6.4.11 Traffic Control 6-13
6.5 Deliverables 6-13
6.5.1 Maximum Number of Submittals 6-13
6.5.2 Developer's Utility Tracking Report 6-13
6.5.3 Utility Assembly Submittals 6-14
6.5.4 FHWA Alternate Procedure 6-15
7 ROW 7-1
7.1 General Requirements 7-1
7.2 Administrative Requirements 7-1
7.2.1 Standards 7-1
7.2.2 Software Requirements 7-2
7.2.3 ROW Acquisition Plan 7-2
7.2.4 Schedule and Review Procedures 7-2
7.2.5 Developer's Project ROW Scope of Services 7-4
7.2.6 Acquisition Process Summary 7-4
7.2.7 ROW Personnel Qualifications 7-5
7.2.8 Developer Conflict of Interest 7-6
7.2.9 Meetings 7-7
7.2.10 Documentation and Reporting 7-7
7.2.11 Responsibilities of Developer 7-8
7.2.12 Responsibilities of TxDOT 7-9
7.2.13 TxDOT Project Monitor/Reviewer 7-9

7.2.14 Responsibilities of the Office of Attorney General 7-9
7.3 Pre-Acquisition Activities 7-10
7.3.1 Project ROW Surveying and Mapping 7-10
7.3.2 Additional Reporting Requirements 7-14
7.3.3 Title Services 7-15
7.3.4 Introduction to Property Owners 7-16
7.3.5 Appraisals 7-16
7.3.6 Project ROW Acquisition Package Approval 7-19
7.4 Acquisition Activities 7-20
7.4.1 ROW Negotiations 7-20
7.4.2 Relocation Assistance 7-22
7.4.3 Closing Services 7-24
7.4.4 Condemnation Support 7-25
7.4.5 Clearance/Demolition of Project ROW 7-27
7.4.6 Payment Submittals 7-28
7.4.7 Property Fence 7-28
7.5 Early ROW Acquisition 7-29
8 GEOTECHNICAL 8-1
8.1 General Requirements 8-1
8.2 Design Requirements 8-1
8.2.1 Subsurface Geotechnical Investigation by Developer 8-1
8.2.2 Pavement Design 8-2
8.2.3 Rehabilitation of Existing Pavements 8-11
8.3 Construction Requirements 8-12
8.3.1 Pavement Materials Requirements 8-12
8.3.2 Construction Verification 8-14
9 LAND SURVEYING 9-1
9.1 General Requirements 9-1
9.2 Administrative Requirements 9-1
9.2.1 Standards 9-1
9.2.2 Right-of-Entry 9-1
9.2.3 Survey by TxDOT 9-1
9.3 Design Requirements 9-1

9.3.1 Units 9-1
9.3.2 Survey Control Requirements 9-2
9.3.3 Conventional Method (Horizontal and Vertical) 9-2
9.3.4 Right of Way Surveys 9-4
9.3.5 Survey Records and Reports 9-4
9.4 Construction Requirements 9-5
9.4.1 Units 9-5
9.4.2 Construction Surveys 9-5
9.5 Deliverables 9-5
9.5.1 Survey Records 9-5
9.5.2 Final ROW Surveying and Mapping 9-5
9.5.3 ROW Monuments 9-5
9.5.4 Record Drawings and Documentation 9-6
10 GRADING 10-1
10.1 General Requirements 10-1
10.2 Preparation within Project Limits 10-1
10.3 Slopes and Topsoil 10-2
10.4 Sodding 10-2
11 ROADWAYS 11-1
11.1 General Requirements 11-1
11.2 Design Requirements 11-1
11.2.1 Control of Access 11-1
11.2.2 Roadway Design Requirements 11-2
11.2.3 Superelevation 11-2
11.2.4 Roadway Design Deviations 11-2
11.2.5 Miscellaneous Roadway Design Requirements 11-3
12 DRAINAGE 12-1
12.1 General Requirements 12-1
12.2 Administrative Requirements 12-1
12.2.1 Data Collection 12-1
12.2.2 Coordination with Other Agencies and Local Governmental Entities 12-2
12.3 Design Requirements 12-2
12.3.1 Surface Hydrology 12-4

12.3.2 Storm Sewer Systems....12-5
12.3.3 Miscellaneous Drainage Design Requirements....12-7
12.3.4 Pump Stations....12-8
12.3.5 Stormwater Storage Facilities....12-8
12.3.6 Hydraulic Structures....12-8
12.4 Drainage Design Report....12-12
12.5 Construction Requirements....12-12
13 STRUCTURES....13-1
13.1 General Requirements....13-1
13.2 Design Requirements....13-1
13.2.1 Design Parameters....13-2
13.2.2 Bridge Design Loads and Load Ratings....13-3
13.2.3 Bridge Decks and Superstructures....13-4
13.2.4 Bridge Foundations....13-5
13.2.5 Bridge Railing and Barriers....13-5
13.2.6 Hydraulic Design....13-5
13.2.7 Retaining Walls....13-5
13.2.8 Noise/Sound Walls....13-6
13.2.9 Bridge Class Drainage Structures....13-7
13.2.10 Sign, Illumination, and Traffic Signal Supports....13-7
13.2.11 Rehabilitation of Structures to be Widened, Extended, or Reused....13-7
13.3 Construction Requirements....13-9
13.3.1 Concrete Finishes....13-9
13.3.2 Structure Metals....13-10
13.3.3 Steel Finishes....13-10
13.3.4 Steel Erection....13-10
13.3.5 Noise/Sound Walls....13-10
13.4 Bridge Construction Limits....13-10
14 RAIL....14-1
14.1 General Requirements....14-1
14.2 Railroad Design Standards....14-1
14.2.1 Design Criteria....14-2
14.3 Administrative Requirements....14-2

14.3.1 Project Work Affecting Railroad Operations 14-2
14.3.2 Railroad Agreement 14-2
14.3.3 Agreement for Construction, Maintenance, and Use of Right of Way 14-3
14.3.4 Operation Safety 14-4
14.3.5 Railroad Right of Entry Agreement 14-4
14.3.6 Developer Right of Entry Agreement 14-5
14.3.7 Insurance Requirements 14-5
14.4 Construction Requirements 14-5
14.4.1 Flagging 14-5
14.4.2 Safety Certification 14-5
15 AESTHETICS AND LANDSCAPING 15-1
15.1 General Requirements 15-1
15.2 Administrative Requirements 15-1
15.2.1 Aesthetics Concepts 15-2
15.2.2 Aesthetics and Landscaping Plan 15-3
15.2.3 Personnel 15-4
15.3 Design Requirements 15-4
15.3.1 Aesthetics Principles and Strategies 15-4
15.3.2 Walls 15-5
15.3.3 Bridges and Other Structures 15-5
15.3.4 Trees, Shrubs, and Other Plant Materials 15-6
15.3.5 Paved Slope Treatment 15-6
15.3.6 Lighting 15-6
15.3.7 Color Pallet 15-6
15.4 Construction Requirements 15-7
15.5 Maintenance 15-7
15.6 Aesthetic Enhancements 15-7
16 Signing, Delineation, Pavement Marking, Signalization, and Lighting 16-1
16.1 General Requirements 16-1
16.2 Administrative Requirements 16-1
16.2.1 Meetings 16-1
16.3 Design Requirements 16-1
16.3.1 Final Design 16-2

16.3.2 Signing and Delineation 16-3
16.3.3 Project Signs Outside of the Project ROW 16-3
16.3.4 Advance Toll Information Signs 16-3
16.3.5 Third-Party Signs 16-3
16.3.6 Sign Support Structures 16-4
16.3.7 Pavement Marking 16-4
16.3.8 Signalization 16-4
16.3.9 Lighting 16-7
16.3.10 Visual Quality 16-10
16.4 Construction Requirements 16-10
16.4.1 Permanent Signing and Delineation 16-10
16.4.2 Permanent Pavement Markings 16-11
16.4.3 Signalization 16-11
16.4.4 Lighting 16-12
16.5 Maintenance 16-13
16.5.1 Signalization 16-13
16.5.2 Lighting 16-13
17 INTELLIGENT TRANSPORTATION SYSTEMS 17-1
17.1 General Requirements 17-1
17.2 Design Requirements 17-2
17.2.1 ITS Communications Requirements 17-3
17.2.2 Conduit 17-4
17.2.3 CCTV Cameras 17-5
17.2.4 Vehicle Detection 17-7
17.2.5 Dynamic Message Signs 17-8
17.2.6 Lane Control Signals (LCS) 17-9
17.2.7 Single-Line DMS (SDMS) 17-9
17.2.8 Communications Systems 17-10
17.2.9 Satellite Buildings 17-10
17.3 Construction Requirements 17-10
17.3.1 General 17-10
17.3.2 Salvaging Existing Items 17-11
17.3.3 Existing ITS Relocation 17-11

17.3.4 ITS Implementation Plan 17-11
17.3.5 End-to-End Testing 17-12
17.3.6 Record Drawings and Documentation 17-13
18 TRAFFIC CONTROL 18-1
18.1 General Requirements 18-1
18.2 Administrative Requirements 18-1
18.2.1 Traffic Management Plan 18-1
18.3 Design Requirements 18-2
18.3.1 Traffic Control Plans 18-2
18.3.2 Restricted Hours 18-15
18.4 Construction Requirements 18-16
18.4.1 Developer Responsibility 18-16
18.4.2 Access 18-16
18.4.3 Detours 18-16
18.4.4 Local Approvals 18-16
18.4.5 Changes to Roadway Height and Width Restrictions 18-16
18.4.6 Pavement Markings 18-17
18.4.7 Reinstatement of Utility Cuts 18-17
18.4.8 Hauling Equipment 18-17
18.4.9 Final Clean Up 18-17
18.4.10 Stockpiles 18-17
19 MAINTENANCE 19-1
19.1 General Requirements 19-1
19.2 General Maintenance Obligations 19-1
19.3 O&M Limits 19-1
19.3.1 Elm Fork of the Trinity River 19-2
19.3.2 Minimum Base Scope and Additional Scope Components 1 and 2 19-2
19.3.3 Additional Scope Components 3 and 4 19-2
19.4 Noncompliance Point System Relationship 19-2
19.4.1 Defect Hazard Mitigation Classifications 19-2
19.4.2 Construction O&M Violations Classifications 19-2
19.4.3 O&M Violation Classifications 19-3
19.5 TxDOT's Obligation to Remedy and Repair 19-3

19.6 Transmission of Maintenance 19-3
19.7 Performance Requirements from NTP2 to Substantial Completion 19-3
19.7.1 Performance Requirements of Temporary Ramps and Diversions 19-3
19.8 Performance Requirements after Substantial Completion 19-3
19.9 Maintenance Management Plan 19-4
19.9.1 Routine Maintenance 19-5
19.9.2 Additional Requirements 19-6
19.9.3 Standard of Remedy or Repair 19-7
19.9.4 Highway Conditions Report (HCR) System 19-7
19.9.5 Bridge/Structures 19-7
19.9.6 Change of Use 19-8
19.9.7 Mitigation for Severe Weather Events 19-9
19.10 Renewal Work Plan 19-9
19.10.1 O&M Work Schedule 19-9
19.11 Inspections 19-12
19.11.1 Inspection Frequency 19-12
19.11.2 Inspection Standards 19-13
19.11.3 General Inspections 19-13
19.11.4 Specialist Inspections 19-13
19.11.5 Developer Audit Inspections 19-14
19.12 Asset Conditions Score by Developer 19-14
19.12.1 Existing Infrastructure and Existing Improvements 19-24
19.12.2 Temporary Ramps and Diversions 19-24
19.12.3 Pavement Sections 19-24
19.13 Handback Requirements 19-24
19.13.1 Residual Life Inspections 19-25
19.13.2 O&M Work Schedule for Handback Requirements 19-25
19.14 Highway Location and Data Requirements 19-26
19.14.1 Texas Reference Marker System (TRMS) 19-26
19.14.2 Establishment of Auditable Sections 19-26
19.14.3 Maintenance Management Information System (MMIS) 19-26
20 BICYCLE AND PEDESTRIAN FACILITIES 20-1
20.1 General Requirements 20-1

20.2 Administrative Requirements 20-1
20.3 Design Requirements 20-1
20.3.1 Bicycle Facilities 20-1
20.3.2 Pedestrian Facilities 20-2
21 TOLLING 21-1
21.1 General Requirements 21-1
21.2 Administrative Requirements 21-1
21.3 Design Requirements 21-1
21.3.1 ETCS Infrastructure Requirements 21-2
21.4 Construction Requirements 21-2
22 OPERATIONS 22-1
22.1 General Requirements 22-1
22.2 General Operations Obligations 22-1
22.3 Operation of the Project 22-2
22.3.1 Corridor Management 22-2
22.3.2 Condition Preservation 22-2
22.3.3 Patrols 22-2
22.3.4 ITS Operations 22-3
22.3.5 Traffic Control and Incident Management 22-3
22.3.6 Policing 22-5

2 Table of Attachments

- Attachment 2-1, Project Management Plan Contents
- Attachment 2-2, Work Breakdown Structure Requirements
- Attachment 2-3, Organizational Structure for Cost Reporting
- Attachment 2-4, I2MS Test Field Forms
- Attachment 4-1, Permits/Commitments/Mitigation
- Attachment 4-2, Special Specification 1122 Temporary Erosion, Sedimentation, and Environmental Controls
- Attachment 4-3, Construction SW3P Field Inspection and Maintenance Report (Form 2118)
- Attachment 4-4, Construction SGC (Form 2448)
- Attachment 4-5, EPIC Sheets
- Attachment 6-1, Utility Forms
- Attachment 8-1, Minimum Pavement Design Requirements
- Attachment 11-1, Roadway Design Criteria.
- Attachment 12-1, Drainage Report for Major Stream Crossings Guidelines
- Attachment 14-1, Amendments for the TxDOT Traffic Operations Manual, Railroad Operations, Volume, February 2000
- Attachment 18-1, TxDMV Permit Restriction Application
- Attachment 19-1, Bridge Maintenance Categories
- Attachment 21-1, Toll Responsibility Matrix
- Attachment 21-2, Jointed Concrete Pavement Using Glass Fiber Reinforced Polymer Bars
- Attachment 21-3, Typical Toll Zone Layout

1 GENERAL

1.1 Project Scope

The SH 183 Managed Lanes Project has been developed in cooperation with local and regional stakeholders to relieve traffic congestion along SH 183, SH114 and LP 12 from SH 121 to IH 35E in Dallas and Tarrant Counties. Developer shall be responsible for the design, construction, financing, maintenance, and operation of the Project under the terms set forth in the Agreement. The project is the first of a multi-phased program that will be implemented through a series of future projects to achieve the Ultimate Project as defined in Section 1.5. The work generally consists of construction and/or reconstruction of managed lanes with ingress/egress points, general-purpose lanes, exit and entrance ramps, direct connectors, collector distributors, frontage road lanes, frontage road turnarounds, and related cross street improvements.

The Work will include, but is not limited to:

- Design and construction of roadways, drainage facilities, structures, sound barriers, landscaping and aesthetic items and treatments, signing, lighting, traffic signals, sidewalks, and shared use paths along and connecting to SH 183/LP 12/SH114 managed toll lanes, general-purpose lanes, frontage roads, and/or crossing streets,
- Design and installation of Intelligent Transportation Systems (ITS), and
- Design, procurement, installation and/or construction of the Electronic Toll Collection System (ETCS) components described in Section 21.

Developer shall manage, plan, execute, and control all aspects of the development Work. Developer shall coordinate its activities with Governmental Entities and other Persons that are directly or indirectly impacted by the development Work. Developer shall also document and report all development Work in accordance with the Contract Documents.

Developer shall be responsible for all remaining right of way acquisition services required as of contract execution or as otherwise specified by and agreed to by TxDOT. The purchase price of right of way parcels, with the exception of Developer-Designated ROW, will not be the responsibility of the Developer.

Developer shall cause all Utility Adjustments necessary to accommodate construction, operation, maintenance and/or use of the Project in both its initial configuration and ultimate configuration, as defined under the Ultimate Project in Section 1.5. TxDOT will assist Developer in the Utility Adjustment process, to the extent described in the Contract Documents. Some Utility Adjustments may be performed by the Utility Owner with its own forces and/or contractors and consultants (i.e., Owner-Managed); all others shall be performed by Developer with its own forces and/or Subcontractors and consultants (subject to any approval rights required by the Utility Owner for those working on its facilities) (i.e., Developer-Managed). The allocation of responsibility for the Utility Adjustment Work between Developer and the Utility Owners shall be specified in the Utility Agreements.

1.2 Work Description

The Project consists of improvements along and connecting to SH 183, SH 114 and LP 12 from SH 121 to IH-35E in Dallas County and Tarrant County. Unless otherwise specified below, the Work shall meet all the requirements of the Technical Provisions and shall be designed and constructed consistent with the Draft Schematic. Certain elements, listed below, of the Ultimate Project shall be implemented in this Project Scope.

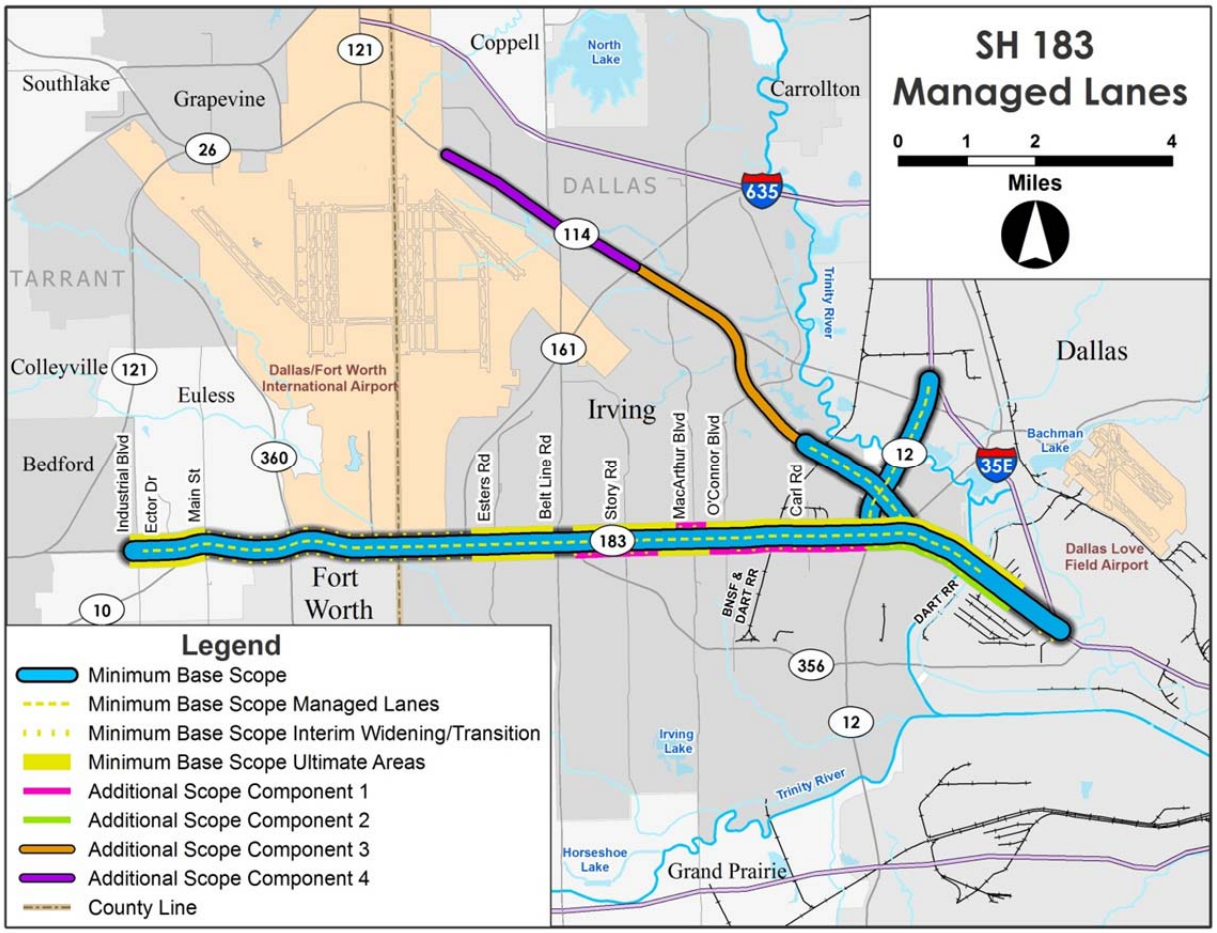

Figure 1-1: SH 183 Managed Lanes Project

General

In this Section 1, reference to limits along SH 183 corridor generally follows the Draft Schematic baseline stationing, west to east. The following station equations, west of County Line Road, applies to SH 183 baselines:

- Eastbound (EB) managed lanes (ML) baseline (EMX): 1542+17.57 Back = 117+30.38 Ahead
- Westbound (WB) ML baseline (WMX): 2542+22.69 Back = 117+30.39 Ahead
- EB general purpose lane (GPL) baseline (EGPX): 3542+21.17 Back = 117+30.00 Ahead

- WB general purpose lane (GPL) baseline (WGPX): 4542+40.32 Back = 117+29.99 Ahead

Station values stated in the Technical Provisions reflect the design in the Draft Schematic. Any design modifications that require alignment changes and different station values must reflect the footprint of the improvements, including the beginning and ending limits, depicted in the Draft Schematic.

Project Description

Minimum Base Scope

SH 183 – Approximately 14.8 miles

- Managed Lanes: Design and construct, widen or configure existing roadway to provide one EB and one WB managed lane generally consistent with the Draft Schematic from Wilshire Drive/Reliance Parkway to Metro Media Place.
    - SH 183 EB ML
        - Station 1302+90 to Station 1394+80 (Construct)
        - Station 1394+80 to Station 433+50 (Widen/Configure)
        - Station 433+50 to Station 539+70 (Construct)
        - Station 539+70 to Station 606+40 (Configure)
    - SH 183 WB ML
        - Station 2308+05 to Station 2393+00 (Construct)
        - Station 2393+00 to Station 408+00 (Configure)
        - Station 408+00 to Station 539+70 (Construct)
        - Station 539+70 to Station 617+15 (Configure)

  The following managed lane sections shall be designed and constructed to accommodate one additional managed lane:
        - SH 183 EB ML Station 1302+90 to Station 1374+00
        - SH 183 EB ML Station 476+00 to Station 480+20
        - SH 183 WB ML Station 2300+00 to Station 2378+00
        - SH 183 WB ML Station 438+00 to Station 505+75, provided that the section between 438+00 and 450+00 is constructed to cover the gap between ML and GPL

  At the western limits, the managed lanes will connect to the existing managed lanes. At the eastern limits, the managed lanes will be transitioned back into the general purpose lanes east of Empire Central Drive. Managed lane construction shall be generally located between the EB and WB general purpose lanes. The managed lanes shall be separated from the general purpose lanes by concrete traffic barrier and access control systems to prevent entering and exiting the managed lanes into opposing traffic. The managed lanes shall include the following auxiliary lanes, entrance and exit ramps, and managed lanes direct connectors between the managed lanes and the general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB ML Ramps and Auxiliary Lanes
        - Exit ramp – EMX between Station 1373+00 and Station1378+00

        - Entrance ramp – EMX between Station 204+00 and Station 217+60
        - Exit ramp – P183EBML between Station 269+00 and Station 287+50
        - Entrance ramp – P183EBML between Station 383+70 and Station 401+00
        - Exit ramp – P183EBML between Station 433+20 and Station 469+60
        - Entrance ramp – P183EBML between Station 483+70 and Station 510+40
    - SH 183 WB ML Ramps and Auxiliary Lanes
        - Exit ramp – WMX between Station 2381+00 and Station 2387+00
        - Entrance ramp – P183WBML between Station 259+00 and Station 270+40
        - Exit ramp – P183WBML between Station 406+00 and Station 423+20
        - Auxiliary lane – P183WBML between Station 423+20 and Station 433+20
        - Entrance ramp – P183WBML between Station 433+20 and Station 444+00
        - Exit ramp – P183WBML between Station 521+00 and Station 540+10
    - SH 183 ML Direct Connectors
        - 1-lane SH 183 EB to LP 12 NB, P183ML12ML Station 18+65 to 61+80
        - 1-lane LP 12 SB to SH 183 WB, P183ML12ML Station 18+65 to 61+80
        - 1-lane SH 114 EB to SH 183 EB, P114ML183ML Station 10+00 to 34+00
        - 1-lane SH 183 WB to SH 114 WB, P183ML114ML Station 10+00 to 35+80
- General Purpose Lanes: Design and reconstruct general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB GPL
        - EGPX Station 3307+80 to Station 3394+80
        - PEB183GP Station 307+50 to Station 363+80
        - PEB183GP Station 488+80 to Station 527+30
    - SH 183 WB GPL
        - WGPX Station 4308+25 to Station 4393+20
        - PWB183GP Station 246+45 to Station 327+55
        - PWB183GP Station 344+00to Station 615+60
- General Purpose Lane Ramps and Auxiliary Lanes: Design and construct or reconstruct ramps and auxiliary lanes connecting general purpose lanes to frontage roads and other connecting facilities generally consistent with the Draft Schematic and the control of access lines in the Acquisition Survey Documents:
    - SH 183 EB GPL Ramps
        - Entrance from Industrial Boulevard (FM 157)
        - Exit to Main Street
        - Entrance from Main Street
        - Entrance from Esters Road
        - Exit to MacArthur Boulevard
        - Entrance – from Story Road
        - Entrance from MacArthur Boulevard
        - Exit to Carl Road (west of BNSF Railroad)
        - Entrance from O'Connor Boulevard
        - Exit to Carl Road (east of BNSF Railroad
        - Exit to LP 12 SB Frontage Road
        - Exit to Spur 482/ Maryland Drive

        - Entrance from Maryland Drive/ Spur 482
    - SH 183 WB GPL Ramps
        - Exit to Industrial Boulevard (FM 157)
        - Entrance from Main Street
        - Exit to Main Street
        - Exit to Esters Road
        - Entrance from Story Road (to Collector Distributor at Belt Line Road)
        - Entrance from Story Road
        - Exit to Belt Line Road
        - Entrance from MacArthur Boulevard
        - Exit to Story Road
        - Exit to MacArthur Boulevard
        - Entrance from Carl Road
        - Exit to O'Connor Boulevard
        - Entrance from Loop 12 SB Frontage Road
        - Exit to Carl Road (from Collector Distributor)
        - Entrance from Collector Distributor
        - Exit (Cloverleaf) to LP 12 SB (from Collector Distributor)
        - Entrance (Cloverleaf) from LP 12 NB (to Collector Distributor)
        - Auxiliary lane between Exit and Entrance Loop Ramps at LP 12
        - Entrance from SH 114 Frontage Road (to Collector Distributor)
        - Exit to Collector Distributor
        - Exit to Regency Drive
        - Auxiliary Lane between Exit to Regency Drive and Entrance from Regal Row
        - Entrance from Regal Row
        - Entrance from Empire Central Drive
- General Purpose Lanes Widening: Design and construct widening of general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB GPL
        - EGPX Station 3394+80to Station 144+10
        - EGPX Station 192+00 to Station 229+70
        - PEB183GP Station 442+95 to Station 475+10
        - PEB183GP Station 648+60 to Station 664+70
    - SH 183 WB GPL
        - WGPX Station 4393+20 to Station 134+80
        - WGPX Station 188+40 to Station 220+30
        - P183WBML Station 270+05 to Station 286+00
        - P183WBML Station 303+20 to Station 312+50
        - P183WBML Station 381+70 to Station 403+00
- GPL & ML Existing Pavement Rehabilitation: Design and construct pavement rehabilitation on existing pavement to accommodate the required improvements including auxiliary lanes, managed lane ramps, and the portion of the general purpose ramps and direct connectors along the General Purpose Lanes up to the physical gore:
    - SH 183 EB

        - GPL & ML, EGPX Station 3394+80 to Station PEB183GP 307+50
        - ML, PEB183GP Station 307+50 to Station 363+80
        - GPL & ML, PEB183GP Station 363+80 to Station 433+50
        - GPL, PEB183GP Station 433+50 to Station 488+80
        - GPL, PEB183GP Station 527+30 to Station 539+70
        - GPL & ML, PEB183GP Station 539+70 to Station 615+60
    - SH 183 WB
        - GPL & ML, WGPX Station 4393+20 to PWB183GP Station 246+50
        - ML, PWB183GP Station 246+50 to Station 327+50
        - GPL & ML, PWB183GP Station 327+50 to Station 344+00
        - ML, PWB183GP Station 344+00 to Station 408+00
        - ML, PWB183GP Station 539+70 to Station 615+60
- Frontage Roads: Design and reconstruct frontage roads to accommodate new interchange construction, managed lanes and general purpose lanes:
    - SH 183 EB FR
        - EGPX Station 3328+20 to Station 3386+80
        - EGPX Station 172+20 to Station 223+20
        - PEB183FR Station 281+65 to Station 295+00
        - PEB183FR Station 305+00 to Station 469+00
        - PEB183FR3 Station 494+25 to Station 534+00
    - SH 183 WB FR
        - WGPX Station 4322+15 to Station 4390+45
        - WGPX Station 171+60 to Station 229+65
        - PWB183FR 242+00 to Station 481+00
        - PWB183FR2 Station 11+00 to Station 29+00
        - PWB183FR3 Station 11+00 to Station 50+40
        - PWB183FR4 Station 570+80 to Station 608+80
- FR and Ramp Existing Pavement Rehabilitation: Design and construct frontage road pavement rehabilitation on existing pavement including auxiliary lanes and general purpose ramps up to the GPL physical gore:
    - SH 183 EB
        - PEB183GP Station 255+00 to PEF183FR Station 281+65
        - PEB183GP Station 469+00 to Station 494+25
        - PEB183GP Station 570+00 to Station 608+80
- Direct Connectors and Collector Distributors: Design and construct or reconstruct general purpose (GPL) direct connectors (DC) and collector distributors (CD):
    - DC, GPL, 2-lane LP 12 SB to SH 183 WB, PSB12WB183 Station 10+00 to 41+55
    - DC, GPL, 2-lane (striped for 1-lane) SH 183 EB to LP 12 NB, PEB183NB12 Station 5+00 to 60+70
    - DC, GPL, 2-lane SH 114 EB to SH 183 EB, P114GP183GP Station 15+60 to 36+35
    - DC, GPL, 2-lane SH 183 WB to SH 114 WB, P183GP114GP Station 11+30 to 34+75
    - DC, GPL, 2-lane Maryland Dr. to Spur 482 EB, PNB482 Station 1126+50 to 1137+80
    - DC, GPL, 2-lane Spur 482 WB to SH 183 WB CD, PWBCOLL Station 10+00 to 20+50
    - CD, GPL, 2-lane SH 183 WB, PWB183GP Station 474+00 to 502+80

- Crossing Streets: Design and construct improvements on crossing streets including bridges and frontage road turnarounds, as required in Section 11, Attachment 11-1, Table 2, generally consistent with the Draft Schematic:
    - FM 157/Industrial Boulevard, Station 11+50 to Station 19+95
    - Ector Drive, Station 11+00 to Station 22+20
    - Main Street, Station 10+00 to Station 19+60
    - Esters Road, Station 4+10 to Station 16+75
    - Story Road, Station 5+20 to Station 17+10
    - MacArthur Boulevard, Station 8+30 to Station 21+00
    - O'Connor Boulevard, Station 7+60 to Station 18+60
    - One-way Access Road and turnaround at BNSF Railroad crossing, Station 395+80 to Station 414+75
    - Carl Road, Station 7+25 to Station 19+50
    - Maryland Drive, Station 1120+40 to Station 1126+50
    - Regency Drive, Station 22+70 to Station 27+10
    - Century Center Connection to SH 183 WB FR (approximately 250 feet)
    - Regal Row, Station 12+50 to Station 15+25
    - Empire Central Connection to SH 183 WB FR (approximately 200 feet)

LP 12 – Approximately 2.5 miles

- Design and construct or configure existing roadway to provide one LP 12 northbound and one LP 12 southbound managed lane generally consistent with the Draft Schematic from Texas Plaza Drive to IH-35E
    - SH 183 to LP12CL Station 1408+60 (Configure)
    - LP12CL Station 1408+60 to Station 1419+40 (Construct)
    - LP12CL Station 1419+40 to Station 1432+00 (Configure)
    - LP12CL Station 1432+00 to Station 1438+00 (Construct)
    - LP12CL Station 1438+00 to Station 1465+20 (Configure)
    - LP12CL Station 1465+20 to Station 1508+10 (Construct)

  At the southern limits, the managed lanes will connect to the SH 183 managed lanes constructed in this Project. At the northern limits, the managed lane will be transitioned into the existing managed lanes direct connectors between LP 12 to IH-35E. The managed lanes shall include the following entrance and exit ramps between the managed lanes and the general purpose lanes generally consistent with the Draft Schematic:
    - LP 12 NB ML Ramps
        - Entrance ramp – LP12CL Station 1393+30 to Station 1416+00
        - Exit ramp – LP12CL Station 1508+10 to DCLP12NB35 Station 112+00
    - LP 12 SB ML Ramps
        - Exit ramp – LP12CL Station 1406+00 to Station 1419+40
        - Entrance ramp – LP12CL Station 1508+10 to DCLP12SB35 Station 112+00
- Design and construct widening of general purpose lanes as needed to accommodate the addition of managed lanes generally consistent with the Draft Schematic:
    - LP12CL Station 1432+00 to Station 1440+00
    - LP12CL Station 1465+20 to Station 1510+00

- GPL & ML Existing Pavement Rehabilitation: Design and construct pavement rehabilitation on existing pavement to accommodate the required improvements including auxiliary lanes, managed lane ramps, and the portion of the general purpose ramps and direct connectors along the General Purpose Lanes up to the physical gore:
    - LP 12 NB & SB
        - GPL & ML, LP12CL Station 1385+00 to Station 1510+00
- Design and construct or reconstruct ramps connecting general purpose lanes to frontage roads and other connecting facilities generally consistent with the Draft Schematic and the control of access lines shown in the final ROW plans:
    - LP 12 NB
        - Exit to Northwest Highway
    - LP 12 SB
        - Entrance from Northwest Highway

SH 114 – Approximately 2.3 miles

- Design and construct or configure existing roadway to provide one SH 114 eastbound and one SH 114 westbound managed lane generally consistent with the Draft Schematic from Rochelle Boulevard/ Riverside Drive to Spur 482
    - SH114CL Station 946+00 to Station 955+00 (Construct)
    - SH114CL Station 955+00 to Station 1027+35 (Configure)
    - SH114CL Station 1027+35 to SH 183 (Construct)

  At the western limits, the managed lanes will be transitioned into the general purpose lanes at Rochelle Boulevard/ Riverside Drive. At the eastern limits, the managed lanes will connect to the SH 183 managed lanes constructed in this Project.
- GPL & ML Existing Pavement Rehabilitation: Design and construct pavement rehabilitation on existing pavement to accommodate the required improvements including auxiliary lanes, managed lane ramps, and the portion of the general purpose ramps and direct connectors along the General Purpose Lanes up to the physical gore:
    - SH 114 EB & WB
        - GPL & ML, SH114CL Station 946+00 to Station 1060+00

Additional Scope Component 1 – SH 183 (Approximately 4.6 miles)

- Managed Lanes: Design and construct, widen or configure one SH 183 EB and one SH 183 WB managed lane generally consistent with the Draft Schematic from Harvard Street to Loop 12
    - SH 183 EB ML
        - Station 265+25 to Station 454+35 (Construct)
        - Station 454+35 to Station 476+10 (Widen)
    - SH 183 WB ML
        - Station 261+50 to Station 421+00 (Construct)
        - Station 421+00 to Station 451+40 (Widen)
        - Station 451+40 to Station 476+10 (Configure)

  The following managed lane sections shall be designed and constructed to accommodate one additional managed lane:
        - SH 183 EB ML Station 271+00 to Station 476+10

        - SH 183 WB ML Station 271+00 to Station 438+00

Managed lane construction shall be generally located between the EB and WB general purpose lanes. The managed lanes shall be separated from the general purpose lanes by concrete traffic barrier and access control systems to prevent entering and exiting the managed lanes into opposing traffic. The managed lanes shall include construction or reconstruction of the following auxiliary lanes and entrance and exit ramps between the managed lanes and the general purpose lanes generally consistent with the Draft Schematic:

- SH 183 EB ML Ramps and Auxiliary Lanes
    - Exit ramp – CP1-183EBML Station 276+00 to Station 286+00
    - Auxiliary Lane – CP1-183EBML Station 286+00 to Station 315+00
    - Entrance ramp – CP1-183EBML Station 315+00 to Station 348+00
    - Entrance Ramp – CP1-183EBML Station 383+00 to Station 394+00
    - Auxiliary Lane – CP1-183EBML Station 394+00 to Station 406+00
    - Exit ramp – CP1-183EBML Station 406+00 to Station 414+00
- SH 183 WB ML Ramps and Auxiliary Lanes
    - Exit ramp – CP1-183WBML Station 320+80 to 329+00
    - Exit ramp – CP1-183WBML Station 408+30 to Station 415+00
    - Auxiliary lane – CP1-183WBML Station 415+00 to Station 421+00
    - Auxiliary lane – CP1-183WBML Station 421+00 to Station 437+00 (Configure)

- General Purpose Lanes: Design and construct or reconstruct general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB GPL
        - CP1-EB183GP Station 265+20 to Station 315+20
        - CP1- EB183GP Station 355+00 to Station 476+00
    - SH 183 WB GPL
        - P2-WB183GP Station 319+00 to Station 352+90
- General Purpose Lanes Ramps: Design and construct or reconstruct ramps connecting general purpose lanes to frontage roads generally consistent with the Draft Schematic and the control of access lines in the final parcel plats:
    - SH 183 EB GPL Ramps
        - Entrance from Henry Street
        - Exit to Carl Road
        - Entrance from O'Connor Boulevard
        - Exit to LP 12 Frontage Road
    - SH 183 WB GPL Ramps
        - Exit to Story Road
        - Entrance from MacArthur Boulevard
- Frontage Roads: Design and construct frontage road widening generally consistent with Draft Schematic:
    - SH 183 EB FR
        - P2-183EBFR Station 362+70 to Station 373+30
    - SH 183 WB FR
        - P2-183WBFR Station 316+25 to Station 323+00
        - P2-183WBFR Station 334+40 to Station 348+55

- Direct Connectors: Design and construct or reconstruct general purpose (GPL) direct connectors generally consistent with Draft Schematic:
    - GPL, 1-lane SH 183 EB to LP 12 NB, PEB183NB12 Station 5+00 to Station 16+75
- Crossing Streets: Design and construct or reconstruct improvements on crossing streets including bridges and frontage road turnarounds, as required in Section 11, Attachment 11-1, Table 2, generally consistent with the Draft Schematic:
    - Story Road turnarounds and widening, Station 8+30 to Station 13+50
    - MacArthur Blvd. turnarounds and widening between Station 11+25 and Station 16+60
    - O'Connor Boulevard turnarounds and widening between Station 12+00 and Station 16+25

Additional Scope Component 2 – SH 183 (Approximately 3.5 miles)

- Managed Lanes: Design and construct, widen or configure one-lane managed lane in each direction generally consistent with the Draft Schematic from LP 12 to Empire Central Drive.
    - SH 183 EB ML
        - Station 480+25 to Station 527+30 (Widen)
        - Station 527+30 to Station 536+90 (Construct)
        - Station 536+90 to Station 577+90 (Configure)
        - Station 577+90 to Station 607+90 (Construct)
    - SH 183 WB ML
        - Station 505+75 to Station 527+00 (Widen)
        - Station 527+00 to Station 533+90 (Configure)
        - Station 533+90 to Station 539+70 (Construct)
        - Station 539+70 to Station 577+90 (Configure)
        - Station 577+90 to Station 607+90 (Construct)

      The following managed lane sections shall be designed and constructed to accommodate one additional managed lane:
        - SH 183 EB ML Station 480+20 to Station 495+00

  Managed lanes shall be generally located between the EB and WB general purpose lanes. The managed lanes shall be separated from the general purpose lanes by concrete traffic barrier and access control systems to prevent entering and exiting the managed lanes into opposing traffic. The managed lanes shall include construction or reconstruction of the following entrance and exit ramps between the managed lanes and the general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB ML Ramps
        - Entrance ramp – P2-183EBML Station 483+00 to Station 502+00
        - Exit ramp – P2-183EBML Station 578+00 to Station 597+00
    - SH 183 WB ML Ramps
        - Entrance ramp – P2-183WBML Station 578+00 to 596+00
- General Purpose Lanes: Design and construct or reconstruct general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 EB GPL
        - P2- EB183GP Station 466+00 to Station 510+10

        - P2- EB183GP Station 517+35 to Station 620+00
    - SH 183 WB GPL
        - P2-WB183GP Station 602+60 to Station 617+20
- General Purpose Lanes Widening: Design and construct widening of general purpose lanes generally consistent with the Draft Schematic:
    - SH 183 WB GPL
        - P2-WB183GP Station 589+00 to Station 602+60
- General Purpose Lanes Ramps: Design and construct or reconstruct ramps connecting general purpose lanes to frontage roads generally consistent with the Draft Schematic and the control of access lines in the final parcel plats:
    - SH 183 EB GPL Ramps
        - Exit to Maryland Drive/ Spur 482
        - Exit to Regal Row (from SH 114 EB to SH 183 DC)
        - Auxiliary Lane between Exit to Regal Row and Entrance from Grauwyler Road
        - Entrance from Grauwyler Road
        - Exit to Empire Central Drive
- Frontage Roads: Design and reconstruct frontage roads generally consistent with Draft Schematic:
    - SH 183 EB FR
        - P2-183EBFR2 Station 527+00 to Station 606+70
- Direct Connectors: Design and construct or reconstruct general purpose (GPL) and managed lane direct connectors generally consistent with Draft Schematic:
    - GP, 2-lane SH 114 EB to SH 183 EB, P2-114GP183GP Station 31+00 to 60+00
    - ML, 1-lane SH 183 WB to SH 114 WB, P2-183ML114ML Station 28+60 to Station 31+45
    - ML, 1-lane SH 114 EB to SH 183 EB, P2-114ML1183ML Station 27+25 to Station 31+25
- Crossing Streets: Design and construct or reconstruct improvements on crossing streets including bridges and frontage road turnarounds, as required in Section 11, Attachment 11-1, Table 2, generally consistent with the Draft Schematic:
    - Grauwyler Road, Station 13+30 to Station 18+50
    - Grauwyler Road Turnaround, Station 10+00 to Station 25+70 (see Section 12.3)
    - Regal Row, Station 7+60 to Station 13+35

Additional Scope Component 3 – SH 114 (Approximately 3.6 miles)

- Managed Lanes: Design and construct one SH 114 EB and one SH 114 WB managed lane generally consistent with the Draft Schematic from SH 161 (President George Bush Turnpike) to Rochelle Boulevard/Riverside Drive.
    - SH 114 EB ML
        - Station 739+50 to Station 946+00
    - SH 114 WB ML
        - Station 756+00 to Station 946+00

Managed lanes shall be generally located between the EB and WB general purpose lanes. The managed lanes shall be separated from the general purpose lanes by a concrete barrier and access control systems to prevent entering and exiting the managed lanes into opposing traffic. The managed lanes shall include construction or configuration of the following auxiliary lanes and entrance and exit ramps between the managed lanes and general purpose lanes generally consistent with the Draft Schematic.

- SH 114 EB ML Ramps
  - Entrance ramp – SH114CL between Station 805+00 and 822+00
  - Exit ramp – SH114CL between Station 946+00 and 958+00
- SH 114 WB ML Ramps and Auxiliary Lanes
  - Entrance ramp – SH114CL between Station 790+00 and 800+20
  - Auxiliary lane – SH114CL between Station 800+20 and 812+00 (on GP lanes between ML entrance/exit ramps)
  - Exit ramp – SH114CL between Station 812+00 and 822+00
  - Entrance ramp – SH114CL between Station 946+00 and 965+00

At the western limits, the managed lanes will be transitioned into the exiting general purpose lanes just west of SH 161. At the eastern limits, the managed lanes will connect to the managed lanes constructed in the Minimum Base Scope. This option includes one eastbound entrance and one westbound exit ramps from the managed lanes to the general purpose lanes at Walnut Hill Road/ Love Drive.

- General Purpose Lanes Widening: Design and construct widening of general purpose lanes generally consistent with the Draft Schematic:
  - SH 114 EB GPL
    - SH114CL Station 746+80 to Station 835+70
    - SH114CL Station 852+45 to Station 946+00
  - SH 114 WB GPL
    - SH114CL Station 764+00 to Station 832+90
    - SH114CL Station 847+70 to Station 946+00
- GPL & ML Existing Pavement Rehabilitation: Design and construct pavement rehabilitation on existing pavement to accommodate the required improvements including auxiliary lanes, managed lane ramps, and the portion of the general purpose ramps and direct connectors along the General Purpose Lanes up to the physical gore:
  - SH 114 EB
    - GPL & ML, SH114CL Station 739+50 to Station 946+00
  - SH 114 WB
    - GPL & ML, SH114CL Station 756+00 to Station 946+00
- General Purpose Lane Ramps: Design and construct or reconstruct ramps connecting general purpose lanes to frontage roads generally consistent with the Draft Schematic and the control of access lines in the final parcel plats:
  - SH 114 EB GPL Ramps
    - Exit to Walnut Hill Road/Love Drive/ Walnut Ridge Drive
    - Entrance from Hidden Ridge
    - Exit to O'Connor Boulevard

        - Entrance from O'Connor Boulevard
        - Exit to Rochelle Boulevard/Riverside Drive
    - SH 114 WB GPL Ramps
        - Exit to SH 161 (PGBT) Frontage Road
        - Entrance from Walnut Hill Road/Love Drive
        - Exit to Hidden Ridge
        - Entrance from O'Connor Boulevard
        - Exit to O'Connor Boulevard
        - Entrance from Rochelle Boulevard/Riverside Drive

Additional Scope Component 4 – SH 114 (Approximately 4.6 miles)

- Managed Lanes: Design, construct and/or configure one SH 114 WB managed lane generally consistent with the Draft Schematic from Spur 97 (International Parkway) to SH 161 (President George Bush Turnpike).
    - SH 114 WB ML
        - Station 512+50 to Station 576+90 (Construct)
        - Station 576+90 to Station 579+25 (Configure)
        - Station 579+25 to Station 756+00 (Construct)

  Managed lanes shall be generally located along between the EB and WB general purpose lanes. The managed lanes shall be separated from the general purpose lanes by a concrete barrier and access control systems to prevent entering and exiting the managed lanes into opposing traffic. The managed lanes shall include construction or configuration of the following entrance and exit ramps between the managed lanes and general purpose lanes generally consistent with the Draft Schematic.
    - SH 114 WB ML Ramps
        - Exit ramp - SH114CL Station 552+40 to Station 561+00
        - Exit ramp - SH114CL Station 725+40 to Station 743+00

  At the western limits, the managed lane will be transitioned into the exiting managed lane at International Parkway. At the eastern limits, the managed lanes will connect to the managed lanes constructed in the Additional Scope Component 3.

- General Purpose Lanes Widening: Design and construct widening of general purpose lanes generally consistent with the Draft Schematic:
    - SH 114 WB GPL
        - SH114CL Station 565+55 to Station 576+90
        - SH114CL Station 579+25 to Station 656+20
        - SH114CL Station 663+50 to Station 705+40
        - SH114CL Station 707+15to Station 756+00
- GPL & ML Existing Pavement Rehabilitation: Design and construct pavement rehabilitation on existing pavement to accommodate the required improvements including auxiliary lanes, managed lane ramps, and the portion of the general purpose ramps and direct connectors along the General Purpose Lanes up to the physical gore:
    - SH 114 EB
        - GPL, SH114CL Station 533+50 to Station 739+50

    - SH 114 WB
        - GPL & ML, SH114CL Station 560+00 to Station 756+00
- General Purpose Lane Ramps: Design and construct or reconstruct ramps connecting general purpose lanes to frontage roads generally consistent with the Draft Schematic and the control of access lines in the final parcel plats:
    - SH 114 WB GPL Ramps
        - Exit to Freeport Parkway
        - Entrance from Esters Boulevard
        - Exit to Esters Boulevard
        - Entrance from Beltline Road
        - Exit to Beltline Road
        - Entrance from Longhorn Drive

Ultimate Areas

The following portions of the Project are considered Ultimate Areas in terms of location and grade:

Minimum Base Scope

- SH 183 from Wilshire Drive/Reliance Parkway to Main Street:
    - EB ML and GPL (including ramps) from Station 3307+81 to Station 3378+10.
    - WB ML and GPL (including ramps) from Station 4308+25 to Station 4378+40.
    - EB frontage roads (FR) and turnarounds (Industrial Boulevard, Ector Drive and Main Street) from Station 3328+18 to Station 3386+82.
    - WB FR and turnarounds (Industrial Boulevard, Ector Drive and Main Street) from Station 4322+13 to Station 4387+01.
    - Main Street, including new bridge over SH 183 general purpose and managed lanes, from Station 10+00 to Station 19+62.
- SH 183 from SH 161 to Belt Line Road:
    - EB FR, ramp and turnaround (Esters Road) from Station 175+45 to Station 221+35.
    - WB FR, ramp and turnaround (Esters Road) from Station 171+60 to Station 225+25.
    - Esters Road, including new bridges over SH 183 general purpose and managed lanes, from Station 4+10 to 16+75.
- SH 183 from Belt Line to MacArthur Boulevard:
    - EB GPL and ramps from Station 315+20 to Station 342+00.
    - EB FR from Station 281+65 to Station 295+00.
    - EB FR and turnaround (MacArthur Blvd. under new SH 183 EB bridge) from Station 305+00 to Station 342+00.
    - WB GPL and ramps from Station 261+30 to Station 319+25.
    - WB FR and turnarounds (MacArthur Boulevard under new SH 183 EB bridge) from Station 248+25 to Station 341+60.
    - Story Road from Station 5+20 to Station 17+10
    - MacArthur Boulevard, Station 8+30 to Station 21+00
- SH 183 from MacArthur Boulevard to LP 12:

  - EB ML from Station 454+40 to Station 478+00.
  - EB GPL and ramps from Station 342+00 to Station 355+00.
  - EB FR and turnaround (O'Connor Boulevard, EB to WB under north side of SH 183 EB existing bridge, Carl Road under SH 183 WB bridges) from Station 342+00 to Station 467+15.
  - WB ML from Station 421+00 to Station 478+00.
  - WB GPL and ramps from Station 352+90 to Station 478+00.
  - WB FR and turnarounds (Carl Road) from Station 341+60 to Station 468+70.
  - O'Connor Boulevard from Station 7+60 to Station 18+60
  - Carl Road from Station 7+25 to Station 19+50
  - LP 12 SB to SH 183 WB GPL Direct Connector Station 10+00 to Station 41+55.
  - SH 183 EB to LP 12 NB ML Direct Connector Station 18+65 to Station 61+80.
  - LP 12 SB to SH 183 WB ML Direct Connector Station 18+65 to Station 61+80.
  - SH 183 EB to LP 12 NB GPL Direct Connector Station 16+75 to Station 60+70.
- SH 183 from LP 12 to Empire Central Drive
  - EB ML from Station 478+00 to Station 505+10.
  - WB ML from Station 478+00 to Station 505+75
  - WB GPL and ramps from Station 478+00 to Station 508+00.
  - WB GPL and ramps from Station 521+20 to Station 602+60.
  - WB FR from Station 22+45 to Station 45+00.
  - WB FR from Station 570+80 to Station 602+10.
  - EB FR from Station 497+70 to Station 527+00.

Additional Scope Component 1

- SH 183 from Harvard Street to Loop 12
  - EB GPL and ramps from Station 271+00 to Station 345+00
  - EB GPL and ramps from Station 355+00 to Station 466+00
  - EB ML and ramps from Station 271+00 to Station 476+00
  - WB GPL and ramp from Station 319+25 to Station 352+90
  - WB ML from Station 271+00 to Station 438+00

Additional Scope Component 2

- SH 183 from Loop 12 to Empire Central Drive
  - EB ML from Station 480+20 to Station 495+00
  - EB GPL and ramp (up to Station 17+10) from Station 466+00 to Station 506+60
  - EB GPL and ramps from Station 533+95 to Station 606+85
  - WB GPL from Station 589+00 to Station 607+90
  - EB FR, ramps and turnarounds (Regal Row) from Station 527+80 to Station 604+50
  - GPL SH 114 SB to SH 183 EB DC Station 43+00 to Station 45+70
  - Grauwyler Road from Station 13+30 to Station 18+50
  - Grauwyler Road Turnaround from Station 11+80 to Station 17+90
  - Regal Row from Station 7+60 to Station 13+35

Additional Scope Component 3

None

Additional Scope Component 4

None

1.3 Project Requirements

Developer shall design and construct the Project in compliance with requirements in TxDOT's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT Standard Specifications)*. All Elements of the Developer's design shall accommodate the Ultimate Project, as specified in the Contract Documents, such that the Ultimate Project can be implemented with little or no impact on traffic and rework. The Developer's design shall provide for a feasible transition from the Project Scope to the Ultimate Project in accordance with the Contract Documents. Prior to construction of the Project Scope, Developer shall provide to TxDOT a schematic level design showing the transition from the Base Scope to the Ultimate Project. Such design shall include a draft sequence of construction plan, a preliminary traffic control plan, horizontal and vertical alignments, wall locations, cross-sections, and bridge layouts in accordance with TxDOT's Project Development Process Manual, Chapter 2, Section 4 - Preliminary Schematics, paragraph 2360 – Develop Typical Sections. For providing this schematic level design that shows the transition plan, Developer is not required to perform or prepare for any public involvement activities, prepare minute orders, or coordinate with railroad companies, Government Entities or third parties.

Requirements for any portion of the Work are not limited to any individual section of these Technical Provisions and may be addressed within more than one section. Developer shall review and follow all requirements related to the Work as described in all sections of the Technical Provisions.

Certain TxDOT standards, manuals, and other documents are referenced as requirements in the Technical Provisions. If any such standards, manuals, or documents are expressly required in the Technical Provisions, then all work associated with the commitments, statements, requirements and guidelines included in these documents shall be included in the Project. All provisions and guidelines of TxDOT standards and other referenced documents, including figures and tables, shall be interpreted as mandatory, and words such as "should," "may," "could," "can," and "will" shall mean "shall" unless the context requires otherwise, as determined in the sole discretion of TxDOT. The Developer shall disregard qualifying words such as "usually," "normally," and "generally." In addition, references to TxDOT's preferred practices and policies shall be construed to be mandatory requirements unless the context requires otherwise, as determined in the sole discretion of TxDOT. It shall be in TxDOT's sole discretion to determine when the context does not require a provision to be mandatory.

References to mainline and mainlane throughout these Technical Provisions shall include general purpose lanes and managed lanes.

All documents referenced by title in the Technical Provisions, whether or not an issuance date is stated, shall mean the latest referenced document as of the Proposal Due Date. For Renewal Work, these

documents shall mean the latest referenced document as of the date the Renewal Work is shown in the Renewal Schedule.

Other projects located within the vicinity of the Project are under design or are being constructed under separate contracts. Developer shall design and construct the Project and coordinate with other contractors, TxDOT, and other agencies to meet all Project requirements and avoid adverse impacts to other projects. For any components of Work which potentially or actually impact the infrastructure of other contractors, TxDOT or other agency, Developer's design shall conform to the design requirements of such entity. Any existing infrastructure impacted by Work and remaining in place after such Work is completed shall be reinstated to existing or better conditions immediately after such Work is complete. Developer shall locate, configure, and design the Project, including transitions to other projects, so that it is compatible and integrated with other projects and provides a smooth, safe transition of traffic (and other infrastructure) to and from each project. Developer shall provide access to all adjacent project managed lane facilities at all times. Available information of these projects is included in Table 1-1.

Table 1-1: Related Projects

Project	CSJ / Type / Developer	Length (miles)	Limits	Current Status
SH 183 Roadway Resurfacing	0094-07-041	1.535	From East Abutment of Trinity River Bridge To IH 35E	Under Construction (Anticipated Completion Late 2013/Early 2014)
DFW Connector	Design-Build / NorthGate Constructors	Varies	From North Kimball Avenue To International Parkway (along SH 114)	Under Construction (Anticipated Completion in 2014)
North Tarrant Express Segment 2	Concession / NTE Mobility Partners	6.9	From IH 820N Interchange (Northeast Interchange) To Industrial Boulevard	Under Construction (Anticipated Completion in 2015)
I35E Install/Upgrade Roadway Lighting	0442-02-148	3.088	From IH 20 To Loop 12	Anticipated Letting December 2013
SH 161 Construction of New Roadway Lanes	2964-01-022	6.326	From South Conflans Road To North of SH 114	Anticipated Letting January 2014
SH 183 and SH 114 Construction of ADA curb ramps [1]	0918-47-052	Varies	SH 183, Belt Line and Valley View; and SH 114 Intersections	Anticipated Letting June 2014
SH 114 Demolition of Pedestrian Bridges	6261-81-001	N/A	Two bridges between Loop 12 and Spur 482	Anticipated Letting July 2014
SH 114 Truck Lane Restriction Signing	0353-04-097	7.9	From Rochelle Blvd. to the Tarrant County Line	Anticipated Letting August 2014
SH 114 Restriping	TBD	TBD	Rochelle Blvd. to SH 183	Anticipated Letting Fall 2014

Project	CSJ / Type / Developer	Length (miles)	Limits	Current Status
I35E Roadway Resurfacing	0196-03-262	1.95	From North of Commerce Street To 0.5 mi South of Regal Row	Anticipated Letting April 2015
Loop 12 Roadway Resurfacing	0581-01-138	8.406	From Spur 408 To Trinity River	Anticipated Letting May 2014
SH 161 Roadway Repair	2964-01-046	7.307	From SH 183 To IH 635	Anticipated Letting January 2016
SH 360 Roadway Resurfacing	2266-02-138	1.624	From SH 183 To Trinity River	Anticipated Letting January 2016
Diamond Interchange SH 183 / SH 114	0581-02-124 / 0094-03-060	Varies	From East of Carl Road To West of Elm Fork of the Trinity River / From Loop 12 To SH 183	Under Design
CottonBelt Rail (DART) Extension of Orange Line and New Stations	N/A	Varies	DFW Airport to Loop 12	Planning
Trinity Parkway	N/A	TBD	From US 175 To I 35E/SH183 Interchange	Planning
Project Pegasus	0196-03-199	5.96	From IH 30 To SH 183	Project Not Currently in 2035 MTP

[1] Scope of the ADA Project (0918-47-052) is being revised. The Developer shall be responsible for meeting the scope and requirements of the Technical Provisions.

1.4 Operations and Maintenance Requirements

Developer shall operate and maintain all Elements within the Project right of way limits in accordance with the Contract Documents including Sections 19 and 22 of the Technical Provisions. The scope includes varying levels of maintenance within the O&M Limits for the O&M Period generally outlined below but specifically described in Sections 19 and 22:

- Constructed/reconstructed Elements – routine operations and maintenance and renewal work with handback requirements and specific maintenance requirements during the O&M Period.
- Rehabilitated Elements – routine operations and maintenance with specific maintenance requirements at Substantial Completion and during the O&M Period.
- Existing Elements – routine operations and maintenance during the O&M Period.

1.5 Ultimate Project

The Ultimate Project is defined in the environmental documents outlined in Section 4.2.4. The following exceptions apply to the Ultimate Project as it relates to the Diamond Interchange:

a) Managed Lanes Direct Connectors between SH 183 and LP 12 including the traffic direction of the managed lanes
b) Managed Lanes Direct Connectors between SH 114 and LP 12.
c) Center bent and middle two spans of the SH 183 GPL and ML bridges over LP 12
d) Detention facilities in the vicinity of SH 183/ LP12/ SH 114 interchange except as stated in Sections 12 and 13

The following exceptions apply to the Ultimate Project:

a) EB Managed Lane pavement between EGPX Station 3362+00 to Station 3378+10 that is not part of the ultimate General Purpose Lane pavement as shown in the Ultimate Schematic
b) WB Managed Lane pavement between WGPX Station 4308+25 to Station 4378+40 that is not part of the ultimate General Purpose Lane pavement as shown in the Ultimate Schematic

2 PROJECT MANAGEMET

Developer shall establish and maintain an organization that effectively manages all Elements of the Work. This project management effort shall be defined by and follow the Project Management Plan (PMP), which is a collection of several management plan Elements (PMP Elements) describing discrete Elements of the Work as described in Table 2-1. The Project Management Plan is an umbrella document that describes Developer's managerial approach, strategy, and quality procedures to design and construct the Project and achieve all requirements of the Contract Documents. Within the timelines for implementing each Element of the PMP, the plan shall include details of external auditing procedures.

Table 2-1: Elements of the Project Management Plan

Chapter Title	Section of Technical Provisions That Defines the Chapter Requirements
Project Administration	Section 2
Quality Management Plan • **Design Quality Management Plan** • **Construction Quality Management Plan** • **O&M Quality Management Plan**	Section 2
Comprehensive Environmental Protection Plan	Section 4
Communications Plan • **Public** • **Developer Entities** • **Local Government and Stakeholders** • **TxDOT**	Section 3
Safety and Health Plan	Section 2
TxDOT – Developer Communications Plan	Section 2
Affected Third Parties Plan	Section 5
Right of Way Acquisition Plan	Section 7
Maintenance Management Plan	Section 19
Operations Management Plan	Section 22
Emergency Management Plan	Section 2

Chapter Title	Section of Technical Provisions That Defines the Chapter Requirements
Cost Management Plan	Section 2
Risk Management Plan	Section 2

A listing of documents to be included in the Project Management Plan is contained in Attachment 2-1, Project Management Plan Contents, which also indicates when each document must be submitted to TxDOT.

TxDOT shall audit and monitor the activities described in the management plans to assess Developer performance. All commitments and requirements contained in the PMP shall be verifiable.

2.1 Administrative Requirements

2.1.1 Project Schedule

2.1.1.1 General Requirements

Developer shall develop a Project Schedule that defines the timeframe for completion of the Project and achievement of Completion Deadlines. Developer shall use the Project Schedule to monitor progress and denote changes that occur during design, construction and operations and maintenance, as well as serving to determine the amount due to Developer for a progress payment due to the Developer subject to the cap on D&C and O&M payments.

Before the commencement of any Schedule Activity, Developer shall submit to TxDOT for review and obtain TxDOT approval of a Project Baseline Schedule (PBS) in accordance with the Work Breakdown Structure (WBS) defined in Attachment 2-2, Work Breakdown Structure Requirements. Developer shall undertake and complete the planning, design, construction, operation and maintenance of the Work in accordance with the most recent and applicable Schedule approved by TxDOT.

The scheduling software employed by Developer shall be compatible with the current and any future scheduling software employed by TxDOT (currently Primavera 6.2). Compatible shall mean that the Developer-provided electronic file version of a schedule may be loaded or imported by TxDOT using TxDOT's scheduling software with no modifications, preparation, or adjustments to do so.

Developer shall manage and execute the planning, design and construction Work in accordance with the PBS and shall manage and execute the operations and maintenance (O&M) Work in accordance with the O&M Work Schedule.

2.1.1.2 Project Baseline Schedule (PBS)

2.1.1.2.1 General

Developer shall submit a hardcopy of the PBS on full-size (11" by 17") color plot sheets, as well as an electronic version of the schedule in its native format for each submittal along with the project schedule narrative.

Developer is solely responsible for planning and executing the Work and TxDOT's approval of the PBS does not:

- Imply approval of any construction methods or relieve Developer's responsibility to provide sufficient materials, equipment, and labor to guarantee completion of the Project in accordance with the Contract Documents.
- Attest to the validity of assumptions, activities, relationships, sequences or any other aspect of the PBS.

Failure of Developer to include any element of the Work required by the Contract Documents in the approved PBS does not relieve Developer of the responsibility to perform such Work.

2.1.1.2.2 Project Baseline Schedule Overview

Developer shall develop and implement the Project Baseline Schedule in the following stages:

a) PBS-1: Preliminary Project Baseline Schedule submitted with the Proposal.

b) PBS-2: Developer shall use the PBS-1 as a foundation to prepare the PBS-2. Developer shall prepare and submit the PBS-2 to TxDOT for review and approval. PBS-2 shall reflect the intended execution plan to meet all schedule requirements and Completion Deadlines. Developer shall incorporate Final Design elements into the PBS-2 updates as Release for Construction Documents (RFC) plans are issued. Activity quantities related to Schedule of Value costs shall be based upon the Developer's proposed design. The data date for PBS-2 shall be the date of NTP1. Developer shall progress and update the approved PBS-2 monthly until a subsequent version is approved.

c) PBS-3: Developer shall submit PBS-3 to TxDOT on or before six (6) months after NTP2 and shall reflect all Final Design elements to date, final quantity assessment for each scheduled construction activity, the updated plan and completed Schedule of Values reflecting Final Design. Developer shall update PBS-3 monthly until a subsequent revision (PBS-3+) is approved or the Substantial Completion Date, whichever is earlier.

The approved PBS or current approved revised PBS shall remain in force until a subsequent PBS or revised PBS is approved by TxDOT.

Developer shall include a separate narrative report with the PBS which describes the general sequence of design and construction, the proposed Critical Path and all Completion Deadlines.

Developer shall submit the PBS in accordance with the WBS, the minimum requirements of which are included in Attachment 2-2, Work Breakdown Structure Requirements, and the resource and cost loading

requirements set forth in Table 2-2, Schedule Level-of-Detail Requirements. The Developer shall submit the PBS to TxDOT for review and approval. Developer shall map each Schedule Activity to one of the WBS levels and describe each segment of the Work to the same level of detail. At a minimum for reporting Project costs, Developer shall utilize the organizational structure included in Attachment 2-3, Organizational Structure for Cost Reporting.

Table 2-2: Schedule Level-of-Detail Requirements

Discipline	Detail	PBS-1	PBS-2	PBS-3
Right-of-Way Acquisition	WBS Level	4	All levels	All levels
	Cost Loading	No	Yes	Yes
	Resource Loading	No	No	No
	Maximum duration of Schedule Activity	No maximum	20 Days[1]	20 Days[1]
Preconstruction Submittals & Permitting	WBS Level	4	All levels	All levels
	Cost Loading	No	No	No
	Resource Loading	No	No	No
	Maximum duration of Schedule Activity	No maximum	20 Days[1]	20 Days[1]
Utility Coordination	WBS Level	4	All levels	All levels
	Cost Loading	No	Yes	Yes
	Resource Loading	No	No	No
	Maximum duration of Schedule Activity	No maximum	20 Days[1]	20 Days[1]
Design	WBS Level	4	All levels	All levels
	Cost Loading	No	Yes	Yes
	Resource Loading	No	No	Yes
	Maximum duration of Schedule Activity	No maximum	20 Days[1]	20 Days[1]
Utility Relocation	WBS Level	5	5	All levels
	Cost Loading	Yes	Yes	Yes
	Resource Loading	No	No	Yes
	Maximum duration of Schedule Activity	No maximum	No maximum	20 Days[1]

Discipline	Detail	PBS-1	PBS-2	PBS-3
Construction	WBS Level	4	4	All levels
	Cost Loading	No	Yes	Yes
	Resource Loading	No	No	Yes
	Maximum duration of Schedule Activity	No maximum	No maximum	20 Days[1]
Operations and Maintenance During Construction	WBS Level	4	4	All levels
	Cost Loading	No	Yes	Yes
	Resource Loading	No	No	Yes
	Maximum duration of Schedule Activity	No maximum	No maximum	20 Days[1]

[1]Unless otherwise approved by TxDOT.

2.1.1.2.3 Project Baseline Schedule Requirements

Developer shall define a complete and logical plan that can realistically be accomplished for executing the Work. The PBS shall:

a) Reflect the proposed approach to accomplish the Work
b) Include all major activities of Work required by the Contract Documents and also include activities for property acquisitions, Utility Adjustments, permit acquisitions, and interfaces with other projects and Governmental Entities.
c) Indicate the sequence of performing each major activity and the logical dependencies and inter-relationships among the activities and shall provide a sufficient number of activities to assure adequate planning to allow monitoring and evaluation of progress and, if applicable, payments.
d) Include a listing of all submittals and submittal activity durations including specific durations for TxDOT review and/or approval of Developer's submittals.

2.1.1.2.4 Project Baseline Schedule Coding

Developer shall utilize an activity coding structure for the PBS that allows project activities to be sorted by type of work and location of work, or as mutually agreed to by Developer and TxDOT. Each activity shall be assigned an activity code for each Work Element to indicate the type of work related to the activity. Activity codes shall be global code values and shall be as indicated in Table 2-3 below.

Table 2-3: "Type of Work" Code Values

Code Value	Description
AGGREGATE	Granular Base
CLEAR&GRUB	Clear & Grub, Removal
DEMO	Building demolition, other

Code Value	Description
DESIGN	Design, studies, RFC package deliverables
DRAINAGE	Pipe, Box Culvert, Headwall
EXCAVATION	Cut, fill, excavate
FLATWORK	Curb, gutter, sidewalks
LANDSCAPE	Topsoil, mulch, seeding
MOT	Maintenance of Traffic
PAVING	Concrete, Asphalt, etc.
PROCURE	Procurement of materials
ROW	Right-of-Way
SIGNALS	Signals, foundations, poles
SIGNING	Signing - Permanent
STRIPING	Striping - Permanent
SUBSTRUCTURE	Foundation, Columns, Bent, Piles, Abutments (bridge)
SUPERSTRUCTURE	Girders, Deck, Approach Slabs, Parapet, Polymer Overlay (bridge)
SURCHARGE	Consolidation & Settlement Times
TRAIL	Trails - Pedestrian & Bike
UTILITY-COMM	Utility Communication
UTILITY-GAS	Utility Gas
UTILITY-POWER	Utility Power
UTILITY-WATER	Utility Water/Irrigation/Sewer
UTILITY-OTHER	Other Miscellaneous Utilities
WALLS	Noise, MSE, Retaining
NA	Not Applicable – Not on Mainline, Misc, LOE, etc. (Misc. programmatic activities not categorized by Type of Work code)

2.1.1.2.5 Work Breakdown Structure

The PBS shall be organized consistent with the WBS. Developer may add WBS elements and/or levels to those presented in Attachment 2-2 with TxDOT's written approval. Developer shall further develop and detail the initial WBS in accordance with its specific Schedule Activities and retain the ability to summarize to at least the same level as shown in Attachment 2-2 or as approved by TxDOT. Developer shall assign the WBS structure consistently and uniformly among all similar activity types and shall develop the WBS with clearly identifiable linkage to the Schedule of Values and Schedule Activities.

2.1.1.2.6 Calendars

Developer shall define calendars as follows:

a) TxDOT holidays are non-work days.

b) Project calendar descriptions shall begin with a unique project identifier.
c) The application of "Standard" Primavera calendars is not acceptable.
d) Potential non-work weather days are identified and included in each calendar's work month.
e) Adequately represent non-work days associated with limitations (such as paving seasons, utility shutdown seasons, landscaping seasons, etc.)
f) A 7-day calendar to be utilized for cure, settlement, and other activities as appropriate is included.
g) Project calendars are assigned consistently among similar activity types.

2.1.1.2.7 Milestones/Constraints

Each Milestone Schedule Deadline shall be separately identified, conform to the scheduling requirements set forth in the Milestone Schedule, and be assigned a "finish no later than" constraint date. Developer shall include additional milestones in the PBS to define significant events such as NTPs, Substantial Completion, Final Acceptance start and finish of major segments/areas/regions of work, major traffic changes and coordination points with outside entities such as Utilities.

The PBS shall not contain any constrained activities, other than contract milestones, without TxDOT approval. Utilization of constraints following the PBS-2 approval will be allowed only with TxDOT approval.

2.1.1.2.8 Activities

Developer shall describe activities with a unique and logical activity description to easily identify the specific activity so that the scope of work is identifiable and progress on each activity can be measured. Each activity description shall indicate its associated scope and location of work such as type of work, bridge number, station to station locations, side of highway, pipe number, etc. and shall include a verb in the activity description to indicate the action undertaken such as install, place, fabricate, etc. Schedule Activities shall be created so that the Work is broken down into similar manageable work elements with greater detail added as the schedule progresses from PBS-1 to PBS-3 (for example, bridges shall be broken down minimally into foundations, substructure, superstructure, and deck for PBS-3.)

Developer shall define the duration of each activity and shall limit the maximum duration according to Table 2-1 unless otherwise approved by TxDOT. Exceptions could include non-work type activities such as mobilization, design, fabrication, settlement durations, curing and long lead procurement items. The duration for each activity shall be the time required to complete the Work based on the quantity of Work divided by reasonably anticipated production rates when applicable. Separate activities for cure time, major inspection points requiring preparation, submittal periods, environmental approvals and other time consuming activities shall be included.

Developer shall clearly identify the relationships and logic that tie activities together. Each activity is to have at least one predecessor and one successor activity, except for NTP and Substantial Completion milestones. Unnecessary relationships or excessive ties to end milestones shall be avoided.

2.1.1.2.9 Miscellaneous

In developing schedules, Developer shall use schedule software settings similar to Primavera schedule software settings, if not using Primavera, as follows:

a) *Critical activities shall be defined as Longest Path* schedule option setting in lieu of *Total Float Less Than or Equal To x*.
b) *Retained Logic* schedule option setting to calculate the Critical Path and controlling activities in the PBS and subsequent schedule updates.
c) Critical Path shall be highlighted in red on all schedules to distinguish critical Schedule Activities from other Schedule Activities and Float shown for all Schedule Activities.
d) *Leveling Resources* schedule option shall only be used with prior notification to and concurrence of schedule update procedures by TxDOT.

Developer shall cost-load the PBS as follows:

a) Provide a sufficient number of activities so that the budget of any one activity does not exceed $1.0 million in the PBS-3 schedule, unless otherwise approved by TxDOT.
b) Allocate the total dollar amount that represents all of the Work that is reimbursable under Federal Law by the Public Funds Amount (if any) throughout the payment activities in the PBS. Such allocation shall not artificially inflate, imbalance, or front-load line items.

c) Developer's indirect costs such as project management, administration, contingencies, site cleanup and maintenance and security costs related to Project costs shall be prorated through all Payment Activities.

Developer shall revise the cost loading during the course of the Project in Project Baseline Schedule Updates if it becomes necessary to add, combine, eliminate, or modify Payment Activities or Schedule Activities to reflect modifications to the Work due to an executed Change Order. Change Orders as approved by TxDOT shall be added into the schedule with appropriate activities, resources, and units/budget to represent the modified scope of work. A WBS level for each executed Change Order shall be added under the "Change Modification" level of the cost breakdown structure (Table 2 of Attachment 2-3). All costs, if applicable, shall be mapped to the Change Order organizational level accordingly.

If applicable, revisions to the PBS and consequent realignment of funds between Payment Activities shall be requested by Developer through a PCO Notices. The total cost in the schedule shall match the total Project cost inclusive of all approved Change Orders. As activities are added or split out in the course of revising a schedule update, units/budget for those activities shall also be re-allocated to represent the appropriate quantity to accomplish the Work within the activity duration.

All executed Change Orders shall be incorporated into the originally planned execution of the Work. Developer shall submit to TxDOT a revised PBS within 14 days after each Change Order is executed.

2.1.1.2.10 Float

Developer shall not sequester total project float through manipulating calendars, extending activities durations or any other such methodology. Float suppression techniques, negative float, and Schedule Activity durations, logic ties, and/or sequences deemed unreasonable by TxDOT shall not be used. Float shall not be considered as time for the exclusive use of or benefit of either TxDOT or Developer but shall be considered as a jointly owned, expiring resource available to the Project. Float shall not be used to the financial detriment of either party. Any schedule, including the PBS and all updates thereto, showing an

early Substantial Completion Date shall show the time between the scheduled Substantial Completion Date and the applicable Milestone Schedule Deadline as the "Total Float" of the Project.

2.1.1.2.11 Schedule of Values

Concurrent with the PBS, Developer shall submit to TxDOT a complete Schedule of Values for all Payment Activities for TxDOT's approval. TxDOT's approval of the Schedule of Values shall be a condition of NTP2. If applicable, no payment by TxDOT will be made until the Schedule of Values is approved by TxDOT.

Pertaining to the presentation of the Schedule of Values:

a) Payment Activities shall be organized and grouped according to the approved WBS with subtotals for each WBS item at each WBS level. There can be one or more Payment Activities for each of the lowest (terminal) WBS elements in the WBS. For example, earthwork could have one Payment Activity or multiple Payment Activities that roll up costs to the WBS Level element.
b) Each Payment Activity from the PBS shall contain a unique identification number, the activity description, the quantity, the applicable unit, the unit price and scheduled cost value.

The Schedule of Values shall contain separate activities for temporary roads for access, off-site access roads, project clean-up as well as planned maintenance, as applicable, to capture budgeted costs. Developer's project management, administration, QA/QC, contingencies and any allowance for inflation, profit and financing, as well as site security shall be prorated through all Payment Activities so that the sum of all the Schedule of Values line items equals the total Project cost.

If it becomes necessary to add, combine, eliminate or modify any Payment Activities due to changes in the Work, a revised Schedule of Values as derived from a revised PBS shall be submitted within 14 days after the respective Change Order is executed. TxDOT will review the submittal and within 21 days of submission, return it to Developer as approved or returned for resubmission within 7 days from the date of receipt by Developer. Developer shall repeat the submittal process until receiving TxDOT approval of the submittal.

2.1.1.2.12 Project Baseline Schedule Narrative

Developer shall provide a schedule narrative with the PBS-2 schedule and subsequent PBS submittals as follows:

a) Describe the construction philosophy supporting the work plan and approach to the Work outlined in the PBS.
b) Describe the approach used to apply relationships between activities, such as physical or chronological relationships between work activities, sequencing due to crew or equipment resources, or timing of work based on limitations (such as ROW, environmental, utilities, etc.).
c) Describe any limited resources, potential conflicts, or other salient items that may affect the schedule and how they may be resolved.
d) Describe the Critical Path and identify challenges that may arise associated with the Critical Path.
e) Describe adverse weather sources and calculations used for assumptions in determining potential non-work weather days.

f) Describe activity coding structures and how they will be used.
g) Provide a list of planned resources describing crews, crew size, major equipment, and production rates. Only planned resources available to Developer shall be included in the work force listing.
h) Provide a list of applicable activities and justification for usage of:
    - Activities with durations exceeding 20 days
    - Constraints
    - Unusual calendars
    - Assumptions and calculations for non-work weather days added to calendars
    - Lag

Along with the schedule narrative, Developer shall include layouts generated from the scheduling software (PDF format) to illustrate the following:

- Developer's approach to work (based on WBS or other applicable coding) including, at a minimum, columns for activity id, activity name, start, finish, original duration, remaining duration, total float, longest path, budgeted cost, and Gantt chart
- Longest Path layout
- Other layouts or reports as agreed upon with TxDOT

2.1.1.2.13 Project Baseline Schedule Submission

Developer shall establish a sequential numbering system for schedule submittals and associated reports to allow easy identification of PBSs, schedule updates and re-submissions. All schedules, charts and diagrams shall display the project title, the data date and a legend indicating the various symbols used and their meanings. Developer shall provide the following for each schedule submittal:

a) One electronic copy in native software of the schedule
b) One electronic copy in PDF format of the narrative report
c) One electronic copy in PDF format of layouts as generated from the scheduling software

TxDOT will review the schedule submittal and within 14 days of submission, return it to Developer as approved, approved with comments to be addressed in the following schedule update, or returned for resubmission within 14 days from the date of receipt by Developer. Developer shall repeat the submittal process until receiving TxDOT approval of the submittal.

2.1.1.3 Project Baseline Schedule Updates

2.1.1.3.1 Project Baseline Schedule Update Requirements

Developer shall provide schedule updates that comply with all PBS requirements. Data dates for schedule updates shall be the day after the progress period closes. No changes in activity durations, calendar assignments, logic ties, or constraints will be allowed without TxDOT's written approval. Developer shall show actual progress for each activity in the schedule updates such as:

a) Actual start and finish dates for completed activities
b) Actual start dates, physical percent complete and remaining duration for activities in progress
c) Projected sequences of activities for future work

d) Revised relationships and durations for unfinished activities, if warranted
e) A well-defined Critical Path

For each schedule update, Developer shall ensure that:

a) Planned budget values match total Project cost or revised total Project cost inclusive of all authorized Change Orders.
b) All planning changes, adjustments, or revisions in sequencing and timing of the remaining Work are accurately represented.

If Work is performed out of sequence, Developer is required to implement logic changes consistent with the retained logic method of scheduling to allow the out-of-sequence Work to proceed.

Through schedule updates, Developer may demonstrate proposed modifications to planned Work that require adding or deleting activities, changing activity descriptions, or revising activity durations or logic that are consistent with the following requirements:

a) No changes are to disrupt the integrity or comparative relationship between current and previously approved PBSs or schedule updates.
b) An activity ID can only be used once in the approved, proposed or old version of the PBS.
c) Activity descriptions may be revised for clarification, but are not to be altered to represent a different scope than originally intended. For example, an earthwork activity may be further defined by adding station limits but the description cannot be changed to concrete paving with related logic ties.
d) If changes impacting the Critical Path result in an extension of the Substantial Completion date, beyond contractual limits, Developer shall be required to submit a time impact analysis.
e) Cost loaded activities shall not be deleted from the PBS in order to retain the integrity of target baseline schedule analysis. Rather, activities to be deleted shall be progressed to 100% and relationship logic modified / deleted accordingly. Progress irrelevant (to be deleted) activities with actual start and finish dates reflective of the modified update period. Add "DELETED ACTIVITY" in the activity description. Remove driving relationship ties from the subject activity in order to eliminate it from the Critical Path model. Budgeted costs assigned to the deleted activity shall be removed and re-distributed to fragneted detailed activities or similar Type of Work activities. A WBS level shall be created for "Deleted Activities" and assigned to the deleted activity.

2.1.1.3.2 Project Baseline Schedule Update Narrative

Developer shall provide a narrative with each schedule update submittal which addresses each of the following:

a) Description of the Work performed during the progress period. Describe progress for each segment/section and the Project as a whole, including all phases of Work and interim milestones organized and reported by the defined WBS.
b) Provide a summary of QA/QC issues that can potentially affect the Critical Path model.
c) Explanation of deviations between the Work planned and the Work performed for the period.

d) Description of the Work to be accomplished during the next period.
e) Description of the current Critical Path of the project, explaining any changes since the previous update as well as potential issues and proposed resolutions.
f) Explanation of significant changes to the schedule since the previous update including:
    - Providing the reason or justification for the changes,
    - Description of any resulting affects or impacts to the project schedule. Particular focus should be on any changes that affect critical or near-Critical Paths, and
    - Explanation of changes to:
        - Calendar
        - Activity unit/budget allocations
        - Planned resource allocations that deviate from the baseline work plan
        - Critical Path
g) Identification of requested and/or required TxDOT actions, if applicable, for the next month.
h) Status on pending items applicable to the schedule such as:
    - Permits, easements, agreements
    - Contract changes or time adjustments
    - Change Orders that were executed during the period from the submission of the previous month's progress report to the submission of the current progress report
    - Time Impact Analyses
i) Current and anticipated problems or delays including:
    - Listing of current/anticipated problems and/or delays with cause and effect on work, milestones and completion dates. A summary of the resolutions (status) to the problems and/or delays listed above (resolved, ongoing or anticipated).
    - Developer's plans on how to mitigate or resolve ongoing and/or anticipated problem and/or delays.
    - Identification of action TxDOT needs to take and required timeline for actions to be taken, to avoid or mitigate the problem.

A discussion of problems or delay in the schedule update narrative does not relieve Developer of any contractual requirements regarding notification and documentation of claims.

If any actual dates are changed or corrected in any following month, Developer shall submit a separate narrative with the schedule update providing an explanation of the change.

Along with the schedule update narrative, Developer shall include layouts generated from the scheduling software, in PDF format, to illustrate the following:

a) Layout to demonstrate Developer's approach and progress of work based on WBS or other applicable coding. At a minimum include columns for activity id, activity name, start, finish, original duration, remaining duration, total float, budgeted cost, and Gantt chart. The Gantt chart shall contain current planned bars and baseline / target bars that represent the previous period's progress forecast.
b) Longest Path layout organized by WBS and sorted by early start.
c) A 90-day look ahead Gantt chart showing all upcoming Submittals from Developer and approvals

required by TxDOT or other Governmental Entities.

d) A 90-day look ahead Gantt chart grouped by WBS and sorted by early start date.
e) Graphical report which compares Developer's actual monthly progress to the previous months planned progress, organized by WBS
f) A 90-day look ahead Gantt chart of Design document submittals for the forthcoming period
g) Monthly expenditure projections and cash expenditure curves by WBS or as requested by TxDOT, if applicable
h) Other layouts or reports as agreed upon or requested by TxDOT.

Progress payment requests, if applicable, shall accompany the schedule update narrative.

In addition to the schedule update narrative, Developer shall provide a separate report on the Milestone Schedule Deadlines showing the schedule dates for the immediate prior month and the current month. For variances greater than 30 Days, Developer shall include a narrative to explain why the dates have changed.

2.1.1.4 Project Baseline Schedule Update Submission

Developer shall submit to TxDOT the schedule update, narrative and agreed upon layouts or reports each month during the life of the D&C Period beginning with the first full month after NTP2. Developer shall provide the following for each schedule update submittal:

a) One electronic copy in native software of the schedule file
b) one electronic copy in PDF format of narrative report
c) one electronic copy in PDF format of, agreed upon, layouts/reports as generated from the scheduling software
d) The project narrative as described in Section 2.1.1.3.2 above.

TxDOT will review schedule updates for consistency with Developer's WBS and the currently approved PBS and for conformance with the Contract Documents. TxDOT will return the schedule updates to Developer as approved, approved with comments to be addressed in the following schedule update, or not approved with comments to be incorporated for resubmission within 14 days of receipt by Developer. The submittal process shall be repeated until receiving TxDOT approval of the submittal.

2.1.1.5 As-Built Schedule

Upon completion of the Punch List, Developer shall submit the schedule update identified as the "as-built schedule". The as-built schedule shall reflect the exact manner in which the Work up to each Final Acceptance and described by the Contract Documents was actually performed including start and completion dates, Schedule Activities, actual durations, sequences and logic.

2.1.1.6 Time Impact Analysis

Developer shall submit to TxDOT a written time impact analysis (TIA) in each of the following situations:

a) As part of a PCO Notice based on a delay as set forth in Contract Documents.
b) If any changes in a schedule update impact the Critical Path, such that they create an extension of the Substantial Completion Date beyond the Substantial Completion Deadline.

c) If the Developer has claim for delay. Developer shall submit a separate TIA for each delay event.

TxDOT may request, at any time, a TIA demonstrating impact or potential impact to the schedule resulting from claimed delays or Change Orders between TxDOT and Developer. If TxDOT requests a TIA, Developer shall submit the requested TIA within 15 Days of receiving the request. TxDOT will return the TIA to Developer as approved or not approved with comments to be incorporated for resubmission within 7 days of receipt by Developer. The submittal process shall be repeated until receiving TxDOT approval of the submittal.

Submission of a TIA does not relieve Developer of any contractual requirements regarding notification and documentation of potential Change Orders and Change Orders.

Time extensions will only be considered if:

a) The delay event is demonstrated to affect the controlling operation on the Critical Path. Changes that do not affect the Critical Path will not be considered as the basis for a time adjustment,
b) The total float is absorbed and the scheduled completion date is delayed one or more working days because of the change or impact, and
c) In the case of multiple lines of negative Float, the proposed change or delay must cause the affected path to exceed all others.

Each TIA submitted by Developer shall consist of the following steps or elements:

a) Establish the status of the Project before the impact by using the most recent schedule update that has the closest data date prior to the event for TIA, or as adjusted by mutual agreement.
b) Identify the impact event, estimate duration of the impact, determine appropriate logic, insert the impact activity or fragnet of activities into the schedule, and progress the schedule.
c) Demonstrate any resulting affects from the impact through layouts generated from the scheduling software. Filter activities to show added or modified activities and activities impacted from changes. Note any other changes made to the schedule including modifications to the calendars or constraints.
d) If the current Project Baseline Schedule update is revised subsequent to submittal of a time impact analysis but prior to its acceptance, Developer shall promptly indicate, in writing, to TxDOT the need for any modification to its time impact analysis.

Developer shall submit the following with each TIA Submittal:

a) A narrative report which:
    - Identifies the schedule update(s) used for analysis.
    - Describes the procedures used to analyze schedule impacts, including:
        - Additions, deletions, or modification to activities and or fragnets
        - Modifications to the calendars or constraints
        - Modifications to relationships
    - Describes the impact or potential impact by comparing Work prior to the impact and Work affected or predicted to be affected after the impact.
    - Describes mitigation efforts taken to date.

- Describes potential resolutions to mitigate or avoid impact.

b) Schedule layouts in PDF format. Filter activities to clearly show impacted activities and affects to the Critical Path. Multiple layouts may be required to adequately demonstrate the impact to the Critical Path. At a minimum, provide a layout demonstrating associated activities prior to the impact and a layout demonstrating associated activities after the impact is inserted and the schedule is progressed.
c) One electronic copy in native software of the impacted PBS
d) Other information or documentation pertinent to the analysis.

Incorporation of TIA activities into the current schedule update submittal requires TxDOT approval.

2.1.1.7 Recovery Schedule

If the Work is or is anticipated to be delayed beyond the Substantial Completion Deadline for a period which exceeds the greater of either thirty (30) days in the aggregate or that number of days in the aggregate equal to five percent of the days remaining until Final Acceptance, the next schedule update shall include a recovery schedule demonstrating the proposed plan to regain lost schedule progress and to achieve Final Acceptance of the Project by the specified date.

If the recovery schedule is required hereunder, Developer shall have no right to receive settlement of a payment request until such time as Developer has prepared and TxDOT has approved the recovery schedule.

If the PBS-3+ schedule performance index values of the Project during the D&C Period falls below 0.65 with negative trending for 4 consecutive update periods, TxDOT has the option of requiring the Developer to resource load the remaining construction activities and perform a resource analysis of the required work force. If required, resources shall be incorporated into the PBS per the following requirements:

a) Provide a list of personnel or crews with associated labor and equipment resources to TxDOT with the schedule submittal.
b) Define crews as a labor resource type and assign to appropriate activities.
c) Provide TxDOT with a definition, the composition of and production rate for each personnel/crew type.
d) Do not include any costs for labor resources and do not calculate cost from units.
e) The "quantity" assigned to each activity shall represent the estimated efforts in place for the Schedule Activity value.

2.1.1.8 Operations and Maintenance Work Schedule (O&M Work Schedule)

Developer shall assemble a separate Critical Path schedule (O&M Work Schedule) to coordinate, manage construct and/or perform maintenance activities including Renewal Work. The O&M Work Schedule shall be sufficiently detailed to indicate the timing of periodic maintenance activities, rehabilitation activities, Renewal Work, and planned improvements, and shall be consistent with the requirements contained in Sections 19 and 22.

During the O&M Period, the Schedule Updates shall be submitted annually beginning no later than 90 Days prior to each calendar year and ending at Final Acceptance of the Work.

The O&M Work Schedule shall be developed utilizing the WBS and conform to the Project Baseline Schedule requirements including the Schedule Level-of-Detail Requirements shown in Table 2-2 or as approved by TxDOT.

An O&M Work Schedule narrative shall accompany any schedule submittal describing the schedule update. The narrative shall meet the requirements of the Project Status Schedule Update Narrative.

2.1.2 Document Management

All electronic information submitted to TxDOT shall be searchable and legible.

2.1.2.1 Document Storage and Retrieval Requirements

Developer shall establish and maintain an Electronic Document Management System (EDMS) to store, catalog, and retrieve all Contract Documents using the applicable control section job (CSJ) numbers. Unless otherwise directed by TxDOT, record retention shall comply with the requirements of the *Texas State Records Retention Schedule*, and shall be provided to TxDOT at the time of the expiration or earlier termination of the Agreement.

Maintenance records shall utilize the same format TxDOT utilizes, or a TxDOT approved alternative, for its statewide asset inventory and condition assessments and shall be capable of being integrated into TxDOT's maintenance management systems.

Construction quality acceptance test results shall be automatically transmitted to TxDOT's I2MS system using TxDOT's extensible markup language (XML) web service. A sample is shown in Attachment 2-4, I2MS Test Form Fields. Developer shall coordinate with TxDOT to obtain the most current version prior to commencing construction quality acceptance testing. The responsible technician and his/her supervisor shall sign the daily test reports and the results of the daily tests shall be provided to TxDOT within 48-hours after test completion.

In the provision of a document management system, the Developer shall:

a) Use data systems, standards and procedures compatible with those employed by TxDOT and implement any new operating practices required as a result of TxDOT's amendments to any such systems, standards and procedures.
b) Provide a secure location for any interface as may be provided by TxDOT, such that only authorized users have access and that it is protected from loss, theft, damage, unauthorized or malicious use.
c) Employ appropriate standards and procedures, and train Developer personnel to operate any TxDOT data management system which TxDOT may require in connection with the Project.
d) Provide a mechanism for the electronic transfer of metadata along with the associated portable document format (PDF) images for uploading into an EDMS employed by TxDOT.

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

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

2.1.2.2 Design Visualization

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

2.1.2.2.1 Services to be Provided by TxDOT

The type of available data may vary dependent on the level of project development. Typical types of data the TxDOT will provide to the Developer if available are:

a) Data that TxDOT has on file concerning the project, if available. Examples include as-built plans, field notes, etc.)
b) Electronic data of topography, roadway alignments and edge lines, pavement markings, criteria files, cross sections, and Digital Terrain Models TxDOT or their consultant contractor have concerning the project.
c) Drawings, sketches, renderings or photographs of special design elements such as, sidewalk paving materials, crosswalk details, landscaping, and any architectural treatments, if available.
d) Elevation data that may be needed in some areas where the terrain changes abruptly and special design features are required, such as retaining walls or elevated structures.

2.1.2.2.2 Services to be Provided by the Developer

Developer shall provide accurate three-dimensional models that depict the Project. Completed models will represent realism and aesthetic attributes of the existing conditions and the proposed Project. The Developer will add roadway design details to the model that are not normally provided at the stage of schematic design and verify that the schematic design complies with design guidelines presented in the TxDOT Roadway Design Manual, Texas MUTCD, and the AASHTO Green Book.

The design visualization models shall show existing and proposed design conditions either separately or combined in the same display. Based on specific project requirements the final design visualization deliverables may include photo-matched renderings, rendered plan view layouts, and animated sequences. Developer shall provide a three dimensional CADD model of the completed project and any work product generated during the modeling process such as site photographs, textures, material assignments, and additional terrain information. All CADD data should be in electronic format and native to TxDOT's CADD architecture using Bentley Systems, Inc. MicroStation to provide complete compatibility between the contractor and TxDOT. The current CADD architecture and standards can be viewed at http://www.txdot.gov/business/contractors_consultants/v8.htm.

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

2.1.2.2.3 Design Visualization Services – Photo Rendering and Exhibits

The Developer shall provide photo renderings of no more than ten (10) locations to be determined by TxDOT.

The Developer shall coordinate with TxDOT the location of the photographs. The Developer shall take a minimum of two existing condition photographs at each of the ten (10) locations. These photographs will serve as the basis for the photo-renderings.

The Developer shall provide two (2) mounted "before" images and two (2) mounted "after" static 3D photo matched images of proposed design elements at each of the ten (10) locations.

The computer model shall accurately depict the geometric design of the proposed improvements at each of the ten (10) locations that would cover the limits of the existing condition photographs. Engineering judgment will be used for definition of slope, retaining wall, bridge abutment placement, and other physical features that may not be readily apparent from the design schematic. The computer model is intended to be used by TxDOT for public information purposes.

All CADD work and resulting data will duplicate TxDOT's existing CADD architecture to ensure total compatibility. This data shall be delivered in native format using Bentley Systems, Inc. MicroStation and GEOPAK or match present versions in use by TxDOT. Specific TxDOT data/configuration for GEOPAK and geometric design will be used. 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 or effort by the end user. The current CADD architecture and standards can be viewed at http://www.txdot.gov/business/contractors_consultants/v8.htm.

2.1.2.2.4 Design Visualization Services – 3-D Computer Model

General Requirements

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

The Developer shall prepare topographically accurate 3D computer models for ten (10) locations.

The computer model will accurately depict the geometric design of the proposed improvements at each of the ten (10) locations and associated interchanges. Engineering judgment will be used for definition of slope, retaining wall, bridge abutment placement, and other physical features that may not be readily apparent from the design schematic. The computer model will also incorporate existing features in the corridor out to a distance of approximately 500-feet either side of the roadway centerline, but up to 750 feet as needed.

All CADD work and resulting data shall duplicate TxDOT's existing CADD architecture to ensure total compatibility. This data shall be delivered in native format using Bentley Systems, Inc. MicroStation and GEOPAK or match present versions in use by TxDOT. Specific TxDOT data/configuration for GEOPAK and geometric design shall be used. 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 or effort by the end user. The current CADD architecture and standards can be viewed at http://www.txdot.gov/business/contractors_consultants/v8.htm.

Design Requirements

Developer shall utilize 3-D methodologies and techniques to incorporate the Draft Schematic into Developer's project integrated design files. Developer's 3-D Design shall facilitate the coordination and accommodation of the Ultimate Scope and any asset management considerations as it relates to operations and maintenance.

A. Geometric Design Requirements

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

Developer shall utilize 3-D methodologies and techniques to develop the geometric design and the 3-D Design model for each proposed roadway and incorporate it into the Project's integrated design models. All geometric design shall be prepared in accordance with these Technical Provisions:

a) Refine and finalize horizontal and vertical alignments for all collector-distributors, frontage roads, ramps, direct connectors, cross roads, pavement transitions and tie-ins to existing lanes.
b) Determine horizontal and vertical clearances at grade separations, underpasses, and overpasses.
c) Develop superelevation and superelevation transition designs for each roadway. Verify rollover constraints are adequately addressed: including ramp, collector-distributor, and direct connector gore locations.
d) Integrated design model deliverables shall consist of 3-D MicroStation file(s) containing 3-D graphical elements (components, contours, superelevation transitions limits, existing and proposed finish grade triangles) representative of the design model, and .dtm or .tin surface files.

Developer shall include key existing and proposed 3-D Design features for the following elements of the Work in accordance with the Technical Provisions:

a) Roadway (including, at a minimum: managed lane pavement and barrier walls, general purpose pavement, frontage road pavement, locations of ramps entering and exiting the managed lanes to the general purpose lanes, and locations of ramps entering and existing the general purpose lanes to the frontage roads)
b) Drainage
c) Structures (including, at a minimum: sufficient detail to show top of deck surface, structure type, bottom of beam surface, and pier, abutment and retaining wall locations)
d) Utilities
e) Signing (including, at a minimum: overhead span or cantilever sign structure locations and structure type)
f) Lighting (including, at a minimum: pole and foundation locations)
g) Signals (including, at a minimum: controller, pole and foundation locations)
h) Toll Infrastructure (including, at a minimum: structure type; not to include detailed elements related to toll gantries or elements inside buildings).
i) Aesthetic Concepts and Elements (including, at a minimum: form, shapes, scale, textures and colors)

j) Landscaping

B. Immersive 3-D Over the Shoulder Milestone Review Meetings

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

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

- View the model and manipulate view settings to interactively change data display on screen (e.g. pan, rotate, walk, fly, zoom, etc.).
- Measure distances and areas throughout all areas of the model.
- Reference baseline geometry, stationing, and existing and proposed right of way.
- Dynamically visualize key existing and proposed design features and detect conflicts/clashes amongst the following disciplines:
  a) Roadway (including, at a minimum: managed lane pavement and barrier walls, general purpose pavement, frontage road pavement, locations of ramps entering and exiting the managed lanes to the general purpose lanes, and locations of ramps entering and existing the general purpose lanes to the frontage roads)
  b) Drainage
  c) Structures (including, at a minimum: sufficient detail to show top of deck surface, structure type, bottom of beam surface, and pier, abutment and retaining wall locations)
  d) Utilities
  e) Signing (including, at a minimum: overhead span or cantilever sign structure locations and structure type)
  f) Lighting (including, at a minimum: pole and foundation locations)
  g) Signals (including, at a minimum: controller, pole and foundation locations)
  h) Toll Infrastructure (including, at a minimum: structure type; not to include detailed elements related to toll gantries or elements inside buildings).
  i) Aesthetic Concepts and Elements (including, at a minimum: form, shapes, scale, textures and colors)
  j) Landscaping

2.2 Quality Management Plan

Developer shall submit a comprehensive Quality Management Plan to TxDOT for approval that is consistent with and expands upon the preliminary Quality Management Plan submitted with the Proposal. The Quality Management Plan shall comply with ISO standards for quality systems, quality plans and quality audits. Developer may elect, but will not be required, to obtain formal ISO 9001 certification. The Quality Management Plan shall also comply with the provisions of the TxDOT Design-Build Quality Assurance Program.

2.2.1 General Requirements

Developer shall develop, implement, and maintain the Quality Management Plan for the Term of the Agreement. The Quality Management Plan shall describe the system, policies, and procedures that ensure

the Work meets the requirements of the Contract Documents and provides documented evidence of meeting these requirements.

The complete Quality Management Plan shall incorporate the following features:

a) Developer shall make all quality records immediately available to TxDOT for review. Developer shall provide TxDOT with a copy of any and/or all quality records when requested.
b) The Quality Management Plan shall encompass all Work performed by Developer and Subcontractors of all tiers.
c) Developer shall submit to TxDOT the results of all internal audits within seven (7) Days of completion.
d) Developer shall promptly submit to TxDOT non-conformance reports both upon issuance and resolution.

The Quality Management Plan shall contain detailed procedures for Developer's quality control and quality assurance activities. Developer's quality process shall incorporate planned and systematic verifications and audits undertaken by an independent party. Developer shall conduct all quality control, quality assurance, performance verification, and design overlay and coordination among design disciplines, all in accordance with the Quality Management Plan and the requirements of the Contract Documents.

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

2.2.2 Quality Terminology

Quality terminology, unless defined or modified elsewhere in the Contract Documents, shall have the meaning defined in ISO 9001. Terms used in ISO 9001 shall have the meanings defined below:

a) Organization: Developer's organization, including any Affiliates and Subcontractors.
b) Customers: the Users of the roadways, TxDOT, Customer Groups, and key stakeholders that have an adjacent property interest or connecting roadway.
c) Product: the Work.

2.2.3 Quality Management Organization

Developer shall regularly maintain the Quality Management Plan to contain current versions of the following information:

a) The organizational chart that identifies all quality management personnel, their roles, authorities and line reporting relationships.
b) Description of the roles and responsibilities of all quality management personnel and those who have the authority to stop Work.

c) Identification of testing agencies, including information on each agency's capability to provide the specific services required for the Work, certifications held, equipment, and location of laboratories for products produced both on and off the Project site.
d) Resumes for all quality management personnel.

2.2.4 Quality Policy

The Quality Management Plan shall contain a complete description of the quality policies and objectives that Developer will implement throughout its organization. The policy shall demonstrate Developer's commitment to implement and continually improve the quality management system for the Work.

2.2.5 Inspection and Testing

The Quality Management Plan shall contain detailed descriptions of the inspection and test plans, including the timing, quantities represented and frequency of testing, that Developer will use to meet quality control and quality assurance requirements of the Work.

Developer shall revise its Quality Management Plan when its own quality management organization detects a systemic or fundamental non-conformance in the work performed or in the manner the Work is inspected or tested, or when TxDOT advises Developer of such a problem.

2.2.5.1 TxDOT Construction Notices

On a weekly basis, Developer shall provide TxDOT with a rolling three-week inspection notice. The inspection notification shall include the fabrication schedule and planned construction activities for items where TxDOT is performing the fabrication inspection.

2.2.5.2 Reporting, Recordkeeping, and Documentation

Developer shall develop and maintain inspection and testing records that include, but are not limited to:

a) Quality control inspection reports and process control material sampling/testing results and control charts shall be submitted to TxDOT within twenty-four (24) hours following the inspection or test.
b) The Construction Quality Acceptance Firm (CQAF) shall maintain, electronically, a daily log of all inspections performed for both Developer and Subcontractor operations in a format acceptable to TxDOT and transmitted to TxDOT daily. The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed. The responsible technician and supervisor shall sign the daily inspection reports. The results of the daily inspections shall be provided to TxDOT in an electronic format within twenty-four (24) hours after the work shift.
c) The CQAF shall be responsible for establishing an electronic system for recording all material test results. The responsible technician and his/her supervisor shall sign the daily test reports. The results of the daily test shall be provided within one (1) Day of test completion.

The CQAF's inspection and materials quality program shall electronically store all source documents and deliver the laboratory and field test results to TxDOT in the database format provided in Attachment 2-4. This electronic reporting is intended to allow the Developer and TxDOT to make timely and accurate decisions on workmanship and material quality issues.

2.2.5.3 Laboratory Requirements

Developer shall perform testing in accordance with, but not limited to:

a) Quality acceptance tests shall be conducted by the CQAF's testing laboratory identified in the CQMP that complies with the requirements of the AASHTO Accreditation Program (AAP) or other appropriate accreditation acceptable to TxDOT for the pertinent test. A copy of AAP accreditation certificate(s) shall be transmitted to TxDOT upon their receipt by the testing laboratory.
b) Equipment in all laboratories shall be certified by AASHTO or TxDOT as applicable prior to commencing any construction activities and for the duration of the Work.

2.2.5.4 Supply Source and Material Quality

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

2.2.6 Responsibility and Authority of Developer Staff

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

Developer's Lead Quality Manager and quality assurance staff shall have no responsibilities in the production of the Work. Quality control staff shall only have responsibilities in the production of the Work and shall remain independent of the quality assurance staff.

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

Developer's Lead Quality Manager, Quality Assurance Manager, and Quality Control Manager(s) shall have the authority to stop Work for quality-related issues.

2.2.7 Design Quality Management Plan

Developer shall prepare and submit to TxDOT for review and approval a Design Quality Management Plan (DQMP) that describes its policies, procedures, and staffing to manage design quality in accordance with the requirements of this Section 2.2.7.

2.2.7.1 Release for Construction Documents

Developer shall submit to TxDOT all Released for Construction Documents in accordance with the submittal requirements of the Design Quality Management Plan. Developer's Released for Construction Documents shall comply with the requirements of the Contract Documents, and shall be detailed, complete, constructible, and shall allow verification of the design criteria and compliance with Contract Documents.

Not later than two (2) Business Days after Developer has completed design of any particular Released for Construction Document, Developer shall submit the signed and sealed document to TxDOT.

The Developer shall prepare and provide all Project-related Submittals and documents using English units of measure.

The Developer shall furnish electronic copies of all Submittals i in accordance with Section 2.1.2. Unless otherwise stated in the Contract Documents, the Developer shall provide to TxDOT four paper copies and a single electronic copy of each Submittal. Each Submittal shall have the signature of an authorized representative of the Developer, unless otherwise expressly stated for a particular Submittal. The electronic copy shall be in a suitable format (e.g. PDF) or in the format in which the Work was originally created unless stated otherwise in the Contract Documents.

The Developer shall include with each Submittal a transmittal cover sheet in a form acceptable to TxDOT.

The minimum sheet size for the Submittals shall be 8.5 inches by 11 inches. The maximum sheet size shall be 36 inches by 120 inches. Every page in a Submittal shall be numbered in sequence.

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

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

Design deliverables shall include a title block, consistent with the standard Project drawing format established as part of the Quality Management Plan, with the following information:

a) Date of issuance and including all prior revision dates.
b) Contract title and number.
c) The names of the Developer and applicable Affiliates.
d) Stage of development.
e) Reference to applicable Technical Documents and amendments.
f) If required, review and acceptance or approval from a Governmental Entity, prior to submission to TxDOT.
g) Review stamp.
h) Action block space – All deliverables shall include a sufficient blank space in which the Developer may list required actions to be taken.
i) When calculations accompany drawings in a Submittal, cross-references from the body of the calculations to the individual drawing to which the pages of the calculations pertain.
j) Organization of the CAD drawings and associated documents in a logical manner, having a uniform and consistent appearance, and clearly depicting the intention of the design.

2.2.7.2 Record Drawings and Documentation

Within ninety (90) Days of Final Acceptance of all or part of the Project, Developer shall submit to TxDOT a complete set of Record Drawings in hard copy and electronic, both native and PDF, format for

the portion of the Project actually opened to traffic. The Record Drawings and documentation shall be an organized, complete record of Plans and supporting calculations and details that accurately represent what Developer constructed.

Developer shall ensure that the Record Drawings reflect the actual condition of the constructed Work. Developer shall submit to TxDOT the electronic files used to prepare the Record Drawings and documentation.

2.2.7.3 DQMP General Requirements

The DQMP shall describe and include the following general requirements:

a) The quality control and quality review procedures for Professional Services products shall be organized by discipline (such as structural, civil, utilities). These procedures shall specify measures to ensure that appropriate quality requirements are specified and included in the Professional Services product and to control deviations from such requirements.
b) Specific quality control and quality review procedures, including all required forms and checklists, shall be specified for preparing, verifying and checking all Professional Services products to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices in the State of Texas and the requirements of the Contract Documents. The checking of structural design shall include a set of independent calculations performed by the Developer's Design Firm for all structural elements.
c) The designer and checker shall be clearly identified on the face of all Final Design Documents. The DQMP shall also include specific procedures for verifying the Professional Services product along with any computer programs being used for such purposes. Design Documents shall be stamped, signed and dated by the engineer in responsible charge for that item, element, or phase of the Work.
d) Procedures shall be described for coordinating Professional Services performed by different individuals or firms working in the same area, in adjacent areas, or on related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings or between the drawings and the specifications. This shall also include the coordination of the review, approval, release, distribution and revision of documents involving such parties.
e) Procedures shall: (1) ensure that Developer personnel are familiar with all the provisions of the Contract Documents concerning their respective responsibilities; (2) provide for the education, training and certification, as appropriate, of personnel performing activities affecting or assessing the quality of the Work to assure that such personnel achieve and maintain reasonable proficiency; and (3) ensure that the Work is performed according to the DQMP, generally accepted engineering practices in the State of Texas and the Contract Documents.
f) Procedures shall be established for meeting documentation requirements; the filing of design criteria, reports and notes, calculations, plans, specifications, schematics, and supporting materials needed during the Final Design; and the specific responsibilities of personnel to satisfy these requirements. All Design Documents shall be maintained, organized and indexed by Developer and copies made available to TxDOT upon request.
g) Procedures and schedules for the Professional Services Quality Control Manager to perform audits of the Design Firm's quality control procedures under the DQMP.

2.2.7.4 Personnel and Staffing

Professional Services Quality Control Manager - Developer shall assign a Professional Services Quality Control Manager (PSQCM) who shall be responsible for management of quality control program for the design, environmental, ROW, Utilities, and survey. The PSQCM shall not be involved with direct scheduling or production activities and shall report directly to Developer's management team. The PSQCM shall see that the methods and procedures contained in the approved DQMP are implemented and followed by Developer design staff in the performance of the Work. The PSQCM shall be a Registered Professional Engineer.

Personnel in Responsible Charge - Developer shall designate (by name) the personnel in responsible charge for each item, element, or phase of the Work. The personnel in responsible charge shall possess the necessary registrations in the State of Texas and shall be personally responsible for directly supervising the Work and will stamp, sign, and date the Professional Services product for a given item, element, or phase of the Work as applicable.

Reviewing Professional Services - The Developer personnel performing the quality control check of the Professional Services shall not be directly involved with the original development of the item, element, or phase being checked.

2.2.7.5 Professional Services Submittal Review Process

Developer shall conduct a series of working meetings with its Professional Services staff, the internal quality control of Developer staff and TxDOT to establish workflow processes and procedures to be utilized during the design review process that are consistent with the Contract Documents. The working meetings are also to develop an understanding on general design concepts such as geometrics, aesthetics, drainage, traffic control, and structures.

Developer and TxDOT shall collaborate and mutually agree upon (i) a list of proposed sections (i.e., Station x+xx to Station y+yy) for the Work; (ii) Professional Services packaging and content (such as drainage, individual structures, roadway, traffic sequencing, and others); (iii) a list of mandatory submittals; and (iv) a proposed submittal schedule. The Professional Services reviews shall be evenly scheduled over the duration of the Professional Services phase of the Work. Sections and packages shall be logically organized into manageable pieces and shall contain sufficient information and details to confirm Developer intent and to validate conditions. Developer shall obtain TxDOT's written approval of the sections, packages and contents, the schedule, and the methodology prior to making the first submittal.

The PSQCM shall chair the submittal reviews with TxDOT and Developer shall maintain formal documentation of these meetings for TxDOT's audit.

The purpose of the submittal reviews is for TxDOT to review Professional Services products for general compliance with Project requirements, sound engineering practice, applicable Law, the Governmental Approvals, and the Contract Documents. All submittals are subject to review and comment by persons designated in the Technical Provisions.

If the Developer and TxDOT cannot come to an agreement on the list of mandatory submittals, the following list shall be provided at minimum:

- Corridor Structure Type Study and Report submittals
- Preliminary Bridge Layout submittals
- Preliminary Design submittal
- Final Design Submittal
- Any deliverables described in the Technical Provisions
- Exhibits Supporting railroad agreements
- Design Exceptions and Design Waiver Requests

2.2.7.5.1 Final Design Submittal

The Final Design Submittal shall be submitted to TxDOT for general review and the PSQCM shall provide certification of compliance. Construction packages for individual Work items, elements, or phases shall be organized such that the final document package can be assembled in a manner similar to the standard construction documentation typically provided to TxDOT for conventional project letting, as mutually agreed upon by Developer and TxDOT.

When Developer has completed the Final Design Submittal for an item, element, or phase and wishes to obtain TxDOT's concurrence of such a design, the PSQCM shall certify that:

a) The design meets all applicable requirements of the Contract Documents, applicable Law and the Governmental Approvals.
b) The design has been checked in accordance with Developer's approved DQMP.
c) The item or element is ready for construction.
d) Developer has obtained all required ROW, Governmental Approvals, and Utility Owner approvals.

The Final Design Submittal shall be complete Design Documents incorporating all of the design submittal review comments. All documentation, including copies of TxDOT's approval of deviations for design standards and/or Design Exceptions shall be provided with the Final Design Submittal.

Prior to certifying the above items, elements, or phases, and upon review and comment of the Final Design Submittal by the TxDOT, PSQCM shall schedule a formal review with TxDOT.

2.2.7.5.2 Formal Review

PSQCM will conduct a formal review presentation to TxDOT at a location acceptable to TxDOT. The formal review presentation will be held following the TxDOT's review and comment of the mandatory submittals.

At least five (5) Business Days prior to the applicable formal review presentation dates, Developer will assemble and submit drawings or other documents to TxDOT for information and review.

Draft minutes of formal review presentations shall be submitted to TxDOT by PSQCM within five (5) Business Days after completion of each review.

2.2.7.6 Resubmittal Process

Resubmittals of any design submittal may be required if deemed necessary by TxDOT or any Governmental Entities with jurisdiction over the Project. Each resubmittal must address all comments received from a prior submittal in a manner satisfactory to the commenting party. Submittals shall be resubmitted as many times as necessary to address comments from TxDOT or any Governmental Entity with jurisdiction over the Project.

If TxDOT had requested additional information during the final formal review, PSQCM will conduct an additional formal review of the resubmitted items, elements, or phases. A copy of all correspondence relating to each submittal made to any Governmental Entity with jurisdiction over the Project shall be concurrently provided to TxDOT.

2.2.7.7 Certification of Compliance

PSQCM shall verify that Developer obtained approval from applicable Governmental Entities and Utility Owners prior to the issuance of a "Certification of Compliance" designation of the Design Documents by the PSQCM. Following issuance of a "Certification of Compliance" by the PSQCM, TxDOT shall review and provide written concurrence.

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

a) Design drawings
b) Design calculations
c) Design reports
d) Specifications
e) Electronic files
f) Documentation required for all Final ROW
g) Governmental Approvals
h) Utility Owner approvals

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

Construction on any item, element or phase covered by the PSQCM's certification of compliance of said item, element, or phase shall only progress to the extent covered by the Design Documents included in that statement except for the Work performed in accordance with Section 2.2.7.9. Prior to progressing further with construction of a certified package, Developer shall complete the next item, element or phase of design or complete the Final Design, and obtain TxDOT's concurrence, except for the Work performed in accordance with Section 2.2.7.9. Any items, elements or phases of design, subsequent to the

certification of compliance from PSQCM, shall be checked and certified by the PSQCM in the same manner indicated above.

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

If there is evidence that the DQMP procedures are not adequate, as evidenced by TxDOT's oversight reviews or problems during construction, TxDOT may, at its sole discretion, withhold payment for design and construction until sufficient DQPM procedures are in place. If construction is in progress, TxDOT may suspend ongoing Work represented by the deficient design and require correction of design and/or construction defects.

Developer shall provide quantity estimates for Work covered by Final Design Documents. The quantity estimates shall be in units consistent with the quality acceptance and quality review sampling and testing requirements in the DQMP.

2.2.7.8 Design Changes

Developer or TxDOT may initiate design changes. Design changes may occur either on items, elements, or phases undergoing construction or after Final Design. In order to process these types of changes, Developer shall submit, when the problem or change occurs, a Request for Information (RFI) for TxDOT's approval.

All design changes submitted under the RFI procedure shall undergo the same DQMP checks as the original design.

The designer responsible for the original design shall approve design changes during construction, or design changes to Final Design Documents in writing. If the original designer is no longer available, then after notification to the original designer, an experienced Registered Professional Engineer shall provide documentation of design changes. All plans, final submittals, specifications, calculations, and reports for design changes shall be stamped, signed and dated by a Registered Professional Engineer. In all cases, the PSQCM shall certify in writing that the design change has been:

a) Designed in accordance with the requirements of the Contract Documents, applicable Law and the Governmental Approvals,
b) Checked in accordance with Developer's approved DQMP, and
c) Prepared consistently with other elements of the original design.

Developer shall request and schedule interim and final RFI formal design review(s) by TxDOT for all design changes made during construction or to the Final Design Plans. All changes made through the RFI process shall be documented in the As-Built drawings.

2.2.7.9 Early Start of Construction

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

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

Any Work constructed by Developer prior to receiving TxDOT's concurrence of the Final Design Submittal for the Work, and later determined to be unacceptable by TxDOT in its sole discretion, shall be revised, removed, or otherwise reconfigured to the satisfaction of TxDOT at Developer's sole cost and expense and without any consideration given to an extension of the Completion Deadline.

TxDOT and Developer shall agree on procedures for Early Start of Construction, which procedures shall, among other things, include a process for distributing construction documents signed and sealed by a Registered Professional Engineer to TxDOT and Developer's field staff. In order for Developer to proceed with early phases of construction of a portion of the Work, specific pertinent items of the design shall have been previously reviewed by TxDOT and comments from TxDOT shall have been transmitted to the Developer. For example, Early Start of Construction may be rough grading of a specific portion of the Project, for which specific pertinent items of the design may include:

a) Horizontal and vertical drainage system
b) Typical sections
c) Related elements of the drainage system
d) Related elements of the Traffic Control Plan specifically applicable during the term of the Early Start of Construction scope
e) Subsurface geotechnical investigations and recommendations
f) Slope stability analysis and recommendations
g) Preliminary structure general plans (if a structure is within the element or portion of the nonstructural Work)
h) Settlement monitoring program
i) Construction specifications

An Early Start of Construction shall be at the sole and complete risk of Developer, and does not release Developer from any of the requirements described in Section 2.2.7. If, as a result of the review process, construction modification or changes to already completed Work elements performed under the Early Start of Construction are required, Developer shall make any and all construction modifications to already completed construction activities at its sole cost and expense without any entitlement to time extensions or adjustments in the Price.

2.2.8 Construction Quality Management Plan

Developer shall construct the Work in accordance with the Released for Construction Documents, following a reasonable timeframe for TxDOT review and comment, together with the relevant requirements and specifications of the Contract Documents.

Developer's Construction Quality Management Plan (CQMP) shall contain detailed procedures for the Developer's quality control and quality assurance activities for construction activities. The CQMP shall be consistent with the applicable procedures contained in the current TxDOT *Contract Administration Handbook for Construction* and establish a clear distinction between quality control and quality acceptance activities and persons performing them. At a minimum, the CQMP shall specify:

a) Methods and procedures that clearly define the distinction/authority/responsibility for the administration of Developer's CQMP.
b) That Developer, Supplier, and Subcontractors designate an individual on each crew to be responsible for performing daily field inspections of their own Work and for preparing a daily QC report to document the inspection performed.
c) The review and approval of all Portland cement concrete and hot mix asphaltic concrete mix designs by a CQAF Registered Professional Engineer.
d) Methods and procedures to be utilized by Developer to obtain active participation of the work force in quality control operations to achieve a quality Project; reporting forms to be used by the responsible quality control personnel shall be included.
e) A construction quality control organization and staffing plan. The period of time that the quality control staff member will be present on the site shall be shown, resumes of the Key Personnel shall be included, and the experience/knowledge/skill levels of the quality control support staff shall be stated.
f) CQAF organizational and staffing plans. The period of time that the quality acceptance staff member will be present on the site shall be shown; resumes of key staff members shall be included; and the required minimum knowledge, technical skills, and experience level of the personnel related to the various inspection functions, such as grading, drainage, pile-driving, and structures inspections that will occur on the Work shall be stated. The administrative/clerical support staff for maintenance and management of records/documents pertinent to quality acceptance for the QCP activities shall be identified.
g) Procedures for inspecting, checking, and documenting the Work. Inspection, examinations, and measurements shall be performed for each operation of the Work to assure quality.
h) Procedures to ensure that all activities affecting the quality of the Work are accomplished under controlled conditions using appropriate equipment for the task being performed.
i) Procedures to ensure that the education, training, and certification of personnel performing CQMP activities are achieved and maintained and that all Work is performed in accordance with the approved designs, plans, and specifications.
j) Procedures to ensure that critical elements of the Work are not started or continued without inspection and testing by the quality acceptance personnel on site. Inspection or hold points shall be identified and communicated to the CQAF, Construction Quality Control Manager (CQCM), and TxDOT. Procedures to proceed beyond inspection points shall be developed.

k) Description of specific procedures to ensure that all Work conforms to the requirements of the Contract Documents, Governmental Approvals and applicable Law, and the Design Documents, as well as that all materials, equipment, and elements of the Work will perform satisfactorily for the purpose intended.

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

m) Measures to ensure that purchased materials, equipment, and services conform to the Contract Documents, Governmental Approvals, applicable Laws, Rules, and the Design Documents. These measures shall be consistent with Good Industry Practice and shall include provisions for source evaluation and selection, objective evidence of quality furnished by Subcontractors and Suppliers, inspection at the manufacture or vendor source, and examination of products upon delivery.

n) Procedures for identification and control of materials, equipment, and elements of the Work. These procedures shall be consistent with the Good Industry Practice to ensure that identification of the item is maintained by appropriate means, either on the item or on records traceable to the item, as necessary, throughout fabrication, erection, installation, and use of the item.

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

p) Procedures for processing an RFI to resolve discrepancies and/or questions in the plans and specifications so that all changes are documented and approved by Developer's design engineers and TxDOT.

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

r) A program for inspection for each operation of all Work examinations, measurement, and test of materials or elements of the Work to assure quality.

s) A program for coordination of all inspection and testing with the inspections and tests of Governmental Entities and Utility Owners.

t) A program to ensure performance of all testing required to demonstrate that all materials, equipment and elements of the Work will perform satisfactorily for the purpose intended and meet the standards specified in the Contract Documents. It shall specify written test procedures which include provision for ensuring that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. The CQMP shall require test results be documented and evaluated to ensure that test requirements have been satisfied. The CQMP shall also demonstrate how the CQAF will track its testing frequencies to ensure compliance with the Contract Documents.

u) Procedures for reviewing and approving acceptance test results, categorizing test results in a manner acceptable to TxDOT, transmitting acceptance test results to TxDOT in a format acceptable to TxDOT for use in fulfilling its statistical validation requirements, and working

collaboratively with TxDOT to resolve statistical non-validation between CQAF and TxDOT test results.

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

w) Procedures to control the handling, storage, shipping, cleaning and preservation of materials and equipment to prevent damage or deterioration.

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

y) A comprehensive system of planned and periodic audits of Developer's CQMP to determine adherence to and the effectiveness of the CQMP. CQAF personnel shall perform the audits in accordance with the written procedures or checklists. Audit results shall be documented, reviewed, and acted upon by Developer. Follow-up action, including re-audit of deficient areas following corrective action shall be taken where indicated.

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

aa) The requirements and methods for controlling documents. Developer's document control system shall be compatible with TxDOT's.

bb) Procedures and personnel to be used to assure that specified instrumentation is installed and monitored in accordance with applicable specification.

cc) The form and distribution of certificates of compliance.

dd) Procedures for quality acceptance in the CQMP with respect to checking and verifying the accuracy and adequacy of construction stakes, lines, and grades established by Developer.

2.2.8.1 Personnel and Staffing

2.2.8.1.1 Construction Quality Control Manager (CQCM)

Developer shall assign an on-site Construction Quality Control Manager (CQCM) who shall be responsible for management of the quality aspect of the CQMP. The CQCM shall not be involved with scheduling or production activities, and shall report directly to Developer's management team. The CQCM shall see that the methods and procedures contained in approved CQMP are implemented and followed by Developer and Subcontractors in the performance of the Work. The CQCM shall be a Registered Professional Engineer.

2.2.8.1.2 Construction Quality Control Staff

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

2.2.8.1.3 Construction Quality Acceptance Manager (CQAM)

Developer's CQAF shall assign an on-site Construction Quality Acceptance Manager (CQAM) who shall be responsible for management of the quality acceptance aspect of the CQMP. The CQAM shall be a Registered Professional Engineer and shall be an employee of the CQAF. The CQAM shall report jointly to Developer's management team and TxDOT. The CQAM shall not report to any person or party directly responsible for design or construction production.

The CQAM shall review, approve, authorize, examine, interpret, and confirm any methods or procedures requiring the "Engineers' review, approval, authorization, examination, interpretation, confirmation, etc." which are contained in the TxDOT Standards.

2.2.8.1.4 Construction Quality Acceptance Staff

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

The quality acceptance inspection and testing staff shall be employees of the CQAF and shall have been trained in the applicable inspection and material sampling and testing procedures. The quality acceptance staff shall be experienced in highway inspection and material testing. The training and experience of the quality acceptance staff shall be commensurate with the scope, complexity, and nature of the activity to be controlled and tested. Qualifications shall include appropriate TxDOT or State Highway Agency certification for testing and inspection as well as nationally recognized certifications such as ACI certification in applicable inspection or testing activities. Construction quality acceptance staff shall report to the CQAM.

The quality acceptance staff shall provide oversight and perform audits of the quality control inspection and material sampling/testing operation.

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

2.2.8.1.5 Construction Quality Acceptance Staff Levels

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

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

Should TxDOT determine that Developer is not complying with CQMP because of lack of staff, TxDOT shall have the right, without penalty or cost, including time extensions or delay damages, to restrict Work efforts until appropriate levels of staffing consistent with the CQMP and satisfactory to TxDOT are obtained or TxDOT may contract with a separate firm to perform these services and withhold payment to Developer for such services.

2.2.9 O&M Quality Management Plan

The Developer shall develop a comprehensive O&M Quality Management Plan (O&M-QMP) which shall fully comply with the requirements of the work during the O&M Period, with the primary function of establishing the Developer's self-monitoring process and to monitor the performance of the Developer's O&M Work. The O&M-QMP shall be submitted to TxDOT for review and approval. At a minimum, the O&M-QMP shall specify:

a) Means to evaluate Developer's level of performance with respect to the minimum performance requirements as detailed in Tables 19-3, 19-4 and 19-5.
b) Necessary operations and maintenance information to compare it to the minimum performance requirements so TxDOT can ultimately determine the Noncompliance Points imposed on the Developer.
c) Detailed quality assurance system for validating the information, accuracy, and results of the O&M-QMP.
d) Procedures to validate the data, times, dates, other information and calculations that are the basis of the Liquidated Damages, Defect Hazard Event, Construction Violations Events and O&M Noncompliance Events, Lane Closures and Noncompliance Points.
e) Methods and procedures that clearly define the distinction/authority/responsibility for the administration of Developer's O&M-QMP.
f) That Developer, Suppliers, and Subcontractors designate an individual on each crew to be responsible for performing daily field inspections of their own Work and for preparing a daily QC report to document the inspection performed.
g) An O&M quality control organization and staffing plan. The period of time that the quality control staff member will be present on the site shall be shown, resumes of the Key Personnel shall be included, and the experience/knowledge/skill levels of the quality control support staff shall be stated.

h) Procedures for inspecting, checking, and documenting the Work. Inspection, examinations, and measurements shall be performed for each operation of the Work to assure quality.
i) Procedures to ensure that all activities affecting the quality of the Work are accomplished under controlled conditions using appropriate equipment for the task being performed.
j) Measures to ensure that purchased materials, equipment, and services conform to the Contract Documents, Governmental Approvals, applicable Laws, Rules, and the Design Documents. These measures shall be consistent with Good Industry Practice and shall include provisions for source evaluation and selection, objective evidence of quality furnished by Subcontractors and Suppliers, inspection at the manufacture or vendor source, and examination of products upon delivery.
k) Procedures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections, and tests performed upon individual items of the Work.
l) Procedures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment, deviations and other Nonconforming Work are promptly identified and corrected. The procedures shall ensure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition and the corrective action taken shall be documented and reported to TxDOT in writing and to appropriate levels of Developer's management to ensure corrective action is promptly taken.

The Developer shall prepare O&M Quality Management Plan reports that identify the results of the O&M Quality Management Plan.

2.2.9.1 Renewal Work

The O&M-QMP shall be developed to reflect the Developer's responsibility for the quality of all design, construction, maintenance and repair associated with the Renewal Work, allowing TxDOT to oversee such Work. The O&M-QMP must be consistent with the design and construction quality control/quality assurance requirements set forth in this Section 2.

2.2.9.2 Personnel and Staffing

2.2.9.2.1 Maintenance QC Manager

Developer shall assign an on-site Maintenance QC Manager who shall be responsible for management of the quality aspect of the O&M-QMP. The Maintenance QC Manager shall not be involved with scheduling or production activities, and shall report directly to Developer's management team. The Maintenance QC Manager is responsible for independently overseeing and performing quality control for the O&M Work. The Maintenance QC Manager report and develop and implement corrective actions for any deviations to the methods and procedures contained in approved O&M-QMP in the performance of the Work.

2.2.9.2.2 O&M Quality Control Staff

Developer's and Subcontractors' O&M work force are all considered to be members of Developer's quality control staff as each and every one is responsible for the quality of the Work. Personnel performing QC inspection shall ensure quality of workmanship and QC sampling/testing shall ensure that materials meet the required specifications. Personnel responsible for performing quality control inspection shall be knowledgeable and receive training to perform their quality control duties. Should any

sampling/testing be required during the O&M Work, Maintenance QC Manager shall be responsible for ensuring that sampling/testing procedures and methods meet the requirements in the O&M-QMP.

2.2.9.3 Reporting

The Maintenance QC Manager shall submit an annual report to TxDOT by each anniversary of the Substantial Completion Date. This annual report shall include the following elements:

(a) An assessment of the actual O&M Work achievements versus the planned goals established in the Maintenance Management Plan, as well as corrective actions and measures to be taken in the ensuing year to ensure that any shortcomings are corrected; and

(b) An assessment of compliance with the various traffic control requirements and limitations contained in the Contract Documents, and the traffic control plans developed in accordance with the Technical Provisions, as well as any corrective measures taken to correct any breach or violation of such requirements and limitations and any corrective measures necessary to prevent any future breach or violation of such requirements and limitations.

2.3 Safety and Health Plan

Developer shall be responsible for the safety and health of its personnel and of the general public affected by the Project. Developer shall prepare and submit to TxDOT for concurrence a comprehensive safety and health plan ("Safety and Health Plan") that is consistent with and expands upon the preliminary safety and health plan submitted with the Proposal for the Term of the Agreement during both the D&C and O&M Periods. All members of Developer's team shall adhere to Developer's Safety and Health Plan. Developer shall meet the following Safety and Health Plan content and preparation requirements.

The Developer shall take full account of the unique attributes of this project in preparing the Safety and Health Plan, including but not limited to, the urban environment, the heavy traffic conditions, and the size and scope of the Project. The Safety and Health Plan shall fully describe Developer's policies, plans, training programs, Work Site controls, and Incident response plans to ensure the safety and health of personnel involved in the Project and the general public affected by the Project. The Safety and Health Plan must cover all phases of the Work, and shall be reviewed, evaluated, and updated as often as necessary to reflect relevant changes during the Term of the Agreement. The Safety and Health Plan shall contain, as a minimum, the following provisions:

a) Safety Management

The personnel and responsible staff who will implement, maintain, and enforce the Safety and Health Plan, including policies and training programs shall be identified in the Safety and Health Plan. As a minimum, the Developer shall provide a fulltime on-the-job D&C and O&M Safety Manager during the D&C and O&M Periods, respectively. The D&C and O&M Safety Manager's qualifications, as a minimum, shall include:

- Ten (10) years of progressive safety experience, five years of which must be safety management experience, on complex heavy civil projects for the D&C Safety Manager;

- Ten (10) years of progressive safety experience, five years of which must be safety management experience, on similar O&M projects for the O&M Safety Manager. However, the D&C Safety Manager shall be deemed to satisfy these requirements;
- Designation, at or before the Effective Date, as a Construction Health and Safety Technician (CHST) or higher certification issued by the Board of Certified Safety Professionals (BCSP);
- Completed the OSHA 30-hour Safety and Health Course;
- Training and current certification for CPR and First Aid;
- Possess verifiable competency in the construction safety disciplines related to the Work to be performed and/or retain full-time competent persons required by State and Federal safety standards; and
- Knowledgeable in safety incentive programs.

As part of the Developer's safety and health management, all Work shifts shall have, as a minimum, an onsite Shift Safety Representative. The Shift Safety Representative shall have the following minimum qualifications:

- Three (3) years of progressive safety experience and general competency in the construction safety disciplines related to the Work;
- Completed the OSHA 10-hour Safety and Health Course; and
- Training and current certification for CPR and First Aid.

The Safety and Health Plan shall define the role and responsibilities of the D&C and O&M Safety Managers and safety staff, the hierarchical relationship between the Safety Manager and other managers, supervisors, and employees, and how responsibility and accountability for safety will be incorporated at all levels on the Project for both the D&C and O&M Periods. The D&C Safety Manager shall report directly to the D&C Project Manager and have the authority to stop Work, and the O&M Safety Manager shall report directly to the O&M Project Manager and have the authority to stop Work.

Clearly stated policies within the Safety and Health Plan shall be established articulating the obligations of all personnel in adhering to the Safety and Health Plan. Clear goals shall be established and communicated within the Safety and Health Plan for safety, security, and health, including defined objectives for meeting the goals. Requirements for evaluating the effectiveness of policies and measuring success in meeting the goals and objectives of the Safety and Health Plan shall be set forth in the Safety and Health Plan and an environment and means for continuous evaluation and improvement shall be established to achieve the Safety and Health Plan goals and to identify deficiencies so that the goals and objectives can be revised as needed to improve the safety and health of Developer’s personnel and of the general public affected by the Project.

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

b) Worksite and Jobsite Analysis

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

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

c) Hazard Prevention and Personal Safety

Methods and procedures shall be provided in the Safety and Health Plan to identify and detail all hazards that may be encountered by personnel while performing the Work. Practices and procedures shall be developed and implemented to address prevention of identified hazards. A communications protocol shall be established to ensure all employers and employees are aware of hazards in all areas and how to deal with them appropriately. Means shall be provided to evaluate all anticipated and unanticipated activities, and address potential hazards related to these activities.

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

The Developer shall handle Hazardous Materials in compliance with Section 3.15 of the Agreement and the applicable requirements of the Technical Provisions.

d) Training

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

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

Procedures shall be provided within the Safety and Health Plan to plan and prepare for Emergencies, and to conduct training and Emergency drills.

e) Drug Free Work Zone

Policies and procedures shall be provided within the Safety and Health Plan to require adherence to a 100% drug/alcohol free work zone.

f) Incident and Emergency management

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

- Maintenance of communication for the exchange of information between Developer, TxDOT, and other involved agencies.
- Coordinated support through interaction with local, State, and federal governmental entities, as well as other entities, for safe and efficient construction.
- Discussion and coordination with Emergency response, traffic control, security, and operational issues affecting construction, operations and maintenance of the Project, and associated system feeders and exits.
- Procedures to update Participating Agencies regarding status of construction of the Project, and associated system feeders and exits, to assure safe and timely response to Emergency events. As a minimum, this shall include off-site and on-site traffic routing changes, and changes to job site access, fire suppression system modifications and in-service availability of standpipes or fire suppression water supply, if applicable, and changes in the Work that may create a greater likelihood of occurrence of a particular type of Emergency.

2.4 TxDOT-Developer Communications Plan

Developer shall submit to TxDOT for approval a TxDOT–Developer Communications Plan that is consistent with and expands upon the preliminary communications plan submitted with the Proposal.

Developer shall maintain and update the TxDOT-Developer Communications Plan throughout the Term.

The TxDOT-Developer Communications Plan shall describe the procedures for communication of Project information between Developer's organization and TxDOT.

The TxDOT-Developer Communications Plan shall describe how Developer's organization will respond to unexpected requests for information, communicate changes, or revisions to necessary Developer personnel, and notify affected stakeholders before and after changes are made to the Contract Documents.

2.5 Public Information and Communications Plan

Section 3 includes requirements for public information and communications.

2.6 Comprehensive Environmental Protection Plan

Section 4 includes requirements for environmental management.

2.7 Affected Third Parties Plan

Section 5 includes requirements for the Affected Third Parties Plan.

2.8 Right of Way Acquisition Plan

Section 7 includes requirements for right of way acquisition management.

The ROW Acquisition Survey Document Package shall be reviewed by an independent Registered Professional Land Surveyor (RPLS) for consistency and compliance with all applicable laws, standards, and requirements. The boundary location and the survey methods remain the responsibility of Developer, and are not part of this review process. The reviewing surveyor shall review the survey document package and return his comments to Developer in a timely manner. Developer shall revise and correct the documents in accordance with the reviewing surveyor's comments in a timely manner. TxDOT will not accept the ROW Acquisition Survey Document Package as complete until the reviewing surveyor has signed and sealed the compliance certificate (see Reference Information Documents).

2.9 Maintenance Management Plan

Section 19 includes requirements for maintenance management.

2.10 Operations Management Plan

Section 22 includes requirements for operations management.

2.11 Emergency Management Plan

The Emergency Management Plan (EMP) will cover procedures for Force Majeure events and vehicle accidents that may disrupt construction or damage facilities. The EMP will describe the Developer's plan for responding to the following emergency situations:

a) Severe weather incidents such as tornados, hail storms, snow storms, and flooding.
b) Power failures that may affect traffic signals and lighting.
c) Vehicular accidents that may damage facilities or interfere with traffic flow.
d) Hazardous Materials spills including flammable liquids.
e) Vandalism including graffiti.

The plan will describe how the Developer will coordinate with local law enforcement agencies and emergency personnel to respond to emergency situations. The plan will describe how the developer will notify the public about the emergency situation.

2.12 Cost Management Plan

The Project is a publicly funded and the Developer shall develop, implement, and maintain a Cost Management Plan. Requirements for the Cost Management Plan are:

a) Cost - in which the total cost and cost-to-complete for major project elements are presented in year of expenditure dollars.
b) Implementation Plan - in which the Project Schedule is presented and the cost-to-complete is presented in annual increments in year of expenditure dollars.
c) Financing and Revenues - presented by funding source as annual amounts available for project obligations.
d) Cash Flow - an annualized presentation of cash income and outgo to illustrate how periodic bills will be paid.

e) Risk Identification and Mitigation Factors.

2.13 Risk Management Plan

The Risk Management Plan shall describe the approach to identification, management, mitigation, and allocation of Project-specific risks, including a risk matrix which shall identify the following at a minimum:

a) Significant risk categories during the design and construction of the Project.
b) The potential consequences of the identified risks.
c) The probable likelihood of risks.
d) Proposed procedures and tools to conduct a risk sensitivity analysis.
e) Risk-mitigation strategies to eliminate or reduce specific risks.

2.14 TxDOT Offices, Equipment

Except where noted elsewhere in the Contract Documents, Developer and TxDOT shall collocate for the D&C period through Final Acceptance to facilitate Project coordination and daily communication. The definition of "collocate" for this Agreement is office space meeting the conditions of this Technical Provision that are near each other along or adjacent to the Project within one mile of the Project ROW or as otherwise approved by TxDOT.

Developer shall provide TxDOT office space (i.e., available for occupancy) within sixty (60) Days of issuance of Notice-to-Proceed 1 (NTP1). The location, condition, and amenities of the office space for TxDOT are subject to TxDOT's prior written approval. The office space requirements for the core office and the field offices are provided below.

2.14.1 Computers and Equipment

The Developer shall provide, install, and maintain the following computers, peripherals, and software for the TxDOT office spaces:

- One computer with two flat panel monitors including all necessary peripherals for each personnel office area and the reception area in core and field office. Fifteen of these computers shall be laptops with docking stations.
- Desktop computers specifications and operating systems shall generally be same as those used by technical staff on Developer's team.
- Laptops specifications and operating systems shall generally be same as those used by the management staff on Developer's team.
- Necessary software and licenses required to perform TxDOT functions for the Project, including Microsoft Office Professional, Microsoft Outlook or Novell GroupWise, Microstation, Geopak, applicable drainage software, and Adobe Acrobat.
- Software version currently employed:
    - Microsoft Office 2010
    - Novell GroupWise v.8
    - Microstation v8i v.2
    - GeoPakSS2

  - Adobe Acrobat X Pro
- Software and licenses shall be compatible with all other Microsoft software products.
- Three GPS Cameras (to include compass / GPS module, 4GB SD card, camera bag, additional battery, USB cable, neck strap, rechargeable lithium-ion battery, battery charger, instruction manuals and warranty card).
- One Digital Video Camera.
- Three iPad with Wi-Fi + 3G 64GB along with 3G service (latest version available) and protective case.
- Three iPhone 4S along with service (or latest version available) and protective case.
- High Speed Office Internet access that is wired separately from phone service.
- Peripherals shall include at minimum, monitor stand, docking station for laptop computers, mouse, keyboard, extra battery for laptop computers, and a carry bag for laptop computers. The computers, monitors, and peripherals shall be at least equal to the ones used by the Developer's staff.

The Developer shall provide, install, and maintain the following telephones, servers, copiers and fax equipment, internet service and premise wiring for the TxDOT office space:

- At least one touch-tone telephone, for each personal office area, each with a status indicator, access to all outside lines, and conference-call capability; and including speakers for the telephones in the enclosed offices rooms.
- At least one touch-tone conference telephone with satellite microphones for each conference room, each with a status indicator, caller id, access to all outside lines, and conference-call capability.
- Hardware and software shall be compatible with that of Good Industry Practice and of the Developer's system interface.
- Full-scale color plotter capable of handling 36 inch roll plots, 36x24 inch plots and 18x12 plots (core office only).
- One high-speed laser computer printer capable of handling 11x17 prints.
- One high-speed color printer capable of handling 11x17 prints.
- One high-speed color photocopy machine capable of handling 11x17 prints.
- One facsimile transmission machine.
- One color scanner capable of handling 11x17 prints.
- All office supplies including copier paper, toners, pens, pencils, notepads, and other miscellaneous office supplies.
- Complete voice/data communications cabling system, which includes but is not limited to the EMT conduit, bridle rings, pull boxes, category 5e UTP cable, category 5e "RJ-45" UTP receptacles, category 3 "RJ-11" UTP receptacles, receptacle boxes, cover plates, and multimode fiber optic cable. All cable shall be routed, terminated, labeled, and tested. Voice and data circuits shall be installed in conjunction with ISD and TxDOT Department of Information Resources staff.

All equipment shall be replaced and updated at least once every three. A multipurpose piece of equipment capable of meeting multiple parts of the requirements above shall be considered to meet the requirements.

Developer shall certify and state supplied components as functional before installation and shall bear all responsibility for replacement of parts at work commencement.

Developer shall prepare, test, plan, and submit before installation, test installed system and supply test results, and shall conform to all industry standard testing procedures

Developer shall terminate all category 5e UTP cable in 66M150 punch down blocks for voice cabling and shall terminate all category 5e UTP data cable in data patch panels within the wiring closet.

Each drop shall contain two data ports with RJ45 connectors and two voice ports with RJ11 connectors.

Developer shall provide all materials, as needed and required, to complete the installation of the cable plant which shall include all cable, connectors, patch panels, equipment rack(s), patch cables, face plates, punch down blocks, fiber optic cable and other miscellaneous materials.

2.14.2 Core Office

Developer shall provide all space, facilities, and support Elements necessary to design, construct, and maintain the TxDOT core office in accordance with the Contract Documents. Developer shall provide office space, not to exceed 12,000 square feet, for TxDOT's design and Project management staff including, the General Engineering Consultant and other contract employees. If it is necessary to locate any of these Elements of the Work off-site or outside of this office, Developer shall obtain TxDOT's prior written consent.

Developer shall provide a preliminary TxDOT facility area layout plan to TxDOT no later than seven (7) Days after NTP1. TxDOT shall promptly review and comment on required modifications to the layout within ten (10) days. Developer shall submit a final facility layout plan within ten (10) Days of receipt of TxDOT comments.

Developer shall have the TxDOT facility area available for move-in no later than sixty (60) days after NTP1.

2.14.2.1 TxDOT Facility Area and Items Provided by Developer

Developer 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 Developer's office staff. TxDOT shall be reasonable regarding re-use of existing space within Developer's current office facility, providing the space is contiguous and workable in TxDOT's sole discretion.

2.14.2.2 Office Condition

The offices shall be in good and serviceable condition, at least of the same quality as those of Developer's counter-part 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

Developer-provided TxDOT facility area to Developer 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 Developer-Related Entity.

2.14.2.3 Loss or Damage

If office spaces, related facilities, fixtures, or equipment specified in Section 2.14.1 are destroyed, damaged or stolen during the Work, in the TxDOT facility area, except as a direct result of willful misconduct of TxDOT or its personnel, Developer shall, at its cost and within ten (10) Business Days after the occurrence of such destruction or damage, repair those items to their original condition or replace them. However, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, printers, and telephones) necessary for normal office operations, replacement shall occur within two (2) Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, Developer shall replace the facilities noted herein within the timeframes specified herein, and TxDOT shall reimburse Developer for actual, reasonable and documented costs incurred.

2.14.2.4 Office Facilities and Equipment

For the TxDOT facility area it provides, Developer shall:

a) General. Secure facility space, obtain all permits, install and pay for all utility services, and maintain the facilities as part of the Work.
b) Access and Security. Provide separate TxDOT entrance/exit(s) from building, which shall be secured with electronic door lock(s) plus a deadbolt lock. Developer 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., server room, document storage, offices). Developer shall provide software for maintaining access to these areas, which shall be owned and/or maintained by TxDOT's design and Project management staff.
c) Lighting and Electricity. Include with all interior spaces overhead lighting meeting OSHA, building, and 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 twenty (20) amperes.
d) Janitorial, Trash and Recycling Services. Provide daily janitorial service (except Saturdays, Sundays and Holidays) and maintain trash and recycling containers and trash and recycling 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 Developer. Developer shall pay for and procure janitorial services for the TxDOT facility area.
e) Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas.
f) Accessibility and Licensing. Meet all access requirements of the Texas Accessibility Standards, the Americans with Disabilities Act Accessibility Guidelines, as amended (42 USC §§12101, et seq.), and the applicable building code. Facility design plans shall be submitted to the Texas Department of Licensing and Regulation (TDLR) for review and approval as required by Section 16, Chapter 68 of the Texas Administration Code.

g) Restrooms, Break Room, and Entry Space. Provide access to women's and men's restrooms, break room space and building entry space, these spaces may be shared with Developer's office space/staff. These spaces and all TxDOT spaces shall have access 24 hours per day, 7 days per week, 365 days per year (24/7/365). In lieu of access to a common break room, Developer may provide a 200 SF break room/kitchen within the TxDOT space, with refrigerator with freezer compartment, ice machine, sink including waste disposer, microwave, and dishwasher. If the building does not have a general building vending area then the break room shall have vending machines and a standalone ice machine. The Developer shall provide coffee, tea, condiments, and bottled water, generally, the same as the Developers staff. Break room/kitchen shall have storage closet (25 sq. ft.) and cabinets with drawers and counter tops. In the event that access to restrooms cannot be accessed from a common building entry/lobby, Developer 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 TxDOT space allocation may be required to be increased to accommodate these spaces.

h) HVAC. Provide electrical, heating, ventilation, and air conditioning (HVAC) systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces, 24 hours per day, 7 days per week, 365 days per year (24/7/365), through the year. Server room shall have dedicated air conditioning/cooling system capable of maintaining temperatures between 65 and 70 degrees Fahrenheit, and 15% relative humidity.

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

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

2.14.2.5 Space Requirements

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

a) Offices. Enclosed offices for TxDOT's management staff (nominal 150 square feet each) 15 total (5 with keyed door hardware).

b) Cubicles. Cubicle area spaces for administration staff (nominal 100 square feet each) 15 total; (power supply and data and communication lines to cubicles may be provided through power pole drops).

c) Conference Rooms. Three conference rooms (enclosed) 2 at nominal 12'x 20' (240 SF), one at nominal 12'x 30' (360 SF) and one assembly room (enclosed) at nominal 32'x45' (1575 SF) All shall have dimmable lighting, minimum 60-inch flat panel monitor with VGA/HDMI accessibility in conferences rooms, a minimum 120-inch diagonal projected image 1024 by 768 resolution in assembly room; each conference room shall have one chair for every 24 SF of conference room space and a conference table of sufficient size for each chair.

d) Reception Area. Receptionist space with waiting area with seating for 8 visitors (nominal 200 SF); other furniture to be determined jointly by developer and TxDOT.

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

f) Storage and Filing. One (1) lockable space for storage and filing, nominal 15'x20' (300 SF).

g) Server Room. One computer server room (100 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 at least three dedicated 20-amp power circuits and one 30-amp circuit. All patch panels (phone and data) shall be located within the designated server room. Temperature shall be maintained with a dedicated air conditioning/cooling system as defined above.
h) Parking Area. Parking area for at least forty (40) vehicles (30 staff/10 visitors) that is reasonably level (all-weather surface and all-weather access). A portion of the available parking area must accommodate an 8' vehicle height.
i) Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain two (2) foot-candles of lighting within the building and parking areas of the site.
j) Corridors. Corridors within the TxDOT facility shall have a nominal width of 54 inches.

2.14.2.6 Miscellaneous Requirements and Features

The following shall be provided:

a) Flooring. Carpeted flooring (nonstatic in server room).
b) Entry Access. Entry to TxDOT areas by electronic door hardware card access (not keyed), with U.P.S. on locks (fail closed).
c) Electrical Outlets. Each office and conference room shall have two (2 data, 1 com Cat 5E) outlets per room, and one (2 data, 1 com Cat 5E) outlet per cubicle, as well as outlets at designated printer, fax and copier locations and any and all shared areas (i.e., workroom, storage room, etc.). All data/voice outlets shall be installed next to power outlets.
d) HVAC. 24/7/365 HVAC as previously described.
e) Window Coverings. Horizontal mini-blinds (no drapes) for each exterior window.
f) Power Circuits. Provide dedicated electrical power circuits for copiers, and minimum of 6 duplex receptacles with three dedicated 20-amp circuits and one 30-amp circuit for the server room.
g) Fire Extinguishers. Developer shall provide fire extinguishers, per fire code and fire marshal with jurisdiction.
h) Insurance. Insurance (obtained and provided by Developer) covering the use of the Project office by Developer and TxDOT, in accordance with the terms of the underlying property use agreement with the property owner, but in no event shall the insurance be less than that required by the Agreement.
i) Vending Area. Developer shall provide access to general building vending area.
j) Utilities. Initial installation and monthly expense of all utilities paid by Developer except long distance telephone service.
k) Emergency Contacts. 24-hour emergency contact to Developer.
l) Furniture. Developer-provided allowance of $50,000 in the Price for furniture, which shall be obtained by Developer at the direction of TxDOT, and billed through Developer. At the end of the Project, Developer 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.

m) Cable Television. Provide basic cable television connections or service to public information office.

2.14.2.7 Items Not Required

The following items are not required:

a) Outside storage.
b) Electronic security system (other than electronic door access hardware).

2.14.3 Field Offices

Developer shall provide field office space for the exclusive use of TxDOT's field construction staff for the Project as specified herein.

Subject to TxDOT's prior written approval, Developer shall provide separate facilities for TxDOT's resident engineer staff located within the same complex as Developer's field office. Should Developer 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 Developer's counterpart management and field staff. Should Developer elect to combine the field office with the design and management office, the combined facility shall be within reasonable proximity to the Project and subject to TxDOT's prior written approval.

Developer shall provide the field staff facilities at least ten (10) Business Days prior to starting any Work activity involving staff that shall occupy the field staff facilities.

2.14.3.1 Office Condition

The field office(s) shall be in good and serviceable condition, at least of the same quality as those of Developer'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 Developer-provided facilities to Developer 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 Developer-Related Entity.

2.14.3.2 Loss or Damage

If office space(s) or related facilities are destroyed, damaged or stolen during the Work, except as a direct result of willful misconduct of TxDOT or its personnel, Developer shall, at its cost and within ten (10) Business Days after the occurrence of such destruction or damage, replace those items that it had provided or repair them to their original condition; however, in the case of lost, damaged, or stolen office equipment (e.g., computers, fax machines, copy machines, printers, etc.) necessary for normal office operations, replacement shall occur within two (2) Business Days. If loss or damage is caused as a direct result of willful misconduct of TxDOT or its personnel, Developer shall replace the facilities noted herein within the timeframes specified herein, except that TxDOT shall reimburse Developer for actual, reasonable, and documented costs incurred.

2.14.3.3 Office Facilities and Equipment

For the facilities it provides, Developer shall:

a) General. Secure sites, obtain all site permits, install and pay for all utility services, and maintain the facilities as part of the Work.
b) Access and Security. Provide separate buildings or trailers for TxDOT staff that include at least two entrances/exits, providing an 8' x 10' (minimum) covered area, from each building or trailer. Each entrance/exit shall be secured with a door lock plus a deadbolt lock.
c) Lighting and Electricity. Include with all interior spaces overhead lighting meeting the requirements of the Occupational Safety and Health Administration (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 twenty (20) amperes.
d) Janitorial and Trash Service. Provide daily janitorial service (except Saturdays, Sundays and Holidays) and maintain trash containers and trash pickup service. This shall include, but not be limited to, sweeping and mopping floors, cleaning the toilet, and lavatory and emptying wastebaskets.
e) Exterior Maintenance. Maintain the exterior areas of office spaces, including access to parking areas.
f) Accessibility. Meet all access requirements of the Americans with Disabilities Act, as amended (42 USC §§12101, et seq.).
g) Utility Service. Provide potable water, sewer service, and electricity to the office facility.
h) HVAC. Provide heating, ventilation, and air conditioning (HVAC) systems capable of maintaining temperatures between 65 and 70 degrees Fahrenheit in all spaces through the year.
i) Code Requirements. Meet all local building and fire code requirements.
j) Disposal and Removal. Be responsible for disposal or removal of all Developer-provided facilities and any site restoration Work as required.

2.14.3.4 Space Requirements

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

a) Offices. Enclosed offices for TxDOT's construction representative, TxDOT-designated construction manager and three other TxDOT or contract employees (150 square feet each).
b) Offices/Cubicles. Offices or cubicles for up to ten (10) field engineer/inspection/ administration staff (100 square feet each).
c) Conference Rooms. Conference rooms (enclosed) (200 square feet) and access to another conference room (350 square feet). d) Storage and Filing. Two (2) lockable spaces for storage and filing at each field office (a combined space of 150 square feet).
d) Surveying Equipment Storage. Clean inside storage space for surveying equipment (80 square feet).
e) Tool Shed. Shed for small tools and equipment (outside) (150 square feet).
f) 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.
g) Staff Parking Area. A parking area for at least fifteen (15) vehicles that is reasonably level (all-weather surface and all-weather access) within the boundaries of a security fence.
h) 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 square feet).

i) Security. A 24-hour security service or silent watchmen-type security system.
j) Exterior Lighting. Sufficient exterior security lighting that is automatically activated at low light levels to maintain two (2) foot-candles of lighting within the fenced field office site.
k) Window Security. Security bars on all windows.
l) Laboratory Facility. A completed facility suitable to accommodate a functioning portable lab (approximately 2,500 square feet).
m) Cultural Resources Storage. Sufficient space and covered facilities for any archeological or paleontological recovery operations (approximately 2,000 square feet).
n) Kitchen/Break Room. Each field office shall contain a 200 sq. ft. kitchen with storage closet (25 sq. ft.), cabinets with drawers and counter tops.
o) Restrooms. Two restrooms including toilets and sinks.
p) First Aid Facilities. Emergency first aid facilities.

2.14.3.5 Items Not Required

The following items are not required:

a) Laboratory Testing Equipment.

3 PUBLIC INFORMATION AND COMMUNICATIONS

3.1 General Requirements

Developer shall coordinate all public information communication plans with ongoing TxDOT public information activities to ensure that a consistent message is being distributed to the Customer Groups. Developer shall meet weekly, more frequently if need, with TxDOT public information officer to coordinate efforts. Copies of all materials to be presented to the public or the media shall be provided to TxDOT at least three (3) Business Days prior to dissemination.

3.2 Administrative Requirements

3.2.1 Public Information and Communications Plan

Developer shall submit to TxDOT for approval a comprehensive Public Information and Communications Plan (PICP) within 30 days of NTP1, based upon the preliminary public information and communications plan submitted with Developer's Proposal, which informs, educates, and engages the Customer Groups throughout every stage of the Project. Developer shall obtain TxDOT approval as a condition precedent of NTP2. The PICP shall identify specific outreach or engagement activities, the frequency of those activities, what modes of communication will be used and what process Developer will use in order to measure the effectiveness of the PICP. Submittal shall be in both hardcopy form and electronic format compatible with TxDOT software. TxDOT approval of the PICP shall be a condition of issuing NTP2.

In preparing this plan, Developer shall identify the Customer Groups and develop specific plans to respond to their concerns and needs in all respects regarding the Project. After incorporation of comments from TxDOT on the PICP, Developer shall implement the various activities and initiatives contained therein. Developer shall continually maintain the plan to ensure delivery of high-quality, well executed communications throughout the Term of the Agreement including the D&C and O&M Periods.

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

The PICP shall include a general timeline listing public information activities for the Project over the entire Term of the Agreement. This timeline shall be used as an initial guide and shall be updated by Developer as the Project is implemented but no less than on a yearly basis.

TxDOT may audit Developer's performance of the activities set forth in the PICP. Developer shall make appropriate changes to the PICP as required to meet the findings of any audit or review and to suit the changing goals and needs of the Project. Developer shall cooperate with TxDOT to amend the PICP as required to suit circumstances as yet unknown, including public reaction to the impacts, real or perceived,

from the Work and the depth, breadth and frequency of information necessitated by Customer Groups. Developer shall document the efforts and results of the PICP in measurable terms to clearly indicate compliance.

Developer shall provide sufficient qualified staffing to effectively implement the PICP.

In developing the PICP, Developer shall make appropriate provisions to achieve the following goals:

a) Gain and maintain support and/or informed consent from Customer Groups, building on existing community partnerships and communication networks.
b) Provide Customer Groups with regular opportunities for input early and often throughout the development process.
c) Demonstrate to Customer Groups that the Project will be developed pursuant to a well-executed program.
d) Notify Customer Groups in advance of key Project ROW acquisition, construction and maintenance activities and communicate the potential impacts of these activities.
e) Provide public information which facilitates alternative trip planning during construction.

Address the Project-specific concerns of Customer Groups, including but not limited to interests in Emergency Services vehicle access, business owner and patron driveway access, delivery access, adjacent neighborhood access, changes to bicycle and pedestrian access and neighborhood traffic patterns, changes to mobility access associated with the *Americans with Disabilities Act* (ADA), construction noise and lighting, and ongoing noise issues.

To achieve these goals, Developer shall use, but not be limited to, the following implementation strategies:

Customer Groups

a) Develop a forum to coordinate on-going dialogue among Customer Groups, TxDOT, and Developer.
b) 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.
c) Organize and manage meetings and communications with key elected officials, the general public, representatives of civic organizations, businesses, and special interest groups along the Project corridor (individually or in groups) for the purpose of building rapport and gaining feedback 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.
d) Respond to invitations and seek opportunities to attend meetings, conferences, and other events at which Project information can be exchanged with Customer Groups.

e) Notify Customer Groups in advance of key Project ROW acquisition, construction, operations and maintenance activities, and communicate the potential impacts of these activities.
f) 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.
g) Develop and manage a public relations campaign and communication strategy to convey key messages, branding, and pertinent information about the Project.
h) At appropriate times and stages and as requested by TxDOT or key stakeholders, coordinate tours of the Project.
i) Comply with the latest requirements of the *Guidelines for Analysis and Abatement of Roadway Traffic Noise*.
j) 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.
k) Communicate impacts and Ultimate Project design for accommodation of pedestrians and bicyclists throughout the Project.
l) Conduct tabletop exercises with stakeholders and government agencies to help prepare for potential emergency situations during construction phase.
m) Compile database of all customer group contacts and make readily available to TxDOT in an easily accessible format.

Media

a) Build on existing TxDOT media resources and/or create and develop advertising messages, including graphics, logos, and slogans.
b) Place Project-related messages in the appropriate media.
c) Develop and distribute public service announcements, paid advertising, news reports, and other communication materials as appropriate.
d) Manage media relations with key transportation and business reporters and prepare and distribute news releases and media kits.
e) Develop and implement communications plans that anticipate and attempt to minimize traffic impacts of public, special and seasonal events adjacent to the corridor that may draw large crowds through the Project Limits.
f) Monitor local, state, and national media coverage for accuracy and to gauge local opinion. Coordinate with TxDOT regarding response to inaccurate information as soon as possible in the same media.
g) Document and provide Project-specific media clips to the entire Project team.
h) Facilitate Project Tours.

Environmental

The PICP shall detail the communication hierarchy for information distribution related to compliance with the Comprehensive Environmental Protection Program, as described in Section 4. The PICP shall include names and contact information, including emergency contact information, and the preferred methods of routine, and emergency communication distribution.

Developer shall assign audit and quality assurance responsibilities to a member of his quality assurance team. The Public Information Coordinator shall not perform those duties because of the potential conflict of interest.

3.2.2 Public Information Coordinator

Developer shall provide a Public Information Coordinator to lead Developer's responsibility for public involvement activities on a day-to-day basis throughout the Term of the Agreement during the D&C Period only and during the O&M Period as needed. The Public Information Coordinator shall have a minimum of four years of relevant experience on projects of similar type and scope, and the ability to competently perform the following:

a) Serve as the primary point of contact between Developer and Customer Groups and act as clearinghouse for the receipt of and response to written or verbal comments or complaints regarding the Project.
b) Lead the production, implementation, audit, quality control/quality assurance, and update of the PICP.
c) Coordinate and supervise day-to-day activities of Developer's personnel in performing the activities described in the PICP.
d) Facilitate communication among Developer, TxDOT personnel (including TxDOT's public information officers), and Customer Groups.
e) Interact with Customer Groups and represent the interests of the Project at associated meetings and other formal and informal events.
f) Develop a "first-hand feel" for Customer Groups' concerns and reactions regarding the Project and public information program and incorporate that knowledge into improving the PICP.
g) Liaise with the person assigned to coordinate the initial response to any Incident or Emergency and any Governmental Entity that may have jurisdiction in the Emergency.
h) Liaise with the appropriate staff and customer groups as appropriate to outline the impacts and benefits of the Project in relation to parks and pedestrian/bicyclist access.
i) Create and manage a Customer Group database. Allow TxDOT access to database as needed.

3.2.3 Public Information Office

Developer shall maintain a public information office for the Term of the Agreement during the D&C Period only. 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 to the Project site. The public information office shall facilitate the exchange of information between Developer and the public and 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 Customer Group meetings. The rooms shall be ADA-compliant, convenient to and accessible by Customer Groups, and appropriately supplied with electrical outlets, tables and chairs, and other basic equipment to meet meeting requirements. One of these rooms shall accommodate at least 50 persons and another shall accommodate at least 15 persons. Developer shall provide sufficient parking to accommodate use of the public information office.

During major construction, the minimum hours of operation of the public information office shall be as follows.

Monday-Friday	8 a.m. – 5 p.m. and by appointment
Saturday	By appointment
Sunday	Closed

Developer shall extend hours of operation to appropriately service Customer Groups.

Developer shall provide reasonable access to the Project site to give TxDOT-approved Customer Groups the opportunity to view the construction.

In addition to the services listed above, Developer shall provide a 24-hour telephone hotline manned during normal business hours of the public information office with a recorded message describing Emergency procedures after hours. Developer shall respond to voicemail messages left after hours within 24 hours of receiving the voicemail message.

3.2.4 Customer Groups

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

a) Media
b) Local, State, and Federal Governmental Entities including regulatory and law enforcement agencies
c) General public residing or working within the general vicinity of the Project or traveling within or across the limits of the Project
d) Business owners within or adjacent to the Project corridor
e) Utilities, railroads, transportation authorities, and providers (such as local airports, transit operators, toll authorities, and other highway concessionaires) affected by the Project
f) Neighborhood associations, community groups, and other organizations with special interest in the Project
g) Major traffic generators that could be affected by closures or construction (such as universities, hospitals and major employers) and sponsors/coordinators of major regional special events such as Super Bowls.

3.2.5 Public Meetings

Developer shall organize and manage public meetings with the Customer Groups during design and construction activities and will serve as the clearinghouse for invitations to attend meetings and other events.

The frequency of public meetings shall be addressed in Developer's PICP and will increase or decrease as needs arise to better inform and engage the Customer Groups. Developer shall propose a schedule of

public meetings to TxDOT and then conduct the public meetings that, at a minimum, shall address Project construction and maintenance.

To maximize public participation, public meetings shall be advertised with sufficient advance notice via e-alerts, social media, and its website and in the appropriate media outlets, such as the *Texas Register*, local newspapers, and television and radio stations, or via media advisories and media releases as appropriate. Developer shall be solely responsible for meeting advertisement except that the *Texas Register* advertising, when appropriate, shall be routed through TxDOT's Public Information Office.

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

a) Design and construction issues affecting adjacent residential areas, frontage roads, local streets, and utilities, including such issues as Project ROW definition, Project ROW acquisition process, grading, drainage, access, lighting, aesthetics and noise, and retaining walls
b) Street and roadway detour design and implementation
c) Scheduling and duration of Work, including hours of construction
d) Haul routes
e) Methods to minimize noise and dust
f) Environmental mitigation measures, including noise wall meetings
g) Other environmental issues
h) Tolling plans and ingress and egress points to the managed lanes
i) Developer shall conduct a ROW open house at the direction of TxDOT and invite all affected and potentially affected property owners

Developer shall notify TxDOT a minimum of 48 hours in advance of any meetings with the public. TxDOT reserves the right to attend any such meetings. When requested by TxDOT, Developer shall participate in and provide support for any meetings with the Customer Groups called and conducted by TxDOT. When TxDOT decides to conduct such meetings, Developer shall share, in a readily manipulative form, all necessary information regarding potential Customer Groups at TxDOT's request. Developer shall bear all costs associated with the meetings organized and managed by Developer.

3.2.6 Meeting Summaries

For all meetings which Developer conducts or directly participates in, Developer shall prepare meeting summaries within five (5) Business Days after the conclusion of such meetings. At a minimum, Developer shall include the following items in the meeting summary:

a) A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses)
b) Documentation of the exhibits, presentations and/or handouts available at the meeting
c) Documentation of the issues discussed and any associated solutions
d) Description of remaining open issues and action items (including the person(s) responsible for follow-up and target date for resolution)

For any formal public meetings or open houses at which a court reporter is required, Developer shall also include detailed verbal transcripts in the summary. Developer shall submit draft versions of all meeting summaries to TxDOT for review before distributing final versions to the meeting attendees and appropriate Customer Groups.

Meeting summaries shall be submitted to TxDOT in readily accessible form (e-mail, Project intranet site, or file sharing site) within five (5) Business Days.

3.2.7 Emergency Event Communications

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

In the event of an unforeseen Emergency, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the occurrence. The definition of an unforeseen Emergency shall follow TxDOT's general guidelines requiring emergency notification when delays for motorists in traffic extend beyond two (2) hours. If advanced warning is available for an Emergency event such as ice/snow, timely notification shall mean as soon as practicable, but in no event longer than within one hour of the time the information is available. In both situations, the Public Information Coordinator shall continue to provide updated information, as available and on a timely basis, until the Emergency no longer exists.

3.2.7.1 Lane Closures

Subject to the lane closure restrictions set forth in Section 18, Developer shall provide TxDOT and appropriate Customer Groups a minimum of two weeks advance notice for lane closures and/or traffic switches planned to be in effect longer than 24 hours, or all full highway closures in effect during any portion of the period from 6 a.m. to 8 p.m., regardless of duration, and a minimum of 48 hours advance notice for lane closures other than full closures that are planned to be in effect less than 24 hours, using all appropriate tools as needed. The Public Information Coordinator shall input all lane closures (or an event that results in lane closures) into the TxDOT Highway Conditions Report.

For planned lane closures and Emergency event lane closures, as appropriate, Developer shall coordinate lane closures that may affect crossing TxDOT facilities with appropriate TxDOT district and area offices, as needed, to ensure that no conflicts occur. Developer shall provide advance notification of all lane closure notices to the appropriate TxDOT district and area office. TxDOT will provide appropriate contacts and information upon request. Developer shall also monitor and work with other projects along the SH 183 corridor for major closures to minimize impacts to the traveling public.

3.2.7.2 Disseminating Public Information

Developer shall prepare and distribute materials regarding Project-related subjects, using all appropriate methods, including, but not limited to: meetings, news releases, telephone correspondence, newsletters, emails, text messages, mobile phone applications for iPhone, Android, and Blackberry devices., hotlines, Highway Conditions Report, dynamic message signs, Web alerts, maps, displays, renderings, presentations, milestone events, business owner taskforce meetings, open houses, brochures, pamphlets, highway advisory radio, and video news releases. Copies of draft public information materials shall be submitted to TxDOT. TxDOT shall have a period of seven (7) days to review and comment in advance of final editing. Copies of all final materials shall be provided to TxDOT at least three days prior to dissemination.

Developer shall create a public website to convey Project-related information, including, but not limited to:

a) 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) Real-time traffic information, including speeds of traffic along the corridor and major incidents
g) Live traffic camera feeds
h) Recommended route alternatives during closures
i) Newsletter and meeting materials
j) Meetings and special events announcements and calendar
k) Links to TxDOT Highway Conditions Reports
l) Links to other related sites as deemed appropriate by TxDOT
m) Information on TxTags, TollTags and a toll calculator
n) Link to TxDOT TEXpress
o) Job opportunities
p) Subcontractor information
q) Comment form
r) Mailing list request form
s) Historical archive of photos taken during construction
t) Renderings or video animations of the Ultimate Project, as appropriate
u) Published materials in Spanish or other languages as needs warrant, as well as TxDOT advised translated materials

The website shall also contain other general Project-related information that enhances the engagement or education of the general public. Developer shall regularly review and update information on this public website throughout the Term of the Agreement to provide current and appropriate information and the website shall provide for question and feedback opportunities for public communication. Developer shall develop and implement a plan to make the Customer Groups aware of the Project website.

All written materials produced for Customer Groups shall follow the TxDOT *Style Guide* and/or other appropriate spelling/writing guidelines.

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

Developer shall track all incoming comments and inquiries and requests for information related to the Project. The following information shall be collected with each contact, and a summary of all contacts without contact information shall be reported to TxDOT on a monthly basis:

- Name of individual
- Address (not required)
- Phone number
- E-mail address
- Subject matter
- Specific comment, question or request
- Date of comment, question or request
- Response given

4 ENVIRONMENTAL

4.1 General Requirements

The Developer shall deliver the environmental commitments required by the Contract Documents and all applicable federal and state Laws and regulations. To that end, the Developer shall develop, operate, and maintain a Comprehensive Environmental Protection Program (CEPP) for the Work to ensure environmental compliance with all applicable Environmental Approvals, Environmental Laws and commitments, as well as documentation required for compliance. The CEPP shall obligate the Developer to protect the Environment and document the measures taken during the performance of the Work to avoid and minimize impacts on the Environment from the Project Right of Way acquisition, design, construction, maintenance, operation, and rehabilitation activities of the Project.

The CEPP shall be designed to incorporate all features and guidelines of ISO 14001. The CEPP shall effectively demonstrate in detail the Developer's knowledge of all applicable Project-specific Environmental Approvals, issues, and commitments and applicable Environmental Laws as set forth in these Technical Provisions, and shall describe the processes that will be followed during the course of the Work to comply with Environmental Approvals, commitments, and Laws, as well as the documentation required to validate compliance. All monitoring and reporting activities shall be concise and consistent throughout the Term of the Agreement as applicable to the activities being performed, and in accordance with the requirements set forth in the Environmental Laws. The CEPP shall also effectively describe the quality control and assurance measures that the Developer will implement to verify the compliance of the program with all applicable Environmental Laws.

The CEPP shall establish and implement environmental permits, issues, and commitments consistent with the Environmental Approvals. The program shall establish a goal of zero environmental violations during the performance of all Work activities. However, should violations occur, the CEPP shall set forth detailed processes for rectifying such violations in an appropriate and timely manner.

The Developer's obligation regarding Governmental Approvals and Laws, including Environmental Laws and Environmental Approvals, and the Developer's obligation for environmental compliance is set forth throughout this Section 4.

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

The costs of all field laboratory and consulting work, including but not limited to phases II to III environmental site assessments, related to Hazardous Materials will be considered part of the Reimbursable Hazardous Materials Costs. In no event shall any Phase I Hazardous Materials investigation cost be included in the Reimbursable Hazardous Materials Costs.

4.2 Environmental Approvals

4.2.1 New Environmental Approvals and Amended TxDOT-Provided Approvals

TxDOT-Provided Approvals are based on the Draft Schematic. Such Approvals may require re-evaluation, amendment, supplement, or additional studies/reports as the Work progresses or in order to accommodate actions not identified in the Environmental Approvals or covered specifically by environmental documents, permits, and existing resource and regulatory agency coordination. Changes to the Draft Schematic or incorporation of Additional Properties into the Project require the validity of existing Environmental Approvals to be reassessed and may require the Developer to obtain new Environmental Approvals.

Developer shall be responsible for coordination with Governmental Entities necessary to obtain new Environmental Approvals or amendments to the TxDOT-Provided Approvals, except where TxDOT has agreements with Governmental Entities to perform such coordination.

Developer shall be responsible for ensuring compliance with the conditions and schedules set forth in amendments to any TxDOT-Provided Approvals or new Environmental Approvals. TxDOT may, in its discretion, provide assistance in securing new Environmental Approvals or amendments to TxDOT-Provided Approvals.

4.2.2 Responsibilities Regarding Environmental Studies

Developer shall be responsible for conducting additional and or continuing environmental studies based on the approved Project NEPA document and Draft Schematic.

Developer shall be responsible for conducting environmental studies and re-evaluations caused by actions not identified in the Environmental Approvals, actions not covered specifically by existing resource agency coordination, or incorporation of Additional Properties into the Project. The Developer shall be responsible for all coordination of environmental studies with appropriate Governmental Entities, except where TxDOT has agreements with Governmental Entities to perform such coordination.

4.2.3 TxDOT Review and Approval of Developer Submissions

TxDOT reserves the right to review, comment on, require revisions to, and reject for resubmission documentation submitted for environmental compliance or Environmental Approvals. Documentation shall conform to current TxDOT submission standards and the requirements of all applicable Governmental Entities, laws, and regulations. TxDOT will accept for review documentation meeting current submission standards. TxDOT will return approved documentation to the Developer for submittal to the appropriate Governmental Entity in cases where the Developer performs coordination. TxDOT, acting reasonably, will approve those submissions for which TxDOT signature or other approval is required. Documentation not meeting current submission standards or requirements of Governmental Entities will be returned to the Developer, and shall be revised by the Developer to meet standards or requirements.

4.2.4 TxDOT-Provided Approvals

All mitigation requirements and environmental commitments set forth in the approved environmental documents for the Project shall be the responsibility of the Developer unless specifically stated otherwise.

The Developer shall comply with all permit requirements, including associated mitigation and other commitments. The following TxDOT-Provided Approvals have been obtained for the Project:

a) Loop 12/IH 35E Environmental Assessment (December 2002);
b) Loop 12/IH 35E Environmental Assessment Re-Evaluation (June 2008);
c) SH 183 Environmental Assessment (February 2004);
d) SH 183 Environmental Assessment Re-Evaluation (April 2012);
e) SH 121/SH 183(Airport Freeway) Environmental Assessment (October 2009);
f) SH 121/SH 183 (Segment 2W) Environmental Assessment Re-Evaluation (June 2011); and
g) SH 114 Environmental Assessment (April 2009).

Upon completion, additional TxDOT-Provided Approvals will include:

a) Loop 12/IH 35E Environmental Assessment Re-Evaluation;
b) SH 183 Environmental Assessment Re-Evaluation;
c) SH 121/SH 183 (Segment 2E) Environmental Assessment Re-Evaluation;
d) SH 114 Environmental Assessment Re-Evaluation; and
e) Initial Section 408 Submittal Package Determination (see Section 4.3.2.4).

4.3 Comprehensive Environmental Protection Program (CEPP)

As part of the PMP, the Developer shall develop and implement a CEPP, applicable throughout the Term of the Agreement, to establish the approach, requirements and procedures to be employed to protect the environment. The CEPP shall be developed in the form of a comprehensive environmental management system, incorporating all features and guidelines outlined in ISO 14000. All component parts shall reflect in order of priority: impact avoidance, minimization and as last resort mitigation. The CEPP shall satisfy applicable FHWA, TxDOT, and resource and regulatory agency requirements, including those detailed as commitments in any Environmental Approvals. The CEPP shall be updated to comply with any changes to the environmental commitments resulting from changes to the Metropolitan Transportation Plan as maintained and approved by the North Central Texas Council of Governments.

The CEPP shall be the overarching system by which the Developer shall cause environmental commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work. The Developer shall use the CEPP to track on-going issues, identify environmental compliances, non-compliances and identify actions required/taken to correct any such non-compliances.

At a minimum, the CEPP shall include the following component parts:

a) Environmental Management System (EMS);
b) Environmental Compliance and Mitigation Plan (ECMP);
c) Environmental Protection Training Plan (EPTP);
d) Hazardous Materials Management Plan (HMMP);
e) Communication Plan (CP);
f) Construction Monitoring Plan (CMP);

g) Recycling Plan (RP); and
h) Environmental Team Resumes.

The dates by which component parts comprising the CEPP are to be submitted for TxDOT approval are set forth throughout these Technical Provisions. Amendments and updates to the CEPP as necessary to address changing conditions and environmental requirements shall be in accordance with the procedures for amendments to the PMP.

4.3.1 Environmental Management System (EMS)

The EMS shall be the overarching system by which the Developer shall cause environmental commitments made during the Environmental Approval and permitting processes, and other environmental requirements to be carried forward and reflected, as appropriate, in the design and implemented throughout the Work. The Developer shall use the EMS to track on-going issues, identify environmental compliances, non-compliances and identify actions required/taken to correct any such non-compliance.

The EMS shall establish a schedule for periodic CEPP review to ensure it is up to date. The EMS shall provide a means to track the reviews and results. At a minimum, the EMS shall require documents in the following list to be on file at the Site and available at any time for TxDOT review:

a) CEPP component parts;
b) Weekly Environmental Monitoring Reports;
c) Investigative Work Plans, Site Investigation Reports, and remedial action plans as necessary for hazardous material discovery/remediation;
d) Jurisdictional Determinations and appropriate Section 404 Permit Application if changes to the design or temporary construction impacts are necessary;
e) Mitigation or resource monitoring reports, as required by resource-specific mitigation plans;;
f) Designs for wetland and floodplain mitigation;
g) TPDES Construction General Permit (TXR150000), NOI;
h) TPDES Construction General Permit (TXR150000), Notice of Termination for Work completed;
i) Storm Water Pollution Prevention Plan (SW3P) and amendments, as required to reflect Project development and staging, including off-site plans, controls and reporting from borrow sites, waste sites, and plant location sites;
j) Completed Permit applications and permits as issued;
k) Pre-Construction Inspection Report;
l) Training Documentation;
m) Developer's final traffic noise analysis, if different than that included in the TxDOT-Provided Approvals;
n) Attachment 4-2, Temporary Erosion, Sedimentation, and Environmental Controls (Special Specification 1122);
o) Attachment 4-3, Construction SW3P Field Inspection and Maintenance Report (Form 2118);
p) Attachment 4-4, Construction Stage Gate Checklist (SGC) (Form 2448); and
q) Attachment 4-5, EPIC Sheets.

4.3.2 Environmental Compliance and Mitigation Plan (ECMP)

The ECMP shall document and fully detail compliance strategies and procedures to ensure Work is performed in accordance with requirements of applicable Environmental Laws and Environmental Approvals. This plan shall establish and/or document schedules, protocols, and methodologies to be used in accomplishing Work, with an emphasis on monitoring, reporting, corrective actions and adaptive management. The plan shall include a Compliance Action Plan (CAP) consisting of a decision-making matrix that defines the triggers for initiating or re-initiating environmental compliance actions for construction and maintenance activities, including construction noise mitigation measures. For each trigger, the CAP shall identify the appropriate type or level of environmental study or other compliance action necessary to ensure the ongoing validity of Project Environmental Approvals and commitments. In addition, the ECMP shall detail any mitigation required by Environmental Approvals and the Developer's approach to satisfying mitigation requirements, including mitigation requirements identified after completion of the ECMP.

The ECMP shall include the following components:

4.3.2.1 EPIC Sheets

The Developer shall develop and maintain EPIC construction plan sheets. Applicable permits and environmental commitments shall be identified on EPIC sheets and updated throughout the construction period to identify on-Site conditions. The State shall ensure that EPIC sheets shall include the Environmental Commitments required to ensure that any discharge from the Project site into a sanitary sewer system complies with appropriate codes and standards of the sanitary sewer owner.

4.3.2.2 Clean Water Act (CWA) - Sections 404 and 401: Waters and Wetlands of the United States

The Developer shall document how it will comply with the terms and conditions associated with Section 404 permit(s) required by the USACE and Section 401 State Water Quality Certification(s) as administered by the Texas Commission on Environmental Quality (TCEQ), as well as any additional Section 404 permits and 401 certifications issued to the Developer during the life of the Project. The documentation, at a minimum, shall include:

a) Process for training personnel to recognize Waters of the U.S. that fall under the jurisdiction of the USACE;
b) Process for communicating the terms and conditions of all USACE 404 permits and TCEQ 401 certifications and other permits as necessary;
c) Procedures for carrying out any required mitigation; and
d) Procedures for handling Project Specific Locations (PSL) outside the Project Right of Way, as required by all Section 404 permit(s) issued to either TxDOT or the Developer by the USACE.

The Project is within the Trinity River Corridor Development Regulatory Zone; therefore, a Corridor Development Certificate (CDC) shall be provided by the Developer, if required. If a CDC hydraulic review for the Project is performed by USACE under the Section 408/RGP 12 approval process, the Developer is responsible for determining applicability of the CDC and shall obtain the CDC if necessary.

4.3.2.3 Clean Water Act - Sections 402: Texas Pollutant Discharge Elimination System (TPDES)

The Developer shall document how it will comply with Section 402 of the CWA. The documentation shall state that the Developer has day-to-day operational control over activities necessary to ensure compliance with the SW3P and has the sole responsibility for any potential non-compliance issue. The documentation shall also state that the Developer is responsible for submitting a Notice of Intent to TCEQ. The documentation, at a minimum, shall include:

a) Process for training personnel on the requirements and conditions of the Texas Construction General Permits (CGPs) for Storm Water Discharges from Construction Sites;
b) Procedures for incorporating additional properties outside the original NEPA approved schematic and any off-Right of Way PSL within one linear mile of the Project Limits to comply with the CGPs and the Project's SW3P;
c) Procedures for handling non-compliance issues;
d) Escalation procedures for SW3P items;
e) Attachment 4-3, Construction SW3P Field Inspection and Maintenance Report (Form 2118); and
f) Attachment 4-4, Construction SGC (Form 2448).

4.3.2.4 Rivers and Harbors Act of 1899 – U.S.C., Title 33

The Developer shall document compliance with Section 14 of the Rivers and Harbors Act of 1899 [33 United States Code (U.S.C.) Section 408]. Approval to construct within the Dallas Floodway must be authorized by the USACE under Section 408. TxDOT will secure the Initial Section 408 Package Determination from the USACE. It will be the responsibility of the Developer to advance the Section 408 Permit to receive construction approval from the USACE. Developer proposed design variations from those presented in the Initial Section 408 Package Determination may be subject to re-analysis, as determined by the USACE. It will be the responsibility of the Developer to provide appropriate documentation and analysis for the design variations to the USACE to obtain the construction approvals. The Developer shall coordinate with the appropriate governmental entities prior to submitting packages to the USACE and initiating construction activities. The Developer shall comply with the USACE approved Section 408 Submittal Review Plan shown in the RID for any submittal related to Section 408.

The Developer shall be responsible for the fee associated with the final decision on the Section 408 Confirmation Package in accordance with RID Exhibit 4-1, Acknowledgement of the Policies between NCTCOG and USACE.

4.3.2.5 State Listed Species and Unregulated Habitat

Developer shall document how it will address state listed species and unregulated habitat. The documentation shall be in agreement with all Memorandums of Understanding (MOU) and Memorandums of Agreement (MOA) TxDOT has with the Texas Parks and Wildlife Department (TPWD), including the requirement for coordination with TPWD to be conducted by TxDOT. The documentation, at a minimum, shall include:

a) Process for communicating commitments regarding state listed species and unregulated habitat; and
b) Procedures for complying with mitigation and/or commitments.

4.3.2.6 Endangered Species Act (ESA), Fish and Wildlife Coordination Act (FWCA), and Migratory Bird Treaty Act (MBTA)

Developer shall document how it will comply with the ESA, FWCA, and MBTA. The documentation shall reflect that coordination with U.S. Fish and Wildlife Service (USFWS) shall be conducted by TxDOT. The documentation, at a minimum, shall include:

a) Process for training personnel on the requirements of the ESA and FWCA;
b) Process for communicating any commitments regarding ESA and FWCA; and
c) Procedures for complying with any commitments including mitigation.

The Developer shall comply with all state and federal laws and regulations as related to state and federal listed threatened and endangered species. Prior to construction, Developer shall review the most current state and federal threatened and endangered species lists to determine if changes to the lists have occurred since the applicable NEPA Approvals. If changes to the lists have occurred, Developer shall reassess the potential Project impacts to the listed species and/or their habitat. Developer shall take all appropriate actions to comply with applicable state and federal regulations. If it is determined that adverse effects to listed species will occur, Developer shall work with TxDOT to develop mitigation approaches. Developer shall prepare any materials needed for coordination or consultation with regulatory agencies, at TxDOT's direction. TxDOT will conduct coordination or consultation with the applicable state and federal agencies for the Project. Developer shall be responsible for any mitigation requirements identified from regulatory agency coordination/consultation.

Based on applicable NEPA Approvals, mussel surveys are required by the Developer prior to construction. Developer shall adhere to the requirements above prior to construction.

In accordance with the MBTA, no vegetation or man-made structures containing active nests, eggs, or young shall be removed during construction. In the event migratory birds are encountered during construction, Developer shall make every effort to avoid adverse impacts to protected migratory birds, active nests, and their young. Developer shall remove all old migratory bird nests between September 1 and January 31 from any vegetation or structure where construction will occur. In addition, Developer will be prepared to prevent migratory birds from building nests within applicable structures between February 1 and August 31. All proposed prevention methods shall be coordinated and approved by TxDOT prior to planned use.

4.3.2.7 Traffic Noise

The Developer shall document how it will address traffic noise mitigation. The documentation, at a minimum, shall include:

a) Process for carrying out traffic noise mitigation measures as identified and discussed in the approved NEPA document schematic and any supplemental traffic noise studies completed by Developer;
b) Process for carrying out traffic noise mitigation measures determined throughout the life of the Project; and
c) Process to handle changes that may occur to proposed permanent traffic noise mitigation in the approved NEPA document and schematic.

To fulfill the commitments of the previously mentioned TxDOT-Provided approvals, the Developer shall be responsible for implementing all noise mitigation measures to minimize construction and long-term impacts of the Work as prescribed in TxDOT-Provided approvals and subsequent re-approvals to TxDOT-Provided approvals secured by the Developer. The Developer acknowledges that TxDOT-Provided approvals and proposed permanent noise mitigation are based on the schematic design and Draft Schematic ROW; consequently, if design changes and/or additional ROW become necessary, applicable noise analyses may require reassessment and proposed traffic noise mitigation may require modification by the Developer. Such reexaminations of noise analyses and noise wall modifications shall be submitted to TxDOT for review and approval.

Developer shall be responsible for public notification and involvement per TxDOT *Guidelines for Analysis and Abatement of Highway Traffic Noise* and in accordance with Section 3. Developer shall allow 15 days for adjacent affected property comments after each noise workshop.

Developer shall be responsible for all coordination with adjacent property owners and Governmental Entities necessary to obtain all such amendments to TxDOT-Provided Approvals and for ensuring compliance with the conditions and schedules set forth in the amendment of any TxDOT-Provided Approvals.

4.3.2.8 Water Well Impacts and Requirements

Developer shall document how it will address wells (such as municipal, domestic, irrigation, oil and gas, or monitoring and observations wells) encountered during the life of the Project. The documentation shall include that the Developer is responsible for plugging and abandoning all wells in accordance with Item 103, Disposal of Wells, from TxDOT Standard Specifications, as well as the developer is responsible for any required remediation efforts. The documentation at a minimum shall include:

a) Process for training personnel on recognition of wells;
b) Procedures for handling wells; and
c) Procedures for handling contamination of a well that results from the Work. Procedures shall include a requirement to notify TxDOT and with TxDOT's concurrence notify appropriate regulatory agency within 24 hours of the discovery.

4.3.2.9 Cultural Resource Studies

Developer shall be responsible for ensuring compliance with cultural resource Laws on the Project through the Term of the Agreement. TxDOT will perform consultation for the Project according to current procedures for implementing Section 106 of the National Historic Preservation Act (NHPA), and the Antiquities Code of Texas.

Subsequent to issuance of NTP1, Developer shall be responsible for performing any necessary cultural resource surveys, evaluations, testing, and mitigation in those areas outside the footprint of the Project ROW shown on the schematics as defined in the original NEPA approval and within the area of potential effects. The Developer shall coordinate all necessary Antiquities Permits through TxDOT. Antiquities Permits shall be obtained from the Texas Historical Commission (THC) for archeological surveys, testing, monitoring, and data recovery.

Developer shall document efforts to avoid impacts to cultural resources that are listed on or determined to meet the eligibility criteria for listing to the National Register of Historic Places as specified in 36 CFR 60.4, or that are designated or determined to meet the criteria for designation as State Archeological Landmarks as specified in 13 (TAC) 26.8.

If evidence of possible archeological deposits are encountered during the course of the Work, the Developer shall immediately cease Work in the immediate area and contact TxDOT to initiate post-review discovery procedures under the provisions of the Programmatic Agreement among TxDOT, the State Historic Preservation Officer, FHWA, and Advisory Council on Historic Preservation as well as the MOU between TxDOT and the THC. The Developer shall undertake appropriate measures to protect the site from further intrusion to the extent feasible until an appropriate evaluation of the site can be made by a qualified representative. Work shall not be resumed in the area until the Developer receives notification and approval from TxDOT.

4.3.2.10 Public Involvement

Developer shall document how it will comply with all public involvement requirements, including public involvement requirements specifically related to cultural resources. The documentation shall comply with all applicable requirements including, but not limited to, 43 TAC Part 1, Chapter 2, Subchapter E, Section 106 of the NHPA (36 CFR 800), Chapter 26 of the Texas Parks and Wildlife Code, the Civil Rights Act of 1964, and the Civil Rights Restoration Act of 1987. The documentation shall include that the Developer is responsible for conducting all public involvement requirements for the life of the Project, except where TxDOT has agreements with Governmental Entities to perform public involvement requirements. The documentation shall follow the TxDOT requirements for public participation (43 TAC Part 1, Chapter 2, Subchapter E) and at a minimum shall include:

a) Process for handling public involvements requirements; and
b) Procedures for documenting public involvement.

4.3.2.11 Standard Operating Procedures

Developer shall develop standard operating procedures for the following activities and include them in the ECMP:

a) Controlling dust during construction;
b) Mitigating vibration during construction;
c) Mitigating light intrusion on adjacent properties; and
d) Monitoring and mitigation of construction noise during night time Work
e) Complying with Section 404 regulations and Section 404 permits for the Project.

4.3.3 Environmental Protection Training Plan (EPTP)

The Developer shall develop and implement an (EPTP) that shall meet the minimum requirements set forth herein. The EPTP shall include methods and procedures documented in the ECMP to:

a) Educate every worker to:

- Recognize the overall importance of environmental issues to constructing, operating and maintaining a successful Project.

- Appreciate the various environmental sensitivities of the Project.

b) Train every worker to:

- Recognize environmentally sensitive resources that may be encountered during the Work.
- Avoid or take appropriate action to minimize environmental impacts from the Work.
- Know the required actions, practices, and procedures regarding regulated resources.
- Understand protocols for meeting environmental commitments for post-review discoveries.

c) Foster the Developer's management and supervisory personnel's attitude of commitment to the Project's environmental quality.

d) Convey to all workers the Developer's management commitment to the Project's environmental quality.

e) Convey to all workers TxDOT's and the Developer's commitment to zero tolerance for violations.

4.3.3.1 EPTP Scope and Content

The goal of the EPTP is to educate Project personnel about the following:

a) Overall importance of environmental protection to the Project;
b) Compliance responsibility and Governmental Entity authority including background and environmental issues regulatory overview;
c) Overview of the Developer's environmental commitments and responsibilities at the Project level;
d) Worker responsibilities;
e) Jurisdictional Waters identification;
f) Environmental Approvals terms and conditions including an overview of the provisions of the ESA, MBTA, and SW3P;
g) BMPs for environmental compliance, including pollution prevention, erosion, sedimentation, post construction controls, and dust control measures to maintain water and air quality;
h) Required mitigation measures;
i) Procedures and precautions in the event of spills of or discovery of Hazardous Materials or unknown chemicals or contamination;
j) Procedures and precautions in the event human skeletal remains or other archeological or paleontological resources are discovered;
k) Procedures regarding the relocation of historical markers (i.e. Texas Historic Commission Subject Markers, DAR OSR Markers, Texas Centennial Markers, Texas Highway Department Markers, and local/county markers);
l) Groundwater protection requirements;
m) CWA regulations and surface water protection requirements;
n) Overview of noise and residential impact reduction procedures;
o) Air quality requirements; and
p) Penalties and/or fines for violations of and noncompliance with Environmental Approvals and Environmental Laws, including termination of employment.

Developer shall submit to TxDOT for review and approval course outlines containing learning objectives designed to achieve stated goals and suggested staff attendance for all anticipated training requirements through the Term of the Agreement. Course outlines shall be submitted within 90 days after NTP1.

4.3.4 EPTP Participation

Developer shall require all non-administrative employees to participate in the EPTP and shall keep accurate records documenting attendance, as well as materials presented.

Developer shall include activities for implementation of the EPTP in the Project Schedule. The length of training sessions and their frequency shall be sufficient to achieve the goals set forth above. Periodic training sessions at key times (e.g., prior to construction or major maintenance in sensitive areas or construction timing restrictions to protect threatened and/or endangered species) shall be used to update workers on specific restrictions, conditions, concerns, and/or requirements.

4.3.5 Hazardous Material Management Plan (HMMP)

Developer shall prepare an HMMP for the safe handling, storage, treatment and/or disposal of Hazardous Materials, whether encountered at or brought onto the Project Site by the Developer, encountered or brought onto the Project site by a third party, or otherwise, during the Term of the Agreement. The Developer shall submit the final HMMP to TxDOT for review and approval in its good faith discretion within 60 days of NTP1; approval of the Plan by TxDOT shall be a condition of commencement of Construction Work.

The HMMP shall include procedures compliant with all applicable Environmental Laws and include, at a minimum:

a) For all chemicals to be used on the Project by Developer-Related Entity, the Developer shall keep and update Material Safety Data Sheets (MSDS), per OSHA requirements, for the Term of the Agreement;
b) Designated individuals responsible for implementation of the plan;
c) Procedures for identifying and documenting potential contaminated sites which might impact Project development;
d) Procedures for mitigation of known contaminated sites anticipated to impact construction;
e) Procedures for mitigation of unanticipated contaminated sites encountered during construction;
f) Procedures for mitigation of contamination during the operation and maintenance of the Project;
g) Procedures for developing a detailed Spill Response Plan for the Term of the Agreement;
h) Process for training personnel for responding to and mitigating Incidents involving contamination or waste;
i) Provisions for appropriate storage and disposal of all waste encountered or disposed of on the Project for the Term;
j) Provision for a Hazardous Materials training module as an Element of the EPTP component of the CEPP;
k) Procedures for preparing an Investigative Work Plan (IWP) and Site Investigative Report (SIR) in the event that Hazardous Materials are discovered during construction; operations or maintenance activities; and
l) Identification and contact information for designated responsible individuals.

The HMMP shall include provisions for making all on-Site workers aware of and able to recognize the potential Hazardous Materials to which they may be exposed, limiting Developer and other Site workers' exposure to Hazardous Materials and providing all necessary personal protection equipment to protect

workers from exposure. The HMMP shall require Developer to provide any non-Developer personnel who visit the Project with the appropriate personal protection equipment.

The HMMP shall require that all personnel of Developer-Related Entities handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 1910.120 (HAZWOPER Training).

Further, the HMMP shall include procedures for ensuring that all applicable certifications, licenses, authorizations and Governmental Approvals for Developer personnel handling Hazardous Materials are current and valid through the duration of the Work.

4.3.5.1 Investigative Work Plans (IWP) and Site Investigation Reports (SIR)

If Hazardous Materials are encountered within any of the Project ROW or Additional Properties used as Developer's staging area, field office site, plant sites, borrow site, or stockpile location, Developer shall prepare an IWP that addresses the methods, techniques, and analytical testing requirements to adequately characterize the extent of the contaminated media (soil and/or groundwater) potentially impacting the Project. Developer shall locate and assess the likely source of contamination.

A Registered Professional Engineer and other qualified professionals, as needed, shall prepare the IWP and other necessary reports in accordance with applicable, relevant or appropriate Laws and guidance.

Upon satisfactorily completing the investigative work, Developer shall summarize the findings within a SIR and make recommendations regarding potential response actions necessary for Project development. Developer shall take Hazardous Materials contamination into account during all subsequent phases of Project development, including Additional Properties negotiation and acquisition, property management, design, and construction.

The SIR shall address the characterization of the impacted area; sampling efforts and findings; opportunities to avoid the contamination by adjusting the design; level of response action warranted if the contamination cannot be avoided; feasibility of initiating response actions prior to construction; pursuit of cost-reimbursement from responsible parties; the need for completing response actions concurrent with construction and nature of any special specifications and provisions necessary for incorporation into the Project.

When required by Federal or State agencies, Developer shall initiate a preventative or corrective action after TxDOT review and approval of the SIR from appropriate Federal or State agencies.

4.3.6 Communication Plan (CP)

The Developer shall develop a CP which describes in detail the communication hierarchy for information distribution related to the compliance with the CEPP. The CP shall include names and contact information, including emergency contact information, and the preferred methods of routine, and emergency communication distribution. Developer shall remain in compliance with CP through the term of the Agreement.

4.3.7 Construction Monitoring Plan (CMP)

The Developer shall develop a CMP that identifies times, locations, and other conditions where monitoring of construction activities are to be performed to maintain and cause compliance with Environmental Laws, Environmental Approvals, and the Contract Documents. The CMP shall establish and/or document schedules, protocols, and methodologies to be used for monitoring Work with an emphasis on timely reporting, corrective actions, and adaptive management. The CMP shall establish reporting procedures, identify reporting requirements, and establish controls for report distribution and records retention. All Environmental Monitoring Reports shall be made available for review by TxDOT at TxDOT's request. Developer shall remain in compliance with the CMP through the term of the Agreement. Should any non-compliance or violation be observed that represents an imminent danger to human health or the environment, the CMP shall include procedures to cause immediate notification of TxDOT.

Prior to NTP2, Developer and TxDOT shall jointly inspect existing facilities, structures, and environmentally sensitive areas in the vicinity of the Site but not included as part of the Work. Developer shall provide a minimum 2-week advance notice to TxDOT of this joint inspection. The inspection shall document the pre-construction condition of vegetation, streets, sidewalks, landscaping, residential and commercial property, creeks, storm drainage, and infrastructure. The purpose of the inspection is to provide a point of reference from which TxDOT can determine if any facility, structure, and environmentally sensitive area damaged during the Work is restored to its pre-construction condition. Developer shall document the inspection with a report that shall include photographs, sketches, maps, and narratives clearly depicting the pre-construction Site condition.

The inspection shall include the municipal separate storm sewer system (MS4) located within and adjacent to the Site. During the inspection, Developer shall note the following:

a) Storm drains, culverts, swales, and other components of the MS4 that Developer verified as free of floatable trash, silt, debris, and functioning as originally intended;
b) Storm drains or culverts that do not function or appear not to function as originally intended;
c) Siltation of culverts, concrete swales, and other components of the MS4;
d) The presence of construction on adjacent, up-gradient, or down-gradient properties. If construction on other properties is noted, Developer shall photographically document the general condition of these properties and their compliance with storm water regulations;
e) Pre-existing off-Site tracking from the Site or surrounding properties;
f) Potential pre-existing contamination (i.e., any areas of soil discoloration or distressed vegetation); and
g) Any other pre-existing condition that, by its nature, could be construed as a violation of the TPDES General Construction Permit.

Following construction of the Project, Developer shall conduct a yearly inspection to monitor and repair any of the above mentioned deficiencies in the storm water system.

All photographs shall be archival quality and shall be accompanied by a caption describing the date; time of day; location and direction in photograph was taken. If the photograph shows existing damage, the

damage must be clearly shown and noted in the caption. All sketches and maps must be no larger than 11 inches x17 inches. All photographs must be 4 inches x 6 inches.

4.3.8 Recycling Plan

The Developer shall develop a recycling plan to document and fully detail the Developer's commitment to recycling, waste minimization, and use of "green products" during all aspects of Work. The recycling plan shall document Developer's recycling initiatives, as well as methods and procedures for maximizing the use of recycled materials in all aspects of the Work. If recyclable materials shall be used in lieu of TxDOT-approved construction and maintenance materials, the Developer shall follow the TxDOT Material Specification DMS 11000. Developer shall remain in compliance with the recycling plan through the term of the agreement.

4.3.9 Operations Monitoring Plan (OMP)

The Developer shall develop a OMP that identifies times, locations, and other conditions where monitoring of operations activities are to be performed to maintain and cause compliance with Environmental Laws, Environmental Approvals, and the Contract Documents. The OMP shall establish and/or document schedules, protocols, and methodologies to be used for monitoring Work with an emphasis on timely reporting, corrective actions, and adaptive management. The OMP shall establish reporting procedures, identify reporting requirements, and establish controls for report distribution and records retention. All Environmental Monitoring Reports shall be made available for review by TxDOT at TxDOT's request. Developer shall remain in compliance with the OMP through the term of the Agreement. Should any non-compliance or violation be observed that represents an imminent danger to human health or the environment, the OMP shall include procedures to cause immediate notification of TxDOT.

4.4 Environmental Personnel

Developer, acting through the Environmental Compliance Manager (ECM), shall designate an Environmental Team (ET), as detailed in this section, to prevent, minimize, and/or correct any violation of or noncompliance with Environmental Approvals. The ET shall include Environmental Training Staff, Environmental Compliance Inspectors (ECIs), Archeologist, Architectural Historian, Historian, Historical Architect, Natural Resource Biologist, Water Quality Specialist, and Hazardous Materials Manager. All of the ET shall be deemed other principal personnel.

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

a) Staffing and availability of ECM and all ET personnel; and
b) ET staff response times during the Work.

4.4.1 Environmental Compliance Manager (ECM)

Developer shall designate a full-time ECM for the Work. The ECM shall report and coordinate all issues directly with TxDOT and the Developer's Project Manager. In the event the ECM, in consultation with Developer's Project Manager and TxDOT, is unable to reach satisfactory resolution of environmental issues, the ECM shall provide written notification to the Developer and TxDOT outlining the concerns, actions taken in attempt to correct the concerns, and provide a recommendation as to the suggested course of action.

The ECM shall direct the work of the ET and shall monitor, document, and report the current status of environmental compliance for the Work. The ECM shall report immediately to TxDOT and the Developer any violation or non-compliance and shall include with any such report, the appropriate recommendations for corrective action, including stoppage of Work.

The ECM shall coordinate with TxDOT, the Developer, and appropriate Governmental Entities. The ECM shall submit all necessary environmental documentation and monitoring reports to the appropriate Governmental Entities and when applicable, through TxDOT, to the extent necessary to maintain compliance with applicable Environmental Approvals.

Developer shall not have the ability to relieve the ECM of his or her duty without the written consent of TxDOT. Should Developer desire to replace ECM, Developer shall submit to TxDOT a replacement candidate and provide the replacement in accordance with Section 7.4.5 of the Agreement. In the absence of the ECM, Developer's Hazardous Materials Manager shall act as an interim ECM.

The ECM shall have at least five years of experience successfully managing environmental compliance of urban freeway construction. The qualifying experience must include the following:

a) Developing and managing a SW3P;
b) Developing and managing a hazardous substance and petroleum products management plan;
c) Implementing environmental mitigation plans;
d) Providing environmental and personal protection training; and
e) Monitoring compliance with Section 404 Permit conditions.

The qualifying experience for the ECM must demonstrate the individual is familiar with:

a) The scope and terminology of ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*;
b) Provisions of the TPDES CGP (TXR 150000); and
c) Requirements of Section 404 and permit provisions.

4.4.2 Environmental Training Staff

Under the direction of the ECM, the ET staff shall develop, schedule, and conduct environmental awareness and environmental compliance training for the Developer's personnel. All training shall be in accordance with the requirements set forth in Section 4.3.3. Environmental Training Staff members shall have at least one year of experience providing environmental compliance inspection for freeway construction.

4.4.3 Environmental Compliance Inspectors (ECIs)

The ECIs shall conduct on-Site environmental monitoring, prepare documentation, and report to the ECM daily all violations, compliance, and noncompliance 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 of operational control experience of SW3P activities.

4.4.4 Cultural Resource Management Personnel

The ECM shall designate Cultural Resource Management Personnel to provide expertise in monitoring impacts to cultural resources during the course of the Work. The Cultural Resource Management Personnel shall be responsible for complying with cultural resource laws for all cultural resource activities required as a result of Developer's Work.

The Cultural Resource Management Personnel shall meet the certification requirements of TxDOT Work Categories, 2.8.1 (Surveys, Research and Documentation of Historic Buildings, Structures, and Objects), 2.9.1 (Historic Architecture), 2.10.1 (Archaeological Surveys, Documentation, Excavations, Testing Reports and Data Recovery Plans), and 2.11.1 (Historical and Archival Research).

4.4.5 Natural Resource Biologist

The ECM shall designate a Natural Resource Biologist to provide expertise in monitoring impacts on wildlife and the natural environment during the course of the Work.

The Natural Resource Biologist shall meet the certification requirement of TxDOT Work Categories 2.6.1 (Protected Species Determination (Habitat)), and 2.6.3 (Biological Surveys).

4.4.6 Water Quality Specialist

The ECM shall designate a Water Quality Specialist to provide expertise in 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 SW3P and be able to demonstrate a working knowledge of the TPDES and MS4 permit requirements applicable to the Project.

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

4.4.7 Hazardous Materials Manager

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

a) Schedule and/or conduct training for the Developer's employees
b) Verify all employee certifications prior to and required for any handling of Hazardous Materials
c) Maintain records of all incidents involving Hazardous Materials and notify the ECM, TxDOT and appropriate authorities in writing of any such incidents

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

a) Experienced in developing IWPs, SIRs, and remedial action plans or equivalent reports necessary and acceptable to the TCEQ in material discovery and remediation efforts of Hazardous Materials.
b) Experienced in TCEQ guidance for the investigation and remediation of Hazardous Materials under the TCEQ Voluntary Cleanup Program and Texas Risk Reduction Program Rules.

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

4.5 Property Access

To fulfill the obligation of the TxDOT-Provided Approvals to maintain current access during and after construction, Developer shall minimize the inconvenience to vehicles, bicycles, and pedestrians during the Term of Agreement. The Developer shall maintain access to adjacent properties during construction and ensure that visibility of businesses is maintained.

4.6 Dust Control

Developer shall institute dust control measures to minimize air quality impacts. The measures shall be adjusted as necessary based on construction traffic, forecasted wind speeds, and persistent dry weather conditions.

4.7 Asbestos Containing Material (ACM)

Developer shall identify, inspect, notify, 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.

4.8 Lead Based Paint (LBP)

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

5 THIRD PARTY AGREEMENTS

5.1 General Requirements

TxDOT has existing agreements with local Governmental Entities along the Project corridor that define the requirements for construction, maintenance, and operation of traffic signals, illumination, and roadway maintenance. These agreements specify the local Governmental Entities' responsibilities and TxDOT's responsibilities with respect to the requirements and are provided in the Reference Information Documents.

Developer shall perform all TxDOT responsibilities and duties as defined in the current and future agreements. Developer shall provide TxDOT and Governmental Entities all information necessary for it to fulfill TxDOT's responsibilities under these agreements.

5.2 Traffic Signals

New construction or modifications to the existing traffic signals are defined in Section 16.

5.2.1 Red Light Cameras

TxDOT shall have the sole discretion to approve any red light cameras within the corridor. Developer shall forward any red light camera installation requests directly to TxDOT.

5.3 Roadway Illumination

Some local Governmental Entities may request continuous illumination along the frontage roads within the Project Limits in addition to the lighting required in Section 16. Should this occur, additional agreements between TxDOT and the Governmental Entity will be required. Developer shall coordinate with and provide reasonable accommodations to the third party to carry out the installation, operations, inspection, and maintenance obligations as specified in such agreements.

For sections of continuous lighting specified by these additional agreements, safety lighting shall be included as a component of the overall system, and responsibilities for said safety lighting shall be as specified in the terms of the additional agreement.

New construction or modifications to the existing illumination are defined in Section 16.

5.4 Municipal Maintenance Agreements

Where Municipal Maintenance Agreements exist, Developer shall execute TxDOT's responsibilities and duties as defined by these agreements. Developer shall coordinate the necessary arrangements directly with the appropriate local Governmental Entity for additional maintenance or improvements within the local Governmental Entity's jurisdiction if so required by the Work.

5.5 Other Affected Third Parties

When Work interfaces with third party facilities, Developer is responsible for coordinating the Work with all third parties potentially affected by the Work. Developer shall prepare an Affected Third Parties Plan that describes how Developer will mitigate the impact of the Work upon potentially impacted third parties, for TxDOT's review prior to initiating discussions with potentially impacted third parties.

When the Work interfaces with other construction projects within, connecting to, or along the corridor, Developer shall coordinate the Work with the other projects to ensure that the proposed design, construction, and schedules for the Project and other projects are not in conflict. A description of how Developer will coordinate with other construction projects shall be included in the Affected Third Parties Plan.

6 UTILITY ADJUSTMENTS

6.1 General Requirements

A number of existing Utilities are located within or in the vicinity of the Project ROW, some pursuant to statutory rights and some pursuant to property rights. Certain of those existing Utilities will need to be relocated or otherwise adjusted in order to accommodate the Project. This Section 6 establishes procedures and requirements for Utility Adjustments including such processes as coordination with Utility Owners, administration of the engineering, construction and other activities necessary for Utility Adjustments, and required documentation. This Section 6 references certain TxDOT forms for Developer's use in Utility Adjustments. Copies of those forms are included in Attachment 6-1, Utility Forms. Except as otherwise provided in this Section 6 or directed by TxDOT, whenever a TxDOT form is provided, Developer shall prepare all forms of the same type using the TxDOT form and is required to notify TxDOT of all changes to the forms for TxDOT's approval prior to execution by the Utility Owner.

Developer shall cause all Utility Adjustments necessary to accommodate construction, operation, maintenance and/or use of the Project in both its initial configuration and in its Ultimate Project configuration. TxDOT will assist Developer in the Utility Adjustment process, to the extent described in the Contract Documents. Some Utility Adjustments may be performed by the Utility Owner with its own forces and/or contractors and consultants (i.e., Owner-Managed); all others shall be performed by Developer with its own forces and/or Subcontractors and consultants (subject to any approval rights required by the Utility Owner for those working on its facilities) (i.e., Developer-Managed). The allocation of responsibility for the Utility Adjustment Work between Developer and the Utility Owners shall be specified in the Utility Agreements as described in Section 6.1.3.

Developer's obligations regarding reimbursement to Utility Owners for eligible costs of Utility Adjustment Work, and Developer's obligations regarding the accommodation of Utilities from and after NTP2, are set forth in Section 3.14 and Section 12.7.5 of the Agreement.

This Section 6 does not address Utility services to the Project. Utility services to the Project shall be the subject of separate agreements between Developer and Utility Owners.

6.1.1 When Utility Adjustment is Required

A Utility Adjustment may be necessary to accommodate the Project for either or both of the following reasons: (a) a physical conflict between the Project and the Utility, and/or (b) an incompatibility between the Project and the Utility based on the requirements in Section 6.2.1, even though there may be no physical conflict. The physical limits of all Utility Adjustments shall extend as necessary to functionally replace the existing Utility, whether inside or outside of the Project ROW. Section 6.2.4.2 contains provisions that address the acquisition of easements for Utilities to be installed outside of the Project ROW.

Utilities may remain in their existing locations within the Project ROW if (a) the requirements of Section 6.2.1 are met, and (b) the existing location will not adversely affect the construction, operation, safety, maintenance and/or use of the Project and Utility. The Utility Owner must agree to its facilities remaining in its existing location.

Pipelines and overhead electric lines, located on an existing compensable property interest, that are not in physical conflict with the Project but that cross the mainlane centerline at less than 90 degrees, may remain in the existing alignment, as long as the Utility facility crosses at no less than a 30 degree angle to the mainlane centerline and does not cross diagonally through connecting intersections. The pipelines and overhead electric lines may remain or be relocated in place in these areas only if all conditions of the Utility Accommodation Rules (UAR) are met, other than the 90 degree reference in the UAR. The affected Utility Owners must agree and approve all proposed Utility Adjustment plans.

6.1.2 Certain Components of the Utility Adjustment Work

6.1.2.1 Coordination

Developer shall communicate, cooperate, and coordinate with TxDOT, the Utility Owners and potentially affected third parties, as necessary for performance of the Utility Adjustment Work. Developer shall be responsible for preparing (unless prepared by the Utility Owner) and securing execution (by Developer and the Utility Owner) of all necessary Utility Agreements.

All Utility Agreements must be approved by TxDOT prior to any utility adjustment construction related activity.

6.1.2.2 Betterments

Replacements for existing Utilities shall be designed and constructed to provide service at least equal to that offered by the existing Utilities, unless the Utility Owner specifies a lesser replacement. Utility Enhancements are not included in the Work; however, any Betterment work furnished or performed by Developer as part of a Utility Adjustment shall be deemed added to the Work, on the date the Utility Agreement providing for same becomes fully effective. Developer shall perform all coordination necessary for Betterments.

6.1.2.3 Protection in Place

Developer shall be responsible for Protection in Place of all Utilities impacted by the Project as necessary for their continued safe operation and structural integrity and to otherwise satisfy the requirements described in Section 6.2.1. The Developer shall obtain agreement from the Utility Owner for all Protection in Place work that pertains to Utility Owner's facilities.

6.1.2.4 Abandonment and Removal

Developer shall make all arrangements and perform all work necessary to complete each abandonment or removal (and disposal) of a Utility in accordance with the requirements listed in Section 6.2.1, including obtaining Governmental Approvals and consent from the affected Utility Owner and any affected landowner(s), or shall confirm that the Utility Owner has completed these tasks. Abandonment of Utilities in place shall require approval by TxDOT.

6.1.2.5 Service Lines and Utility Appurtenances

Whenever required to accommodate construction, operation, maintenance and/or use of the Project, Developer shall cause Service Line Adjustments and Utility Appurtenance Adjustments. The Service Lines shall have a definitive point of termination such as a meter or point of sale. On completion of these, Developer shall cause full reinstatement of the roadway, including reconstruction of curb, gutter,

sidewalks, and landscaping, whether the Utility Adjustment Work is performed by the Utility Owner or by Developer.

6.1.3 Agreements Between Developer and Utility Owners

Except as otherwise stated in this Section 6 or in the Agreement, each Utility Adjustment shall be specifically addressed in a Project Utility Adjustment Agreement (PUAA) or in a Utility Adjustment Agreement Amendment (UAAA), as described elsewhere in this Section 6. Developer is responsible for preparing, negotiating (to the extent allowed by this Section 6), and obtaining execution by the Utility Owners, of all Utility Agreements, (including preparing all necessary exhibits and information about the Project, such as reports, Plans and surveys). A Utility Agreement is not required for any Utility work consisting solely of Protection in Place in the Utility's original location within the Project ROW, unless the Utility Owner is being reimbursed for costs incurred by it on account of such Protection in Place. If no reimbursement is required to the Utility Owner, a Utility Joint Use Acknowledgement and set of plans detailing UAR compliance is required pertaining to the Protection in Place work.

6.1.3.1 Project Utility Adjustment Agreements (PUAA)

Developer shall enter into one or more PUAAs with each affected Utility Owner to define the design, material, construction, inspection, and acceptance standards and procedures necessary to complete Utility Adjustments, as well as to define Developer's and the Utility Owner's respective responsibilities for Utility Adjustment costs and Utility Adjustment activities such as material procurement, construction, inspection, and acceptance. A PUAA may address more than one Utility Adjustment for the same Utility Owner. Additional Utility Adjustments may be added to an existing PUAA by a Utility Adjustment Agreement Amendment (UAAA).

Developer shall prepare each PUAA using the standard form of TxDOT Project Utility Adjustment Agreement (Owner-Managed) or TxDOT Project Utility Adjustment Agreement (Developer-Managed), Attachment 6-1, Utility Forms. Developer shall not modify the standard forms except by approval of TxDOT.

Promptly following issuance of NTP1, Developer shall begin negotiations with each affected Utility Owner to reach agreement on one or more PUAAs. Developer shall finalize the necessary PUAAs with each affected Utility Owner within a reasonable time period after issuance of NTP1. Developer shall include any proposed changes to a standard form (other than filling in blanks specific to a particular Utility Owner) in a Utility Owner-specific addendum. Each PUAA (including the Utility Adjustment Plans attached thereto) shall be subject to TxDOT review and approval as part of a Utility Assembly.

Language modification to a PUAA shall be approved by TxDOT prior to the submission of a Utility Assembly.

6.1.3.2 Utility Adjustment Agreement Amendments

Except where Utility Adjustment Field Modifications are permitted pursuant to Section 6.4.7, modification of an executed PUAA or any component thereof, after it has been approved by TxDOT as part of a Utility Assembly, shall be stated in a Utility Adjustment Agreement Amendment (UAAA). A UAAA may be used only when the allocation of responsibility for the Utility Adjustment Work covered

by that UAAA is the same as in the underlying Utility Agreement; otherwise, an additional PUAA will be required.

Each UAAA (including any Utility Adjustment Plans attached thereto) shall be subject to TxDOT's approval as part of a Supplemental Utility Assembly. Except as otherwise directed by TxDOT or provided in an applicable Utility Agreement, Developer shall prepare all UAAAs using the standard form included in Attachment 6-1, Utility Forms. Developer shall not modify the standard forms except by approval of TxDOT. Developer shall include any proposed changes to a standard form (other than filling in the blanks specific to a particular Utility Owner) in a Utility Owner specific addendum.

Language modification to a UAA shall be approved by TxDOT prior to the submission of the UAAA.

6.1.4 Recordkeeping

Developer shall maintain construction and inspection records in order to ascertain that Utility Adjustment Work is accomplished in accordance with the terms and in the manner proposed on the approved Utility Adjustment Plans and otherwise as required by the Contract Documents and the applicable Utility Agreement(s).

6.2 Administrative Requirements

6.2.1 Standards

All Utility Adjustment Work shall comply with all applicable Laws, Codes, Regulations and Technical Provisions of the Development Agreement, including the utility Adjustment Standards, the TxDOT *Utility Manual*, Section 3.14 of the Agreement, and the requirements specified in this Section 6.

6.2.2 Communication

6.2.2.1 Communication with Utility Owners

Developer is responsible for holding meetings and otherwise communicating with each Utility Owner as necessary to timely accomplish the Utility Adjustments in compliance with the Contract Documents. TxDOT shall be notified of all meetings and will participate in these meetings if requested by the Utility Owner or Developer or otherwise as TxDOT deems appropriate.

Before distribution of any mass mailings to Utility Owners, Developer shall submit to TxDOT, 21 Days in advance of distribution, for its review and comment the form, content, and addressees of any such mass mailings. For purposes of this Section 6, the term “mass mailing” means correspondence that is sent to 50 percent or more of Utility Owners within a three-week time period, and contains substantially the same content with respect to each Utility Owner.

6.2.2.2 Meetings

At least three Business Days in advance of each scheduled meeting, Developer shall provide notice and an agenda for the meeting separately to TxDOT and, if necessary, to the appropriate Utility Owner. Developer shall prepare minutes of all meetings and shall keep copies of all correspondence.

Developer shall prepare meeting minutes within five Business Days after the conclusion of such meetings. At a minimum, Developer shall include the following items in the meeting minutes:

- A complete list of attendees (including their affiliations, telephone numbers, and e-mail addresses)
- Documentation of the issues discussed and any associated solutions
- Description of remaining open issues and action items (including the person(s) responsible for follow-up and target date for resolution)

Developer shall submit draft versions of all meeting minutes to TxDOT for review before distributing final versions to the meeting attendees and appropriate Customer Groups.

6.2.3 Utility Adjustment Team

Developer shall provide a Utility Adjustment team with appropriate qualifications and experience for the Utility Adjustment Work. Developer shall provide the names and contact details, titles, job roles, and specific experience of the team members in the PMP. Specifically, Developer shall provide a Utility Manager (UM) and a Utility Design Coordinator (UDC) and a Developer Utility Coordinator (DUC) as described herein.

The UM's primary work responsibility shall be the performance of all Developer's obligations with respect to Utility Adjustments. The Utility Manager shall have a bachelor's degree, and have at least four years of relevant experience in coordinating and solving complex utility adjustments on highway improvement projects. The Utility Manager should be authorized by the Developer to approve all financial and technical modifications associated with Utility Adjustments, and modifications to the Utility Agreement.

The UDC shall be a Registered Professional Engineer. The UDC shall be responsible for coordinating the Utility Adjustment design with the overall highway design features during the planning, design, and construction phases of the Work.

The DUC shall hold a bachelor's degree and have at least five years of relevant experience in ROW and Utility coordination activities involving large transportation projects. The DUC will be responsible for tracking and following the Developer's activities and communicating the progress to the Developer. The DUC will assist with developing good working relationships with the Utility Owners and assisting the Developer in all utility coordination matters.

6.2.4 Real Property Matters

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

6.2.4.1 Documentation of Existing Utility Property Interests – Affidavits

For each Existing Utility Property Interest within the Project ROW claimed by any Utility Owner, Developer shall include an Affidavit of Property Interest in the applicable Utility Assembly, with documentation of the Existing Utility Property Interest (e.g., an easement deed) attached. Any such claim shall be subject to TxDOT's review as part of a Utility Assembly approval. Except as otherwise directed by TxDOT, Developer shall prepare all Affidavits of Property Interest using the standard forms included in Attachment 6-1, Utility Forms.

6.2.4.2 Acquisition of Replacement Utility Property Interests

Each Utility Owner will be responsible for acquiring any Replacement Utility Property Interests that are necessary for its Utility Adjustments. Developer shall have the following responsibilities for each acquisition:

a) Developer shall coordinate with, and provide the necessary information to each Utility Owner as necessary for the Utility Owner to acquire any Replacement Utility Property Interests required for its Utility Adjustments.
b) If any of Developer-Related Entities assists a Utility Owner in acquiring a Replacement Utility Property Interest, such assistance shall be by separate contract outside of the Work, and Developer shall ensure that the following requirements are met:

- The files and records must be kept separate and apart from all acquisition files and records for the Project ROW.
- The items used in acquisition of Replacement Utility Property Interests (e.g., appraisals, written evaluations and owner contact reports) must be separate from the purchase of the Project ROW.
- Any Developer-Related Entity personnel negotiating the acquisition of Replacement Utility Property Interests must be different from those negotiating the acquisition of Project ROW.

Developer is not responsible for Utility Owner condemnation proceedings.

6.2.4.3 Relinquishment of Existing Utility Property Interests

Developer shall cause the affected Utility Owner to relinquish each Existing Utility Property Interest within the Project ROW, unless the existing Utility occupying such interest is either (i) remaining in its original location or (ii) being reinstalled in a new location still subject to such interest.

6.2.4.4 Quitclaim Deeds

Except as otherwise directed by TxDOT, Developer shall prepare a Quitclaim Deed for each relinquishment of an Existing Utility Property Interest using TxDOT's standard form included in Attachment 6-1, Utility Forms. Each Quitclaim Deed shall be subject to TxDOT's review as part of a Utility Assembly approval as described below.

Developer understands and expects that a Utility Owner will not relinquish any Existing Utility Property Interest until after the Utility Adjustment has been accepted by the Utility Owner in its new location. Accordingly, instead of an executed Quitclaim Deed, the Utility Assembly for such a Utility Adjustment shall include a letter signed by the Utility Owner's authorized representative confirming that the interest will be quitclaimed upon completion of the Utility Adjustment, and a copy of the unsigned Quitclaim Deed. In these cases, Developer shall obtain the executed Quitclaim Deed within 90 Days of completion of the Utility Adjustment or unless otherwise approved by TxDOT in writing. The Quitclaim Deed must be approved by TxDOT prior to recording.

6.2.4.5 Utility Joint Use Acknowledgements

Developer shall prepare a Utility Joint Use Acknowledgment (UJUA) for:

a) Each Utility proposed to be relocated within the Project ROW
b) Each Utility proposed to remain in its existing location within the Project ROW

c) Any Existing Utility Property Interest located within the Project ROW that is not required to be relinquished pursuant to Section 6.2.4.3, and is not addressed in the foregoing clause (a) or clause (b)

Developer shall prepare all Utility Joint Use Acknowledgments using TxDOT's standard form included in Attachment 6-1, Utility Forms. Developer also shall prepare all required documentation to be included with each Utility Joint Use Acknowledgment.

Developer shall arrange for the Utility Owner to execute each Utility Joint Use Acknowledgment. Each Utility Joint Use Acknowledgment (executed by the Utility Owner) shall be subject to TxDOT's approval as part of a Utility Assembly.

6.2.4.6 Documentation Requirements

Developer shall prepare, negotiate (to the extent permitted by this Section 6.2.4, and obtain execution by the Utility Owner of (and record in the appropriate jurisdiction, if applicable) all agreements and deeds described in this Section 6.2.4, including all necessary exhibits and information concerning the Project (e.g., reports, Plans, and surveys). Each agreement or deed shall identify the subject Utility(ies) by the applicable Utility Assembly Number, and shall also identify any real property interests by parcel number or highway station number, or by other identification acceptable to TxDOT.

6.3 Design

6.3.1 Developer's Responsibility for Utility Identification

Developer bears sole responsibility for ascertaining, at its own expense, all pertinent details of Utilities located within the Project ROW or otherwise affected by the Project, whether located on private property or within an existing public ROW, and including all Service Lines.

Developer shall prepare and submit to TxDOT, no later than 90 days after NTP2 or 30 days before the first assembly package is submitted, a Utility Strip Map showing the information obtained and/or confirmed pursuant to this Section 6.3.1. Developer's Utility Strip Map shall show in plan view all Utilities within the Project ROW or otherwise impacted by the Project, in each case detailing the type of Utility facility (communication, gas, oil, water, etc.) size, material and the Utility Owner's name and contact information. The scale of the Utility Strip Map shall be 1"=100'. Developer shall update the information provided in the Utility Strip Map with SUE data and shall submit the same to TxDOT in accordance with the PMP.

6.3.2 Technical Criteria and Performance Standards

All design plans for Utility Adjustment Work, whether furnished by Developer or by the Utility Owner, shall be consistent and compatible with the following:

a) The applicable requirements of the Contract Documents, including Section 6.2.1
b) The Project as initially designed
c) Any Utilities remaining in, or being installed in, the same vicinity
d) All applicable Governmental Approvals
e) Private approvals of any third parties necessary for such work

6.3.3 Utility Adjustment Concept Plans

Developer shall prepare a proposed conceptual Utility design (a Utility Adjustment Concept Plan) for the Project (or proposed Utility Adjustment Concept Plans for various segments of the Project), as appropriate), showing the approximate location of each existing Utility, the existing Utilities to remain proposed location of each Utility and Developer's Utility Adjustment recommendations.

In accordance with the PMP, Developer shall submit the proposed Utility Adjustment Concept Plans(s) to TxDOT for its review. The Utility Adjustment Concept Plan(s) shall be submitted in both tabular and plan formats. The plan(s) shall be color-coded and shall utilize a scale that clearly depicts all of the required information. Developer shall coordinate with the affected Utility Owners as necessary to obtain their respective concurrence with the Utility Adjustment Concept Plan(s) as initially submitted to TxDOT and with any subsequent revisions. The Utility Adjustment Concept Plan is a working document. Developer must update the Utility Adjustment Concept Plan as the Work progresses.

6.3.4 Utility Adjustment Plans

Utility Adjustment Plans, whether furnished by Developer or by the Utility Owner, shall be signed and sealed by a Registered Professional Engineer (PE) per governmental regulations and industry practice.

6.3.4.1 Plans Prepared by Developer

Where Developer and the Utility Owner have agreed that Developer will furnish a Utility Adjustment design, Developer shall prepare and obtain the Utility Owner's approval of plans, specifications, and cost estimates for the Utility Adjustment (collectively, "Utility Adjustment Plans") by having an authorized representative of the Utility Owner sign the plans as "reviewed and approved for construction." The Utility Adjustment Plans (as approved by the Utility Owner) shall be attached to the applicable Utility Agreement, which Developer shall include in the appropriate Utility Assembly for TxDOT's approval.

Unless otherwise specified in the applicable Utility Agreement(s), all changes to Utility Adjustment Plans previously approved by the Utility Owner (excluding estimates, if the Utility Owner is not responsible for any costs) shall require written Utility Owner approval. Developer shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, re-approval by the Utility Owner and re-submittal to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.2 Plans Prepared by the Utility Owner

For all Utility Adjustment Plans to be furnished by a Utility Owner, Developer shall coordinate with the Utility Owner as necessary to confirm compliance with the applicable requirements as referenced in Section 6.2.1. Those Utility Adjustment Plans shall be attached to the applicable Utility Agreement, which Developer shall include in the appropriate Utility Assembly for TxDOT's approval. Developer shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, review by Developer and re-submittal to TxDOT as necessary to obtain TxDOT's approval.

6.3.4.3 Design Documents

Each proposed Utility Adjustment shall be shown in the Design Documents, regardless of whether the Utility Adjustment Plans are prepared by Developer or by the Utility Owner.

6.3.4.4 Certain Requirements for Underground Utilities

Casing as specified in the UAR shall be used for all underground Utilities crossing the Project ROW. However, high-pressure gas and liquid petroleum pipelines may be allowed to cross the Project ROW without steel casing as long as the requirements of the UAR are met. All high-pressure gas pipelines within the Project ROW shall comply with a design factor "F" = 0.6 or less as required by the class location of the pipeline. The Utility Owner is required to submit or approve the Barlow's Formula calculation(s) in writing to be included in the Utility Assembly.

Refer to Section 14 for certain design requirements for underground Utilities within the potential freight railroad corridor.

6.3.4.5 Utility Assemblies

Each Utility Adjustment in addition to each Utility remaining in place in the Project ROW and not requiring any Protection in Place or other Utility Adjustment shall be addressed in a Utility Assembly prepared by Developer and submitted to TxDOT for its review and comment, and for TxDOT's approval of any items for which this Section 6 requires TxDOT's approval. Temporary Adjustments that are installed within the Project ROW must also be included with an assembly for TxDOT's prior approval unless TxDOT waives or allows other approval methods concerning Temporary Adjustments. Each Utility Adjustment shall be addressed in a full Utility Assembly, unless it is appropriate for a Supplemental Utility Assembly or Abbreviated Utility Assembly, as described below. Developer shall coordinate with the Utility Owner to prepare all components of each Utility Assembly. Completion of the review and comment process for the applicable Utility Assembly, as well as issuance of any required TxDOT approvals, shall be required before the start of construction for the affected Utility Adjustment Work.

Provisions governing the procedure for and timing of Utility Assembly submittals are in Section 6.5.

All Utility Adjustments covered by the same initial PUAA can be addressed in a single full Utility Assembly.

Each set of the required Utility Assembly shall include the following:

a) A transmittal memo recommending approval and detailing any unique characteristics or information pertaining to the adjustment.
b) A completed Utility Assembly Checklist.
c) A TxDOT approved Utility Adjustment Agreement.
d) Plans which:

- Show the existing and proposed Utility facilities,
- Show existing and proposed grades for all utility crossings,
- Show the existing and Project ROW lines along with the Control of access denial line,
- Show an offset distance from the Project ROW line to all longitudinal Utilities within the Project ROW.
- Present sufficient information to enable TxDOT to verify compliance with the UAR requirements for each Utility located within the Project ROW, including highway design features.
- Are folded to 8.5" x 11" size unless waived by TxDOT.

e) Estimate(s) from the Utility Owner (and also from Developer, where Developer is furnishing design and/or performing construction), which estimates shall, without limitation, detail material type and quantity (material quantities detailed on the estimates must correlate to the materials shown on the plans described in (d) above), labor and engineering. The estimate must list the estimated amount of reimbursement to the Utility Owner, taking into consideration the betterment credit calculation, salvage credit and any applicable eligibility ratio. The estimated cost(s) associated with the Developer's internal coordination costs and overheads shall not be included in this estimate.
f) A proposed Utility Joint Use Acknowledgement.
g) Statement of Work form, if applicable.
h) Affidavit(s) of Property Interest form (With property interest instrument of conveyance attached), if applicable.
i) A ROW map showing the existing and proposed utility facilities identified on a plan view. This ROW map will only be required to be included with TxDOT's copy of the Utility Assembly.
j) All utility no conflict sign off forms.

Utility Adjustment Amendment Agreements (UAAA). For each UAAA, Developer shall prepare an additional Utility Assembly for the relevant initial PUAA (an Assembly), covering all Utility Adjustments addressed in the UAAA. The UAAA Assembly shall contain a transmittal memo, Utility Assembly Checklist, proposed UAAA cost estimate, a proposed UAAA which has been executed by the Utility Owner and Developer (one original in each of the two original Supplemental Utility Assemblies), including all required attachments, and applicable revisions to the Utility Adjustment Plans, as well as Utility Joint Use Acknowledgement(s) and Affidavit(s) of Property Interest, if applicable. The transmittal memo shall briefly describe the desired amendment and explain why the amendment is necessary including an estimated construction start date and duration.

Abbreviated Utility Assemblies. Developer shall prepare an Abbreviated Utility Assembly for each Utility proposed to remain at its original location within the Project ROW that is not required to be addressed in a PUAA or UAAA, unless an Adjustment is required pursuant to Section 6.1.1. If Developer is reimbursing the Utility Owner any of its costs, a PUAA or UAAA is required. Each Abbreviated Utility Assembly shall contain a transmittal memo recommending that the subject Utility(ies) remain in place, a completed Utility Assembly Checklist, a certification from the Utility Owner approving leaving the Utility(ies) in place, as well as Utility Joint Use Acknowledgement(s), No-Conflict Sign-off Forms, plans detailing UAR compliance, and Affidavit(s) of Property Interest, if applicable. Each of the foregoing items shall comply with the requirements for same described in Attachment 6-1, Utility Forms.

6.4 Construction

6.4.1 Reserved

6.4.2 General Construction Criteria

All Utility Adjustment construction performed by Developer shall conform to the requirements listed below. In addition, Developer is responsible for verifying that all Utility Adjustment construction performed by each Utility Owner conforms to the requirements described below. In case of nonconformance, Developer shall cause the Utility Owner (and/or its contractors, as applicable) to

complete all necessary corrective work or to otherwise take such steps as are necessary to conform to these requirements.

a) All criteria identified in Section 6.3.2
b) The Utility Adjustment Plans included in the Utility Agreement approved by TxDOT (other than Utility Adjustment Field Modifications complying with Section 6.4.7
c) All Project safety and environmental requirements
d) All pre-construction meeting requirements
e) The ROW acquisition schedule described in Section 7
f) Utilities standards provided in the Utility Agreement

6.4.2.1 Reinstatement of Utility Cuts

After installation of drainage structures, storm sewers, or any other public or private Utility facility by open cut beneath existing pavements carrying traffic during construction, the pavement shall be restored and maintained to a normal satisfactory riding surface equal to or better than the existing.

6.4.3 Inspection of Utility Owner Construction

Developer shall set forth procedures in the PMP for inspection of all Utility Adjustment Work performed by Utility Owners (and/or their contractors) to verify compliance with the applicable requirements described in Section 6.4.2. Developer is responsible for Quality Control and Quality Assurance for all Work performed by the Utility Owners and/or their contractors.

6.4.4 Scheduling Utility Adjustment Work

The Utility Adjustment Work (other than construction) may begin at any time following issuance of NTP1. Refer to Section 3.8.2 of the Development Agreement for the conditions to commencement of Utility Adjustment construction work by Developer. Developer shall not arrange for any Utility Owner to begin any demolition, removal, or other construction work for any Utility Adjustment until all of the following conditions are satisfied:

a) The Utility Adjustment is covered by an executed Utility Agreement (and any conditions to commencement of such activities that are included in the Utility Agreement have been satisfied);
b) Pre-construction meeting, in accordance with Section 6.2.2.2, shall be required after execution of the Utility Agreement and prior to commencement of any construction activities, unless otherwise approved by TxDOT.
c) Availability and access to affected Replacement Utility Property Interests have been obtained by the Utility Owner (and provided to Developer, if applicable);
d) If any part of the Utility Adjustment construction work that will affect the Project ROW, availability and access to that portion of the Project ROW has been obtained in accordance with the applicable requirements of the Contract Documents.
e) If applicable, the Alternate Procedure List has been approved by FHWA, and either (a) the affected Utility is on the approved Alternate Procedure List, as supplemented, or (b) the Utility Owner is on the approved Alternate Procedure List, as supplemented.
f) The review and comment process has been completed and required approvals have been obtained for the Utility Assembly covering the Utility Adjustment.

g) All Governmental Approvals necessary for the Utility Adjustment construction have been obtained, and any pre-construction requirements contained in those Governmental Approvals have been satisfied.
h) All other conditions to that Work stated in the Contract Documents have been satisfied.

6.4.5 Standard of Care Regarding Utilities

Developer shall carefully and skillfully carry out all Work impacting Utilities and shall mark, support, secure, exercise care, and otherwise act to avoid damage to Utilities. At the completion of the Work, the condition of all Utilities shall be at least as safe and permanent as before.

6.4.6 Emergency Procedures

Developer shall provide Emergency procedures with respect to Utility Adjustment Work in the PMP. Developer shall obtain Emergency contact information from, and establish Emergency procedures with each Utility Owner in the event of rupture, break, or damage to Utility Owner's Utility facilities.

6.4.7 Utility Adjustment Field Modifications

Developer shall establish a procedure to be followed if a Utility Adjustment Field Modification is proposed by either Developer or a Utility Owner, after the Utility Assembly (which includes the Utility Adjustment Plans) has been approved. The procedure shall contain, at minimum, the following processes:

a) The Utility Owner's review and approval of a Utility Adjustment Field Modification proposed by Developer, or Developer's review and approval of a Utility Adjustment Field Modification proposed by the Utility Owner. The UAFM shall have approval prior to commencement of construction. All revisions shall be signed and sealed by a PE and formally submitted to TxDOT for review and approval;
b) Transmittal of Utility Adjustment Field Modifications to the appropriate construction field personnel;
c) Inclusion of any Utility Adjustment Field Modifications in the Record Drawings for the Project.

Developer shall cause the procedure to be followed for all Utility Adjustment Field Modifications, whether the construction is performed by Developer or by the Utility Owner.

6.4.8 Switch Over to New Facilities

After a newly Adjusted Utility has been accepted by the Utility Owner and is otherwise ready to be placed in service, Developer shall coordinate with the Utility Owner regarding the procedure and timing for placing the newly Adjusted Utility into service and terminating service at the Utility being replaced.

6.4.9 Record Drawings

Developer shall provide Record Drawings to each Utility Owner for its Adjusted Utilities, in accordance with the applicable Utility Agreement(s).

Developer shall provide Record Drawings to TxDOT (regardless of whether design and/or construction of the subject Utilities was furnished or performed by Developer or by the Utility Owner). These drawings shall show the location of, and label as such, all abandoned Utilities, shall show and label all other Utilities, whether remaining in place or relocated, located within the Project ROW or otherwise impacted by the Project, and shall otherwise comply with Section 2. Developer shall provide the Record Drawings

for each Adjustment to TxDOT not later than 90 Days after Utility Owner acceptance as defined in the Utility Agreement, the Adjustment or before such earlier deadline as is specified elsewhere in the Contract Documents.

6.4.10 Maintenance of Utility Service

All Utilities shall remain fully operational during all phases of construction, except as specifically allowed and approved in writing by the Utility Owner. Developer shall schedule Utility Adjustment Work in order to minimize any interruption of service, while at the same time meeting the Project Schedule and taking into consideration seasonal demands. Each Utility Adjustment or remain in place location must allow for adequate access to the Utility facility that is agreed to by the Utility Owner.

6.4.11 Traffic Control

Developer shall be responsible for the Traffic Management Plan. The Traffic Management Plan shall cover, all traffic control made necessary by Utility Adjustment Work, whether performed by Developer or by the Utility Owner. Traffic control for Adjustments shall be coordinated with, and subject to approval by, the local agency(ies) with jurisdiction. Traffic control shall comply with the guidelines of the TMUTCD and of Section 18.

6.5 Deliverables

Developer shall time all submittals described in this section to meet the Project Schedule, taking into account the maximum number of submittals set forth in this Section 6.5 or, if not stated herein, then as stated in Section 4.1 of the Development Agreement. All deliverables shall conform to the standards required in the Project Management Plan.

6.5.1 Maximum Number of Submittals

Developer shall coordinate all Submittals required pursuant to this Section 6.5, so as not to overburden TxDOT's staff and consultants. In each calendar week, Developer shall not submit more than:

a) Two Utility Assemblies (excluding Supplemental or Abbreviated Utility Assemblies); and
b) Two of any of the following:
   - A modified or additional item submitted in response to TxDOT comments on a particular Utility Assembly
   - A Quitclaim Deed
   - Any other type of relinquishment document; and
c) Two Supplemental Utility Assemblies; and
d) Two Utility Adjustment Agreements, Amendment Assemblies.

Where the number of Submittals exceeds these limits, the Submittals shall be considered excess and TxDOT may defer its review of any such excess Submittals to a subsequent calendar week (or weeks), as necessary.

6.5.2 Developer's Utility Tracking Report

Developer shall maintain a Utility Tracking Report in tabular form, listing all Utilities located within the Project ROW or otherwise potentially affected by the Project. Developer shall submit the Utility Tracking Report to TxDOT on a monthly basis in the format described below unless otherwise approved by

TxDOT. The Utility Tracking Report shall, at a minimum, contain the following information for each utility:

a) The name of the Utility Owner and a unique tracking number starting with the prefix "Highway U-" followed by a four digit number starting with 0001 to be assigned by the Developer;
b) Utility size and type;
c) Location of the Utility based upon station and offset;
d) The proposed method of treatment;
e) State whether the adjustment will be Owner or Developer Managed;
f) Dates on which the PUAA/UAAA was executed by TxDOT, Utility Owner, Developer;
g) Dates on which the UJUA was executed by the Utility Owner and TxDOT;
h) The Utility Owner's existing right of occupancy of the right of way for each Utility (e.g. UJUA, permit, easement or combination);
i) Whether any Replacement Utility Property Interest will be necessary;
j) Estimated cost approved in the PUAA or UAAA;
k) Amounts and dates of payments made by the Developer to the Utility Owner, listing in each case the type of payment (final, partial or lump sum);
l) Scheduled start and completion date for construction of each adjustment;
m) Percent complete of construction;
n) Whether any betterment is included in the adjustment

The Utility Tracking Report shall also include a separate section for Replacement Utility Property Interest including each necessary Replacement Utility Property Interest with the names of property owners or parcel number(s), Utility Assembly Numbers, status of the acquisition, acquisition cost, and other information as necessary. Developer shall maintain this section of the Utility Tracking Report and submit to TxDOT in the same manner as all other portions of the Utility Tracking Report.

6.5.3 Utility Assembly Submittals

The following procedure shall govern submittal and review of each Utility Assembly, including Supplemental and Abbreviated Utility Assemblies:

a) Before submitting a Utility Assembly to TxDOT, Developer shall:

- Verify that each subject Utility (or the Utility Owner) is on the approved Alternate Procedure List, if applicable;
- Submit the complete Utility Assembly to the quality control/quality assurance entity designated by Developer in accordance with the PMP; and
- Resolve all comments made by the quality control/quality assurance entity, coordinating with the Utility Owner as appropriate.

b) Developer shall submit to TxDOT three identical and complete originals of each Utility Assembly, each of which shall be bound and labeled "Developer Copy," "TxDOT Copy," or "Utility Owner Copy," as appropriate. The "TxDOT Copy" shall be color coded and shall include the Project ROW map with the existing and proposed Utility facilities identified on a plan view. These submittals shall be for TxDOT's review and comment, except for any components of the Utility Assembly for which TxDOT's approval is required by this Section 6.5.

TxDOT will review the Utility Assembly for compliance with the requirements of this Section 6.5.3, and within ten (10) Business Days will return the Utility Assembly to Developer with the appropriate notations pursuant to Section 3.8.2 of the Development Agreement to reflect its responses. Developer shall transmit any TxDOT comments to the Utility Owner, and shall coordinate any modification, review and approval by the Utility Owner and re-submittal to TxDOT, as necessary to resolve all TxDOT comments and/or obtain TxDOT's approval, as applicable. Upon (a) TxDOT's approval of any Utility Assembly components for which TxDOT's approval is required, and (b) completion of the review and comment process for all other Utility Assembly components, TxDOT will sign three originals of any approved UJUA and of any other components of the Utility Assembly for which this Section 6 requires TxDOT's signature.

6.5.4 FHWA Alternate Procedure

The Developer will develop the Alternate Procedure List that includes the utility owner's name, approximate station numbers and estimated cost. TxDOT will then submit to the FHWA the Alternate Procedure List in order to obtain FHWA authorization for federal reimbursement Promptly upon determining that any additional Utility Owner not referenced on the Alternative Procedure List is impacted by the Project, Developer shall submit to TxDOT all documentation as referenced above in order to update the Alternative Procedure List.

TxDOT will forward the approved Alternate Procedure List (and any amendments thereto) to Developer, promptly upon receipt of same from the FHWA.

7 ROW

7.1 General Requirements

Developer's obligations with respect to the acquisition of Project ROW are set forth in Section 3.13 of the Development Agreement.

This Section 7 sets forth the ROW activities assigned to Developer, including pre-acquisition and acquisition activities, and designates which ROW activities TxDOT will conduct. This section also sets forth the requirements applicable to the Work assigned to Developer related to the acquisition of Project ROW. Developer shall provide all services necessary to acquire title to the Project ROW, in form and substance acceptable to TxDOT, in the name of the State; relocation of displacees; and clearance/demolition of the improvements from the Project ROW, as more fully described in the following sub-sections.

Except as otherwise set forth in the Agreement, Developer's Project ROW staff and/or Subcontractors will function as independent contractors while acquiring Project ROW, and not as an agent, representative, or employee of TxDOT. If Developer obtains a Property Agreement to facilitate design, construction, or maintenance in relation to the Project, Developer shall provide a copy of the agreement to TxDOT.

7.2 Administrative Requirements

7.2.1 Standards

Project ROW shall be acquired in accordance with State and federal Law and the practices, guidelines, procedures, and methods contained in the following as they pertain to Right of Way:

a) TxDOT *Right of Way Manual* (Collection, available online at http://onlinemanuals.txdot.gov/manuals)
b) TxDOT *Access Management Manual* (available online at http://onlinemanuals.txdot.gov/manuals)
c) TxDOT *Survey Manual*
d) TxDOT *Appraisal and Review Manual*

Pursuant to the applicable federal regulations, Developer shall (i) acquire ROW parcels for the Project on behalf of the State, but without the direct participation of TxDOT, subject to TxDOT's rights of review, approval, and audit; (ii) certify acceptance of the TxDOT *Right of Way Manual*; (iii) provide adequate access to all occupied properties; (iv) maintain Utility service to occupied properties until relocation is complete; and (v) not permit open burning within 1000 feet of an occupied dwelling.

Developer shall maintain a complete and current set of the TxDOT *Right of Way Manual* Collection, Volumes 1 through 8 (available online at http://onlinemanuals.txdot.gov/manuals), TxDOT *Access Management Manual*, TxDOT *Appraisal and Review Manual*, and a current approved Project ROW map for public use. Any TxDOT forms referenced in this section shall be found in the TxDOT *Right of Way Manual* Collection or will be provided by TxDOT.

All Project ROW activities must be completed and documented in compliance with all applicable Laws, including the Uniform Act, and the rules and regulations implementing the Uniform Act.

7.2.2 Software Requirements

Developer shall employ software that is fully compatible with the software in use by TxDOT, or fully transferable to TxDOT's systems. Developer must supply and maintain a parcel-by-parcel status report that incorporates the fields and information required by TxDOT's ROW tracking system: ROWIS. Developer must maintain and participate in any other required ROW tracking system required by the Contract Documents. The database shall be fully accessible to Persons authorized by TxDOT.

7.2.3 ROW Acquisition Plan

Developer shall prepare a ROW Acquisition Plan in accordance with the requirements of this Section 7 and Section 2. The ROW Acquisition Plan shall set forth Developer's organization including names, titles and qualifications of Key Personnel, and other Project ROW personnel, integration of the Project ROW schedule into the Project Schedule, interface between design and Project ROW activities, documentation and reporting, quality control procedures and quality review standards.

The ROW Acquisition Plan shall contain, as a minimum, the following:

a) The name of TxDOT approved title company(ies) to be used for title services
b) The name and qualifications of the proposed ROW Acquisition Manager (ROW AM)
c) The resumes and qualifications for appraisers, appraisal reviewers, land planners, relocation agents, negotiators, real estate attorneys, eminent domain specialist and ROW personnel who shall have the minimum qualifications and experience specified in Section 7.2.7

The ROW Acquisition Plan shall establish the specific means by which Developer will:

a) Provide sufficient personnel to achieve, in accordance with the Project Schedule, the goals and milestones established for Project ROW acquisition, relocation assistance, appraisals and appraisal review, and clearance/demolition of the improvements from the Project ROW.
b) Provide administrative support.
c) Provide for Spanish, visually impaired, or hearing impaired translation, as necessary.
d) Provide documentation and reports.
e) Produce and distribute acquisition and relocation brochures as approved by TxDOT.
f) Establish, implement, and maintain quality control procedures and quality review standards for the acquisition for Project ROW.
g) Prevent fraud, waste, and mismanagement.

Developer shall update the ROW Acquisition Plan regularly, at least quarterly, in accordance with the Contract Documents.

7.2.4 Schedule and Review Procedures

The Project Schedule shall indicate the date to begin the acquisition of the Project ROW and the anticipated completion date of acquisition activities for each parcel. TxDOT shall be advised of all Additional Properties and temporary rights or interests in real property to be acquired by Developer. In developing the Project Schedule, Developer will give priority to the acquisition of parcels that have

significant impact on the Project Schedule and/or affect the Critical Path as so indicated. The monthly status reports required by Section 2.2.1 shall provide updated projections for the acquisition date of each parcel.

In developing the Project Schedule, Developer shall incorporate adequate time periods for TxDOT review and approval of Acquisition Packages and Condemnation Packages. TxDOT intends to review the completed Acquisition Packages and Condemnation Packages as expeditiously as possible; however, for the purposes of the Project Schedule, Developer shall assume that the reviews performed by TxDOT will require ten (10) Business Days for Acquisition Packages and Condemnation Packages (collectively) that Developer submits as final and complete in accordance with Section 7.3.6 and Section 7.4.4(f), up to a maximum of twenty-five (25) Acquisition Packages and Condemnation Packages (collectively). Any Submittals that would require TxDOT to review more than twenty-five (25) Acquisition Packages and Condemnation Packages (collectively) within any given ten (10) Business Day period shall be considered excess, and TxDOT may defer its review of any such Acquisition Packages and/or Condemnation Packages to a subsequent ten (10) Business Day period (or periods as necessary). TxDOT will notify Developer of its election to defer any excess Acquisition Packages and/or Condemnation Packages within ten (10) Business Days after receipt. The balance of Acquisition Packages and Condemnation Packages (collectively) in excess of twenty-five (25) will be rolled over to the next ten (10) Business Day period and added to the Acquisition Package and Condemnation Package Submittals made by Developer in that period. When Developer submits more than twenty-five (25) Acquisition Packages and Condemnation Packages (collectively) at any given time, Developer shall indicate the priority of review.

The Developer shall also assume that the reviews performed by TxDOT will require ten (10) Business Days for the following submittals: payment submittals, relocation submittals, administrative settlement submittals, and closing submittals, up to a maximum of twenty-five (25) submissions for each type of submittal noted above, in addition to the Acquisition Packages and Condemnation Packages.

If TxDOT notifies Developer that any submitted Acquisition Package and/or Condemnation Package has a deficiency, Developer shall correct such deficiency and resubmit the package to TxDOT. Resubmissions shall be treated as a new Acquisition Package and Condemnation Package (collectively) as described above. An Acquisition Package and/or Condemnation Package shall be deficient, as determined by TxDOT, if any of its components fails to meet any of the criteria established by this section for such component, or contains any material errors or omissions. Schedule delays resulting from inadequate or incomplete submissions of Acquisition Packages and/or Condemnation Packages shall be the responsibility of Developer and will not be eligible for treatment as a Change Order.

TxDOT reserves the right to undertake additional review on Acquisition Packages and/or Condemnation Packages that contain or identify facts or issues of an unusual nature or which do not clearly fit within TxDOT standards and will notify Developer in writing that the review period will be extended by an additional (10) ten Business Days before rendering a decision to Developer.

Developer may request TxDOT to do a preliminary review of the survey, project ROW map, and appraisal before the complete Acquisition Package is submitted. TxDOT may elect to review the preliminary submission of the survey, map and appraisal and notify Developer of any deficiencies after TxDOT's receipt and review of such preliminary submission.

7.2.5 Developer's Project ROW Scope of Services

Developer shall complete all administrative activities and prepare all documentation sufficient for Developer to acquire the Project ROW. Developer shall obtain TxDOT's review and prior written approval of all Project ROW maps and surveys, appraisals, legal descriptions, acquisition documentation, purchase price, requests to acquire Project ROW, condemnation-related activities, and funding/closing procedures. TxDOT will (i) approve and return the Project ROW acquisition documentation, (ii) provide review comments for incorporation by Developer in accordance with Section 7.2.4, or (iii) in the case of an Acquisition Package that is deficient, notify Developer of the deficiency(ies) to be corrected by Developer in accordance with Section 7.2.4. Except as otherwise authorized by applicable State and federal policy and regulations for early acquisition and approved by TxDOT, Developer shall not proceed with acquisition of the Project ROW until the NEPA Approval is issued, public involvement procedures have been completed, and ROW maps and legal descriptions for the applicable constructible segment as established by the logical termini of the Project have been prepared and approved by TxDOT. TxDOT will provide a separate release for each approved segment. Further, Developer shall not commence any negotiations with landowners nor will TxDOT begin eminent domain procedures until the specific Acquisition Package for that particular parcel is approved by TxDOT.

If Developer and the landowner cannot negotiate an agreed-upon conveyance by deed, due to any specific issue (such as deed language, land/improvements value, damages to remainder), acceptable to TxDOT, TxDOT will initiate acquisition of the property through eminent domain procedures. Developer shall not be permitted to commence any condemnation action through the statutory "Declaration of Taking" procedure without the express written consent of TxDOT. Consent may be withheld in TxDOT's sole and absolute discretion.

Developer shall not begin construction on any parcel of real estate unless property rights for the parcel have been conveyed and recorded in favor of TxDOT, possession has been obtained through eminent domain or any other method as provided for in Section 7.2.1, or a Possession and Use Agreement has been validly executed and delivered by all necessary parties in accordance with Section 7.4.1.

7.2.6 Acquisition Process Summary

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

a) Project ROW surveying and mapping
b) Project ROW budget estimates and updates
c) Title services
d) Appraisal services
e) Appraisal review
f) Negotiations
g) Closing services
h) Relocation assistance
i) Condemnation support services
j) Clearance and demolition of Project ROW
k) Environmental due diligence
l) Documentation and document control
m) Progress reports

n) Project ROW administration and management
o) Project ROW quality management
p) Letter from Developer's design engineer certifying that the required Project ROW acquisition is necessary and that any proposed alternatives are not feasible or are cost prohibitive
q) Obtaining rights of entry, as necessary

7.2.7 ROW Personnel Qualifications

Developer's ROW Acquisition Manager shall have at least five years of experience managing the acquisition of transportation ROW projects for a condemning authority, be licensed as a real estate salesman or broker pursuant to the *Texas Real Estate License Act* or rules established by the Texas Real Estate Commission, be familiar with appraisal and appraisal report review pursuant to the Uniform Standards of Professional Appraisal Practice (USPAP), and be familiar with the Uniform Act and applicable Laws of the State of Texas.

Quality Control Specialist(s) – Developer shall designate a specific person(s) responsible for internal quality control and quality assurance. This individual will review all Developer deliverables associated with survey, title, appraisal, acquisition, relocation and eminent domain prior to the deliverable being delivered to TxDOT for review.

Appraiser and Appraisal Reviewer – Each appraiser and appraisal reviewers shall be licensed and certified in the State of Texas and shall have a minimum of five years of experience in appraising real property for eminent domain purposes, including partial taking appraisal, partial taking appraisal review and expert witness testimony. He or she must also have been actively and continuously engaged for at least three years immediately preceding his or her selection for this Project in appraisal work primarily in Dallas County and Tarrant County, and Pre-certified by TxDOT. The appraisers and the appraisal reviewers shall have separate and distinct duties, and appraisers must be employed by different firms from the appraisal reviewers. Each appraiser shall be required to submit three samples of previous appraisal work prepared for eminent domain purposes. All appraisers preparing and signing appraisals must be Pre-certified by TxDOT before performing any appraisals on the Project. If required by TxDOT, the appraiser will be required to demonstrate his/her skills at expert witness testimony.

Land Planner - Each land planner shall have a minimum of five years of experience in land planning including experience with expert witness testimony in eminent domain proceedings. He or she must also have been actively and continuously engaged for at least three years immediately preceding his or her selection for this Project in land planning work primarily in Dallas County and Tarrant County and Pre-certified by TxDOT. Developer shall provide a minimum of two land planners to assist appraisers and complete land plans.

Relocation Agent - Each relocation agent shall have a minimum of three years of experience in relocation assistance for ROW projects pursuant to the Uniform Act. A relocation agent's responsibilities shall include the following: Determination of eligibility of all displacees, contacting all displacees and informing them of their benefits, maintaining a file of all documentation concerning the relocation of the displacees, and extending all relocation assistance advisory services.

Negotiator - Each ROW negotiator shall be licensed either as a real estate sales person or broker pursuant to the *Texas Real Estate License Act* or rules established by the Texas Real Estate Commission, and shall be familiar with appraisal and appraisal report review pursuant to the USPAP. The negotiator shall have a minimum of three years of experience in right of way negotiations. The ROW negotiator's responsibilities shall include the following: contact with property owners on the Project to discuss the acquisition of property needed for the Project, maintaining complete and accurate files of all transactions and contacts with the property owners and/or their representatives, and actively working toward a joint resolution to acquire the property with the property owner.

Eminent Domain Specialist – Each eminent domain specialist shall have a minimum of three years of experience with TxDOT procedures and policies as related to acquisition of property through the use of eminent domain. The eminent domain specialist must be well versed in all activities necessary with the acquisition of parcels through the TxDOT Eminent Domain process. This includes correctly completing all TxDOT forms including the ROW-E-49, filing the eminent domain forms, coordinating the hearing with all appropriate parties and ensuring that the Award of Special Commissioners is deposited into the registry of the Court and all notices sent to the appropriate parties.

Real Estate Attorney - Each real estate attorney shall be licensed by the State of Texas and shall have at least five years of experience in title review and curative matters. The real estate attorney's responsibilities shall include coordinating and clearing all title issues, and compliance assistance with State and federal acquisition requirements for the properties acquired for the Project.

ROW personnel shall have at least three years of experience in title review and curative matters. ROW personnel's responsibilities shall include, but not be limited to the following: maintain complete and accurate files of all transactions and contacts with the property owners and/or their representatives, coordinate and clear all title issues and assist at closing for properties acquired for the Project.

7.2.8 Developer Conflict of Interest

If at any time, Developer or to the best of Developer's knowledge, any Developer-Related Entity directly or indirectly (i) acquires or has previously acquired any interest in real property likely to be parcels of the Project ROW or the remainders of any such parcels; (ii) loans or has previously loaned money to any interest holder in any real property likely to be a Project ROW parcel and accepts as security for such loan the parcel, or the remainder of any such parcel that is not a whole acquisition, or (iii) purchases or has previously purchased from an existing mortgagee the mortgage instrument that secures an existing loan against real property likely to be a Project ROW parcel, or the remainder of any such parcel, Developer shall promptly disclose the same to TxDOT. In the case of acquisitions, loans or mortgage purchases that occurred prior to the execution of the Agreement, such disclosure shall be made within ten days after execution of the Agreement.

In the event that Developer, or any subsidiary or parent company of Developer, acquires a real property interest, whether title or mortgage, in parcels of the Project ROW, the real property interest acquired or a release of mortgage as the case may be, shall be conveyed to the State of Texas without the necessity of eminent domain.

Developer shall not acquire or permit the acquisition by Developer or any Developer-Related Entity of any real property interest in a Project ROW parcel, whether in fee title or mortgage, for the purpose of avoiding compliance with the Laws, practices, guidelines, procedures and methods described in Section 7.2.1.

7.2.9 Meetings

Developer shall attend meetings as requested by TxDOT. At such meetings Developer shall provide exhibits, record minutes, and distribute the minutes to all attendees for review and comment. Minutes will not be finalized until all attendees agree on content. Meeting minutes shall be provided to TxDOT within five (5) Business Days from the date of the meeting. TxDOT will respond within five (5) Business Days or at the next occurrence of the meeting. Proposed agendas shall be provided three (3) Business Days prior to the meeting.

7.2.10 Documentation and Reporting

Developer shall provide TxDOT with all specific reports and supporting documentation for review and approval during the acquisition process. All correspondence with TxDOT and property owners relating to acquisition of real property shall include a heading with the following information (at a minimum):

a) County
b) Control Section Job (CSJ) number
c) Right-of-Way Control Section Job (RCSJ) Number
d) Highway Designation
e) Project Limits
f) Parcel number
g) Name of record owner(s)
h) Developer shall utilize TxDOT's approved naming convention for all electronic files and reporting fields.

In administering and managing its Project ROW activities, Developer shall:

a) Maintain parcel records on file of all aspects of the acquisition process in accordance with TxDOT requirements and applicable Law. Each parcel file shall include all documents required by the Contract Documents, the FHWA, and/or TxDOT.
b) Provide monthly summaries for the cost of Project ROW acquisition and related relocation assistance including amounts authorized and amounts paid on a parcel-by-parcel basis and budget forecasting on an overall Project basis as requested by TxDOT.
c) Maintain and electronically transmit to TxDOT, in a format acceptable to TxDOT, monthly status reports including appraisal, acquisition and relocation status of all parcels and activities related to Project ROW, acquisition and disposition of Additional Properties and acquisition and disposition of temporary easements or other property interests, and provide weekly (or as requested) updates to TxDOT.
d) Evaluate and report to TxDOT, Subcontractor status and performance on a monthly basis or more frequently as requested.

e) Prepare and submit electronically to TxDOT, on a monthly basis, a spreadsheet that contains Project ROW specific data required in order to complete the fields in TxDOT's ROWIS tracking software program or as directed by TxDOT.
f) Input and update parcel status in TxDOT approved web-based tracking system or as directed by TxDOT.

7.2.11 Responsibilities of Developer

As set forth in Section 3.13.4 of the Development Agreement and as more fully described in this section, Developer shall be responsible for the costs of all services and preparation of all documentation for all Project ROW acquisition, easement acquisition, permitting and related relocation assistance for the Project. The Work related to Project ROW acquisition includes mapping, surveying, environmental assessment, testing and remediation, appraisal, appraisal review, negotiation, acquisition, relocation advisory assistance and determination of relocation benefits to be provided, procurement of title insurance, clearing of title, closing of acquisitions, condemnation support including expert witnesses required by TxDOT and/or the Attorney General's Office for all condemnation proceedings through special commissioner's hearings. The Developer shall also be responsible for all exhibits, transcripts, and photos associated with condemnation services and proceedings required by the Attorney General's Office through special commissioner's hearings, relocation appeals and assistance, and clearance/demolition of improvements, as required.

Developer shall not contact the Attorney General's Office or an Assistant Attorney General handling a specific parcel that has been filed for eminent domain action or is in the process of settlement unless authorized by TxDOT.

Developer acknowledges that Developer has incorporated the value of saleable improvements into the Project ROW costs, and Developer shall concurrently, with conveyance of the real property interest to the State of Texas, and without the necessity of further documentation executed by the State, obtain the rights to said saleable improvements. Developer shall not be entitled to a credit for any improvements retained by a property owner. Upon conveyance of the real property interest to the State of Texas, Developer shall comply with all applicable Laws with respect to relocation assistance and demolition.

Developer shall also be responsible for the costs of acquisition and documentation for the acquisition of any temporary right or interest in real property not necessary for the Project but that Developer deems advisable to acquire for work space, contractor lay-down areas, material storage areas, borrow sites, or any other convenience of Developer. Except as otherwise authorized by Law for temporary areas necessary for construction of the Project, TxDOT shall not be obligated to exercise its power of eminent domain in connection with Developer's acquisition of any such temporary right or interest, and TxDOT shall have no obligations or responsibilities with respect to the acquisition, maintenance or disposition of such temporary rights or interests.

Developer shall be responsible for processing payment submittals for request of payments and distributing all payments of: agreed purchase prices or court awards and judgments; special commissioner's awards; relocation assistance payments; all legal, administrative, and incidental expenses of, or related to, Project ROW.

Developer is responsible for the payment of and all closing costs associated with the purchase of Project ROW in accordance with the Uniform Act and TxDOT policies.

Developers cost shall include all costs not paid by TxDOT.

7.2.12 Responsibilities of TxDOT

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

a) Except as otherwise set forth in this Section 7, provide final approval for all Acquisition Packages, Condemnation Packages, and payment submittals, relocation eligibility, relocation appeals, relocation submittals, administrative settlement submittals, closing submittals, court settlement requests, and other approvals required by the Contract Documents, by the State, or by applicable Law subject to submission requirements and timelines in Section 7.2.4.
b) After receiving a complete Condemnation Package from Developer in accordance with Section 7.4.4, and Section 7.2.4 , TxDOT will submit a minute order request on the agenda of the next scheduled Texas Transportation Commission meeting; provided the completed Condemnation Package is submitted ten (10) Business Days before the Commission's required deadline for eminent domain minute order requests.
c) After receiving a complete payment submittal from Developer in accordance with Section 7.4.6, and Section 7.2.4, TxDOT will submit a payment request to the Comptroller's Office. Upon receipt of the State warrant, TxDOT will relay the State warrant to the Developer within (5) five Business Days.
d) TxDOT will coordinate with the Office of the Attorney General to provide legal counsel to prepare and deliver to TxDOT the condemnation petition within twenty (20) Business Days after the Attorney General's receipt of the condemnation packet, including Commission minute order approval. TxDOT will deliver the condemnation petition to Developer within ten (10) Business Days after receipt of the condemnation petition from the Office of the Attorney General.
e) TxDOT will provide all coordination services between Developer and the Office of the Attorney General for prosecution of jury trials.
f) TxDOT will provide a ROW Administrator to serve as the point of contact for all Project ROW issues as set forth in 23 CFR § 710.313(d). TxDOT will facilitate an office for review of all submissions as described above and will have ultimate approval authority for said submissions.

7.2.13 TxDOT Project Monitor/Reviewer

In addition to its review and approval authority as expressly set forth in other provisions of this Section 7, TxDOT may, at its sole discretion, audit and/or monitor the ROW activities and services performed by Developer. TxDOT may contract with independent consultants to assist it in fulfilling the audit/monitoring function provided that the audit authority is not delegated. In addition to any of the matters specifically required to be provided by Developer to TxDOT pursuant to the foregoing sections, Developer shall provide information to TxDOT as requested to assist in its review and assessment of the progress, timeliness, adequacy, or sufficiency of Developer's Project ROW activities.

7.2.14 Responsibilities of the Office of Attorney General

The Office of the Attorney General, with the assistance of Developer and coordination of TxDOT, shall be responsible for implementing all necessary legal actions for acquiring and obtaining possession of the

Project ROW (and any necessary temporary construction easements approved by TxDOT for acquisition by condemnation) through the eminent domain process and eviction process. The responsibilities of the Office of the Attorney General will include:

a) Represent TxDOT as the State's Attorney of Record
b) Preparation of complete petitions for condemnation with the appropriate court for a cause number to be assigned
c) Coordination with TxDOT on all legal matters concerning acquisition processes, including negotiated settlements
d) Analysis of recommended parcel values and/or appraisal issues
e) Additional legal advice and opinions as needed by TxDOT
f) Special commissioners' hearings
g) Jury trials including determination of expert witnesses and all appeals
h) Preparation, obtaining, and filing of all necessary legal documentation for eviction of property owners or tenants.

7.3 Pre-Acquisition Activities

7.3.1 Project ROW Surveying and Mapping

Developer shall perform all Project ROW surveying and mapping and shall prepare all Project ROW documents in accordance with applicable TxDOT Standards, including the TxDOT *Right of Way Manual*, the TxDOT *Survey Manual*, and the TxDOT *GPS User's Manual*. Developer shall refer to the current *Manual of Practice* by the Texas Society of Professional Land Surveyors and the *US National Map and Accuracy Standards*. Developer shall refer to Section 9 for additional survey requirements.

The project ROW map shall be prepared by Developer and submitted to TxDOT for review and approval. The Project ROW map may be prepared in separate constructible segments established by the logical termini of the Project. TxDOT shall have ten (10) Business Days for review of each submitted ROW map, each containing up to a maximum of 25 parcels. Any submittals that would require TxDOT to review more than 25 parcels within any given ten (10) Business Day period shall be considered excess, and TxDOT may defer its review of any such excess parcels to a subsequent ten (10) Business Day period (or periods as necessary).

Developer shall assemble an Acquisition Survey Document to be included in the submission of the Acquisition Package. The Acquisition Survey Document shall include:

a) Three half size right of way maps on paper, Scale 1"= 100' (11"X 17").
b) One separate set of Originals signed and sealed by RPLS, legal descriptions and parcel sketch, traverse closure sheets and a copy of the parent track deeds and subdivision plat if tract is a platted lot.
c) A CD with DGN Master File, Map Sheets, Excel Point List and Raw Data File and/or Field Notes and scanned copies of the instruments of record or other pertinent documents.
d) One full size right of way map on paper, Scale 1" = 50' (22"x34").

e) One set of folders for each parcel, Parts 1 & 2, etc., would be considered one folder. With one (copy signed and sealed) legal description, sketch, closure sheet, parent tract deed and subdivision plat if tract is a platted lot (and bi-section if applicable) secured inside on the right side.
f) Three copies (signed and sealed) of each legal and sketch.
g) One separate set (copies) of legal and sketch of each parcel for TxDOT records.
h) One separate set (copies) of legal and sketch of each parcel for Title Company.
i) One separate set of Originals legal and sketch signed and sealed by R.P.L.S. to be kept in mapping files.

Developer shall prepare all Project ROW surveying and mapping in accordance with the following supplemental specifications:

a) Developer shall assemble an Acquisition Survey Document. The Acquisition Survey Document shall include the Project ROW map, a parcel (metes and bounds) description, and a parcel plat, with a closure report for each of these three items for each of the parcels to be acquired. The latter three items shall be on standard 8½" x 11" bond paper. The Project ROW map sheets shall be on 22" x 34" paper. Each final submission to TxDOT shall include two sets of each document, unless otherwise directed. Each map sheet and document page shall have an "as of" date near the lower right hand corner. The parcel plat and parcel description for a given parcel should show identical "as of" dates.
b) The ROW map sheet and plat shall show all areas of denied access for the parcel according to the current TxDOT *Access Control Management Manual and amendments*.
c) The point of beginning (POB) shall be located on the proposed Project ROW line and shown in all documents with its centerline (survey baseline) station and offset or as reviewed and approved by TxDOT.
d) The point of commencing (POC), where applicable, shall be a well-defined monument or monument of record, and shall be tied to the POB by measured bearing and distance. The POC shall not be located on any proposed Project ROW line, or existing Project ROW line within the proposed Project ROW.
e) The centerline (survey baseline) station and offset shall be shown on the Project ROW map sheets for all significant points along the Project ROW line such as point of curvature (PC), point of tangency (PT), point of intersection (PI), point of compound curvature (PCC), and point of reverse curvature (PRC), and for property line intersections (PLI) with the Project ROW line, and for any other monumentation points on the Project ROW line.
f) The centerline (survey baseline) station and offset shall be shown in the parcel description and parcel plat at the beginning and ending, being the points with the lowest station and the highest station, of each parcel along the proposed Project ROW line.
g) Project ROW map sheets shall include all curve data, with the station and coordinates of the PI, and the stations at each end (PC, PT, PRC, PCC), for every centerline (survey baseline) curve on that map sheet.
h) Any existing ROW lines being incorporated into the proposed Project ROW, including intersecting rights of way, shall be surveyed and monumented (if not previously monumented).
i) All Project ROW maps (and on the title sheet) and all parcel descriptions (at the end of the description) shall include a notation that identifies the State Plane Coordinate System and UTM

zones, datum (NAD83) (1993 adj), or as shown on the current ROW maps, and the Project grid-to-surface coordinate adjustment factor or refer to Primary Project Controls provided by TxDOT (refer to Section 9.3).

j) A Project ROW map title sheet with signature blocks shall be produced for each portion of the Project. Developer shall sign the Project ROW map.

k) All Project ROW maps shall include a control sheet (or sheets), to show the primary survey control points with their location relative to the Project.

l) The parcel description and parcel plat documents shall all be referenced as parts of the exhibit recorded with the deed, so the pages shall be numbered accordingly. For example, if the parcel description is two pages, the parcel plat is one page, and then the first page of the parcel description is denoted "Page 1 of 3", the parcel plat is denoted "Page 3 of 3".

m) Improvements within 100 feet outside of all proposed Project ROW shall be depicted on the Project ROW map sheets. All improvements should be current as of the date of the on-the-ground property survey.

n) All visible improvements (buildings and structures) within 50 feet outside of the proposed Project ROW line shall be located by an "on-the-ground" survey and documented on the Project ROW map sheets and the parcel plats by measured offset distance from the proposed Project ROW line. Clearly indicate which distances are surveyed on–the-ground.

o) Calculated points shall be shown by a symbol on the drawing, with their relationship to the found reference points.

p) All property, city, county, abstract, section, and survey lines shall be indicated appropriately. A map legend should clearly define the line styles and symbols used.

q) Upon final submittal from Developer of the Project ROW documents to TxDOT, Developer shall cause the surveyor to mark on the ground, using permanent and stable monuments as defined in Section 663.17 of the General Rules of Procedures and Practices of the Texas Board of Professional Land Surveying (TBPLS), all significant points along the Project ROW line, as described above, and all property line intersections with the Project ROW line. TxDOT requires these monuments to be a 5/8-inch iron rod, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument).

r) Prior to acceptance of the ROW maps and surveys by TxDOT, Developer shall cause a TxDOT Type II monument to be set at all significant points on the Project ROW line and at intersections with existing Project ROW lines, replacing monuments as described above (construct according to TxDOT specifications), unless otherwise directed by TxDOT.

s) As a part of the survey process, Developer shall cause a TxDOT Type II monument to be set at all significant points such as PCs, PTs, angle points and at 1500 foot intervals along tangent sections on the Project ROW line and at intersections with existing Project ROW lines, replacing monuments as described above, unless directed by TxDOT. Project ROW line intersections with property lines shall remain monumented by a 5/8-inch iron rod with a TxDOT aluminum cap (rod-and –cap monument). A TxDOT Type II monument must be set on the Project ROW lines, perpendicularly left and right of each significant centerline point, regardless of the relative orientation of the final Project ROW line.

t) For any required revisions, Developer shall resubmit to TxDOT all documents pertaining to the parcel to reflect the most recent revision date, and shall add a notation on the appropriate documents to state briefly the reason for the revision.

u) Documents shall contain deed references (survey name, abstract number, volume and page or document number, grantee, and area) for all existing public right of way encountered within the Project Limits. If there is no recorded information found, a note shall state "Based upon our research, there appears to be no recorded vesting deed for the public right of way as shown hereon."

v) The documents produced by the surveyor are the property of TxDOT, and release of any document shall be subject to TxDOT's prior written approval.

w) Developer shall cause the surveyor to include the denial of access line on the Project ROW map sheets and on the parcel plats, as required for controlled access facilities. Developer also shall cause the surveyor to describe the area of denied access in the parcel description and monument on the ground with a 5/8-inch iron rod with a TxDOT aluminum cap stamped "TxDOT ADL" the limits of the denial of access.

x) The Project ROW map and each parcel plat shall include a parcel information table containing the areas, expressed in square feet, of the following: 1) the parent ownership as stated in all adjoining record vesting deeds or converted from the stated record acreage in those vesting deeds; 2) the parcel to be acquired as shown on the closure report for that parcel, and; 3) the remainder tract (item 1 minus item 2). If the parcel to be acquired consists of multiple parts, the Project ROW map shall show the net remainder. The parcel information table shall also contain the areas, expressed in acres, of the parent tract, the parcel to be acquired, and the remainder. This acreage (except stated record) shall be converted from the square footage as contained in the table. A note shall be included on the Project ROW map and on each parcel plat stating: "The acreage calculated and shown hereon is converted from the square footage shown hereon, and is for informational purposes only." Parcels with area less than one acre will not require acreage units to also be shown. All parcels, including parcels acquired by TxDOT or other Governmental Entity, shall be included on the Project ROW map.

y) Within the proposed Project ROW, all property owned by a city, county, or other local public agency (LPA) in fee or easement that does not have a vesting deed shall be identified by a parcel number and included on the Project ROW map. Developer shall cause the surveyor to prepare a parcel description and parcel plat for use as an exhibit in the Project ROW acquisition (property transfer) documents.

z) Developer shall cause an independent Registered Professional Land Surveyor (RPLS) to review the Acquisition Survey Document Package for consistency as to the information delineated thereon and for compliance with all applicable Technical Provisions and survey documents. The boundary location and the survey methods remain the responsibility of Developer, and are not part of this review process. TxDOT will have no obligation to accept the Acquisition Survey Document Package as complete until the reviewing RPLS has signed and sealed the compliance certificate (compliance certificate form to be provided by TxDOT).

aa) Parcel numbering shall follow the TxDOT *ROW Manual*. Parcels are to be numbered based upon the parent tract. Developer shall revise parcel numbering due to subsequent transactions as in the following example: From a 50-acre parent tract, with a proposed Project ROW acquisition parcel

identified as Parcel 14, a 5-acre tract is sold which will also require Project ROW acquisition. The result is, Parcel 14 is "Not Used", and the two new Project ROW acquisition parcels are identified as Parcel 14A and 14B. If the property containing Parcel 14B sells a portion, then 14B is "Not Used" and the new Project ROW acquisition parcels are identified as Parcel 14C and 14D, etc. Developer shall not use the letter "E" to avoid confusion with easement designations. Parcel numbering shall be sensitive to the appraisal of the required parcels.

bb) Complicated portions of a Project ROW acquisition survey can cause the Project ROW Map to be very difficult to read. TxDOT's preferred solution is to create an additional Project ROW map sheet or sheets for details, curve data, general notes, etc. The primary page would still retain the whole property inset, record ownership data, and most of the usual information. The additional sheet(s) should be clearly referenced and be numbered as the next sequential page(s). Pages numbered with a letter added (for example: 6A, 6B) are for revisions and corrections. Developer shall use the preferred solution unless TxDOT approves an alternate method.

cc) An ownership sheet or sheets, containing an index to the information for all the parcels, shall be included and located near the beginning of the Project ROW map, after the title sheet and control sheet. The ownership sheet index shall include the parcel numbers, the names of the property owners, the vesting deed recording information, the record area of the parent tract, the area of parcel(s) to be acquired, the area of the remainder(s) left and right, the beginning and ending stations of the parcel along the Project ROW line, and the sheet number in the Project ROW map where the parcel is located.

dd) At property corners where more than one monument is found, a detail shall be provided to show the measured relationship between the monuments found and the monument set or held.

ee) Developer shall purchase all materials, supplies and all items necessary for proper survey monumentation. Developer may purchase Type II monuments from TxDOT. TxDOT shall make available for pick-up by Developer Type II monuments within 75 Days after TxDOT receives from Developer a written order, specifying the number of monuments to be purchased. Payment for TxDOT-supplied monuments shall be due within 30 Days after TxDOT delivers to Developer a written invoice. Developer may use these monuments only for this Project and shall be responsible for proper storage thereof.

ff) Developer at the request of the property owner or TxDOT shall re-stake the proposed ROW with a flagged wooden stake.

Design Certification

Developer shall provide sufficiency of design to determine the Ultimate Project configuration ROW need and produce ROW maps that delineate the proposed ROW and potential impacts to the remaining ROW. A design certification of ROW will be provided by the Developer for each parcel which confirms that the proposed ROW acquisition is adequate and necessary to construct and perform operations and maintenance on the Project and that other ROW acquisition alternatives are not feasible and/or cost prohibitive.

7.3.2 Additional Reporting Requirements

In addition to the Project ROW map, parcel description, and parcel plats, Developer shall provide the following reports and electronic files:

a) Monthly Parcel Report: Developer shall provide a report, prior to the first of the month, listing all parcel deletions, parcel additions, and parcel splits.
b) Monthly Progress Report: Developer shall provide a report of all survey activity that occurred during the previous month, including a two-week look ahead of anticipated survey activity.
c) CADD Files: Developer shall provide digital CADD files in MicroStation format which includes: property lines and/or existing ROW lines, as surveyed; proposed ROW lines; parcel numbers; resource files; level assignments; and plot files. Developer shall submit CADD files prior to submitting the first Acquisition Package, and provide updates as needed.

7.3.3 Title Services

With respect to title services, Developer shall comply with the applicable standards identified in Section 7.2.1, including the following requirements:

a) Select and contract with one or more title companies approved by TxDOT and deliver to TxDOT a five-year sales history, a preliminary title commitment or preliminary title report, and, if necessary or appropriate, copies of all underlying documents and a plot of all easements, including Existing Utility Property Interests, referenced therein for each parcel (including fee acquisitions, slope easements, other drainage and roadway ROW or easements and abandonment of utility easements) to be acquired by TxDOT for the Project. Each title report shall be dated not more than 90 Days prior to the date of submittal to TxDOT of the Acquisition Package for such parcel. Developer shall, at its own cost, review each title report to ensure that it complies with the format required by the Contract Documents. Developer shall, at its own cost, retain the services of a real estate attorney, licensed and located in the State of Texas, to be available for title support and acquisition assistance. All title reports must be in the following required format: clearly indicate which exclusions and exceptions shall be deleted upon acquisition of the subject parcel, and clearly indicate any required deliverables to the title company to clear identified exclusions and exceptions. Title reports shall be in accordance with Good Industry Practice. Developer shall notify the title company, by letter, which exceptions should be removed, including easements that (a) are appurtenant to and/or of benefit to the parcel but not included in the parcel to be acquired, and (b) are a burden on the parcel and not acceptable.
b) Review the preliminary title commitment or report to ensure that all current owners of record title are contacted and that negotiations or condemnation actions are conducted with all appropriate parties.
c) Work with the current owners of record title to each parcel or interest in a parcel or their designee and all other appropriate parties to clear any title exceptions or exclusions not acceptable to TxDOT.
d) Secure an owner's policy of title insurance in the amount of the total acquisition cost to include cost of the property, improvements, and damages to the remainder of the property, for each parcel from a title company acceptable to TxDOT for each parcel acquired, whether by deed or eminent domain judgment, insuring title as required by TxDOT. All Project ROW shall be acquired, and TxDOT's title in the Project ROW shall be insured, in fee simple absolute or easement interest as appropriate, free and clear of any and all liens and encumbrances. Title policies must be in a form and substance approved by TxDOT. Title to the Project ROW shall be insured in the name of the "State of Texas by and through the Texas Transportation Commission."

7.3.4 Introduction to Property Owners

TxDOT shall prepare and send out initial contact letters of introduction for both property owners and displacees with the assistance and at the cost of the Developer. The letters shall clearly describe the Project, TxDOT's need for the owner's property, and shall include the name and telephone number of a Developer's representative. TxDOT's ROW Administrator or his/her designee will sign the letters on TxDOT letterhead. The forms for these letters shall be approved by TxDOT prior to use. Property owners or displaces unable to read or understand the notice must be given appropriate translation.

Developer shall send a copy of the State of Texas Landowner's Bill of Rights for each property owner and submit a copy to be included with the letter of introduction. The copy of the Bill of Rights shall be the latest version as shown on the Attorney General's website,

https://www.oag.state.tx.us/agency/Landowners_billofrights.pdf.

7.3.5 Appraisals

7.3.5.1 Appraisal Services

Developer shall provide TxDOT with fair market value appraisals prepared by appraisers meeting the minimum qualifications established herein. All appraisals shall be prepared in conformance with applicable Law (including the Uniform Act), and in accordance with professional appraisal methods and applicable TxDOT standards for all parcels to be acquired by TxDOT. Developer shall:

1. Select appraisers from TxDOT's list of Pre-certified fee appraisers and meeting the requirements specified in Section 7.2.7. TxDOT shall have final approval of the selection of each appraiser and appraisal reviewers submitted by Developer. Developer must identify and receive written approval of the appraiser who will be responsible for the appraisal work product and who will be signing the reports.
2. Establish personal pre-appraisal contact with each owner of record title and each occupant, and document all contacts utilizing forms provided by TxDOT.
3. If necessary, make a diligent effort to secure a written agreement between the record title owner and Developer granting TxDOT, Developer or assignees permission to enter the applicable parcel to be acquired (a "Right of Entry Agreement"). Developer may at its sole discretion and expense offer to pay reasonable compensation for any required Right of Entry Agreements. If Developer, after best efforts, is unable to secure a Right of Entry Agreement from the property owner, Developer shall provide documentation acceptable to TxDOT indicating conversations, correspondence, and efforts used to attempt to secure the Right of Entry Agreement.
4. Contact the record title owners or their designated representatives, in writing, to offer them the opportunity to accompany the appraiser on the appraiser's inspection of the parcel, and maintain a record of all such contacts and attempts to contact in the parcel file.
5. Cause the appraiser to prepare a complete appraisal report for each parcel to be acquired to include the whole property, the portion to be acquired, and any damage to the remainder. It shall also include all improvements on the whole property, unless otherwise directed by TxDOT. The appraisal reports shall comply with and include all matters required by this section and TxDOT ROW related manuals, and shall satisfy the requirements of the USPAP in effect at the time the appraisal is submitted. Special analyses, studies or reports, as necessary, shall be made a part of

each appraisal. The appraiser must continually monitor these standards to ensure the appraisals conform to the most current requirements of professional appraisal practice. All appraisals shall utilize TxDOT Form ROW-A-5 - Real Estate Appraisal Report unless otherwise authorized by the TxDOT *Right of Way Manual* or TxDOT *Appraisal and Review Manual*; however, all appraisals for condemnation proceedings shall utilize TxDOT Form ROW-A-5 - Real Estate Appraisal Report.

6. Obtain and provide TxDOT with copies of all written leases, licenses and other occupancy agreements, including outdoor advertising/sign agreements that are not already included in the Title Commitment, in order to identify lessees, licensee and other occupants with potential compensable interests in each parcel and to determine the value of each such interest.
7. Perform an evaluation of all outdoor advertising signs, as required, utilizing the appropriate forms as instructed by TxDOT.
8. Cause the appraiser(s) to testify as an expert witness(es) or provide expert witness(es) approved by TxDOT in special commissioners' hearings or eminent domain proceedings through jury trial and be available for depositions, other discovery, pre-hearing or pre-trial meetings and appeals, as directed by TxDOT. Developer shall also provide administrative and/or technical support for such proceedings as requested by TxDOT.
9. Coordinate with the review appraiser regarding corrections and/or additional information that may be required for a particular appraisal.
10. Cause a report to be prepared by an environmental professional that meets ASTM E-1527-05, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, or provide a report in a manner approved by TxDOT, documenting the environmental condition of each parcel, which may be based on field investigations and/or historical review, as appropriate for the particular parcel. The report shall be completed in coordination with the appraiser(s) and shall be available to the appraiser(s). A Phase I environmental site assessment or a report provided in a manner approved by TxDOT shall be performed for all properties. If it is determined that there is a potential environmental risk based on the Phase I report or other report then a Phase II investigation shall be performed. A Phase III investigation shall be performed if the Phase II report justifies it. The Phase III report must indicate the approximate cost to remediate the parcel to achieve its current use and its highest and best use. Prepare timely written notification to TxDOT of any environmental or other concerns associated with the Project ROW or Additional Properties to be acquired that could require environmental remediation or other special attention or which would cause a report to be prepared.
11. Engage the services of, and cause, a land planner to perform, or otherwise assist in the preparation of, any and all appraisals that involve a parcel with a valuation analysis indicating a highest and best use that is other than the current use of such parcel, or as directed by TxDOT for certain other appraisals. Developer shall notify TxDOT in writing of each and every instance when the highest and best use of a parcel is different and TxDOT will determine to what degree land planner services will be utilized by Developer.
12. Cause the appraiser(s) to prepare updated appraisals, as well as updated appraisal reviews, when required by TxDOT or as needed during eminent domain proceedings. An updated appraisal package shall comply with USPAP, specifically the Statement on Appraisal Standards No. 7 (SMT-7) and Advisory Opinion, AO-3. The term “Update of an Appraisal” is defined as “an

extension of a complete or limited appraisal and report relied on by a client for a prior business decision." At a minimum, the updated appraisal report must include:

a. A letter of transmittal with a specific reference to the original appraisal report, any changes in market conditions, since the original appraisal, any changes in the subject property since the original appraisal, a statement of the current value or extension of the original value opinion and the listing of the current date of value.
b. An updated Page 1 from TxDOT Form ROW-A-5 – Real Estate Appraisal Report or Form ROW-A-6 – Real Estate Appraisal Report, as appropriate, with the current date of a recent inspection of the subject property and a current date of value. This form needs to have a current signature and date by both the appraiser and the reviewing appraiser in the appropriate spaces on the form.
c. Any qualifying and limiting conditions or general assumptions by the appraiser shall be clearly stated and attached.
d. A copy of the survey and legal description of the property being acquired, current photographs of the subject property, clearly showing the area being acquired, even though the original appraisal report contained photographs of the subject and the area of the acquisition. If there are significant changes to the subject property, the area being acquired, access to the remainder property, damages to the remainder(s), market conditions, the subject property's highest and best use from the previous appraisal or significant changes in the approaches to value, the property shall be reappraised using either TxDOT Form ROW-A-5 – Real Estate Appraisal Report, or, when approved by TxDOT, TxDOT Form ROW-A-6 – Real Estate Appraisal Report, depending on the report used for the original appraisal. Appraisers shall refer to Sections 6.03 and 6.04 of the TxDOT *Appraisal & Review Manual* for additional guidance. Developer shall follow these guidelines in producing updated appraisal reports and shall discuss specific updating requirements for any complex appraisals with TxDOT before beginning the assignment.

13. Prepare and deliver to TxDOT upon request, a copy of all file documents, as formally requested in discovery motions or request for production.
14. Developer shall complete and furnish, to the appraiser and Relocation Agent, TxDOT Form ROW-A-9 - Property Classification Agreement before appraisal is completed.

7.3.5.2 Appraisal Review

In connection with appraisal review, Developer shall:

1. Select review appraisers from TxDOT's list of pre-certified fee appraisers and meeting the requirements of Section 7.2.7. The review appraiser selected must follow the appraisal guidelines and procedures found in Chapter 4 of the TxDOT *ROW Appraisal & Review Manual*.
2. Determine, in consultation with TxDOT, if additional appraisal reports or technical expert reports are required. Initiate, review, and reconcile each report required.
3. Review all appraisal reports for each parcel to determine consistency of methodology, supporting documentation related to the conclusion reached, and compliance with TxDOT standards, as defined in Section 7.3.5.1 and this Section 7.3.5.2, the TxDOT *ROW Appraisal & Review Manua*l, the *Uniform Appraisal Standards and Federal Land Acquisitions* and the requirements

of the Appraisal Foundation's USPAP in effect at the time the appraisal is reviewed. The review appraiser must continually monitor these standards to ensure the appraisals conform to the most current requirement of professional appraisal practice.

4. Inspect the subject properties and the sale properties used in direct comparison for each appraisal being reviewed.
5. Upon completion of the review outlined above, the appraiser shall certify in writing to TxDOT that all required standards have been met. This certification will occur by signing on Page 1 of each TxDOT Form ROW-A-5 (Real Estate Appraisal Report) or TxDOT Form ROW-A-6 (Real Estate Appraisal Report) in the block provided. The review appraiser will also complete TxDOT Form ROW-A-10 (Tabulation of Values) to accompany each appraisal.
6. For appraisal updates, the review appraiser shall perform a complete review of the updated appraisal, re-inspecting the subject property and the sales used, as of the current date of value. The review appraiser shall follow the procedures outlined in the TxDOT *ROW Appraisal and Review Manual*. A new TxDOT Form ROW-A-10 (Tabulation of Values) will be required for each updated appraisal ordered by Developer.
7. In accordance with providing a Quality Control Specialist(s) as stated in Section 7.2.7, ensure that appraisal consistency and quality for the entire Project is monitored for Project-wide controls and consistency.

7.3.6 Project ROW Acquisition Package Approval

Acquisition Packages submitted by Developer for TxDOT's approval shall include the following items, prepared for each parcel in accordance with the requirements of this section:

1. A cover sheet setting forth the following information for each parcel.
    a. Parcel number and number of parts
    b. Station number
    c. CSJ number
    d. Location of parcel
    e. Name of owner
    f. County and/or other jurisdiction
    g. Extent of acquisition (partial or whole acquisition)
    h. Type of conveyance (fee, easement, etc.)
2. A complete legal description of the parcel adequate to effect the desired acquisition of the parcel, signed and sealed by an RPLS. A legal description and parcel plat is required for each parcel. Control of access shall be addressed in all legal descriptions. All descriptions shall be in recordable form and shall be prepared in a form and manner acceptable to TxDOT in all respects.
3. The parcel plat, as prepared by the RPLS, and a half size (11" x 17") copy of the ROW map sheet(s) pertaining to the parcel, such plat to include control of access designations.
4. A title report, current within 90 Days, including copies of all documents identified in the exceptions listed therein and a plot of all easements identified therein. The Acquisition Package shall include Developer's analysis of each preliminary title report or title commitment to determine potential problems and proposed methods to cure title deficiencies. Developer shall perform title curative work. Developer shall provide TxDOT with copies of all curative documents.

5. A copy of the appraisal report with an effective date less than 180 Days and all supporting documentation.
6. A copy of the environmental site assessment and all amendments as described in Section 7.3.5.1.
7. A real/personal property report detailing the items making up each parcel are classified as real estate, tenant-owned improvements or personal property. Particular attention shall be paid to items that have questionable classifications. A completed TxDOT Form ROW-A-9 (Property Classification Agreement).
8. Replacement Housing Calculations, notification of business eligibility, completed displacee interviews, all comparables used in estimating the Replacement Housing Calculations, and letter to displacee(s) explaining Replacement Housing Calculations. Calculations and replacement housing benefit package shall be prepared and reviewed by a qualified consultant, in conformance with TxDOT's standard relocation procedures and applicable to State and federal Laws.
9. The proposed initial offer letter, memorandum of agreement, deed, and any other documents, which shall be prepared by Developer as required or requested by TxDOT, on Developer's letterhead or as otherwise directed. TxDOT will provide the format for preparing these documents. Documents referred to in this section are standardized by TxDOT and modification of standardized documents shall be kept to a minimum. All changes are subject to approval by TxDOT in writing, in TxDOT's sole discretion.
10. Any other required TxDOT forms, such as record of all contacts with the property owner or any party with a compensable interest.

No Acquisition Packages will be approved if performed or submitted by appraisers or agents not previously approved by TxDOT for this Project.

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

7.4 Acquisition Activities

7.4.1 ROW Negotiations

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

a) Within ten Business Days of TxDOT's approval of the Acquisition Package, contact each property owner or owner's designated representative, in person where practical, to present the offer and deliver an appraisal report (not more than 6 months old) and appropriate brochures. The approved appraisal shall be sent by certified mail, return receipt requested. A copy of the appraisal report for the subject property shall be provided to the property owner or authorized representative at the time of initial offer. All appraisal reports produced or acquired by TxDOT relating specifically to the property owner's property and prepared in the 10 years preceding the date of the offer must also be delivered to the property owner. Developer shall also maintain a file record of receipt of appraisal signed by the property owner. Developer shall also maintain follow-up contacts and secure the necessary documentation and title curative Work upon acceptance of the purchase offer.

b) At the time of offer, produce and distribute to all property owners and displacees, TxDOT-approved informational brochures, as appropriate. The ROW brochures shall be purchased by Developer and shall include language about the use of the *Declaration of Taking* procedure if Developer anticipates requesting the utilization of this procedure by TxDOT anywhere within the Project.

c) Identify lessees, licensees, occupants, or other parties with potential compensable interests including outdoor advertising sign owners, and, if appropriate, after consultation with TxDOT, negotiate with such parties for the acquisition of their compensable interests.

d) Advise the property owners, lessees, licensees, occupants, and other holders of compensable interests, as applicable, of the administrative settlement process. Confer with and transmit to TxDOT's ROW Administrator any settlement request from property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, including a detailed recommendation from Developer in accordance with standards, manuals and procedures as defined in Section 7.2. TxDOT shall determine whether to accept a settlement request. Delivery of the administrative settlement request and Developer's recommendation to TxDOT must occur within fifteen (15) Business Days following Developer's receipt of the administrative settlement request.

e) Developer, at its request or the request by TxDOT and/or the TxDOT Administrative Settlement Committee, may participate in the evaluation of the administrative settlement request and attend the committee meeting.

f) Developer shall provide a letter with the TxDOT Administrative Settlement Committee's response to the property owner, lessee, licensee, occupant, or other holder of a compensable interest, as applicable. Developer shall deliver all settlement responses (if within reasonable proximity of the Project) by hand within three Business Days after receipt. If this delivery method is not feasible, Developer shall mail (return receipt requested) response letters not more than three Business Days following any decision by the TxDOT Administrative Settlement Committee. If Developer selects the mailing option, Developer shall make a telephone call to the property owner to discuss the settlement offer prior to mailing the response letter. The TxDOT ROW Administrator, on an as-needed basis, will convene the TxDOT Administrative Settlement Committee.

g) Notwithstanding an unsuccessful completion of the formal administrative settlement process, Developer may, engage in ongoing negotiations with the owners of compensable interests. Developer shall develop and incorporate in its ROW Acquisition Plan a procedure for these negotiated settlements. Said negotiations may continue until such time as the Texas Transportation Commission adopts a minute order authorizing the filing of a condemnation petition. Developer shall submit to TxDOT its recommendation of a negotiated settlement and obtain TxDOT's consent prior to acceptance of any settlement.

h) Provide timely (i.e., not more than ten Business Days after inquiry) response to the verbal or written inquiries of any property owner, lessee, licensee, occupant or other holder of a compensable interest, as applicable.

i) Prepare a separate negotiator contact report for each meeting or conversation with any person (or their appointed representative(s) supported by a written confirmation of appointment) who has a

compensable interest in each parcel on TxDOT Form ROW-N-94 – Negotiator's Report. Contact reports shall also be prepared for unsuccessful attempts to contact such persons.

j) Maintain a complete parcel file for each parcel. All original documentation related to the purchase of the real property interests will be maintained (housed separately from the relocation files) in conformance with TxDOT standards, manuals, and procedures, as defined in Section 7.2. All original Project ROW documents must be retained and properly secured in Developer's Project office or as otherwise approved by TxDOT. Signed original documents shall be forwarded to TxDOT periodically or as requested by TxDOT with a transmittal form during the acquisition process; provided, however, that all remaining original documents shall be forwarded upon completion of the acquisition of Project ROW for the Project.

k) Prepare and deliver documents of conveyance (including bisection clause and access clause, if applicable) to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable, and obtain their execution of the same. All signatures on documents to be recorded shall be notarized in accordance with Texas Law.

l) Pursue and obtain Possession and Use Agreements (PUA) concurrently with the parcel negotiations. The form of PUA will be provided by TxDOT and will contain provisions allowing for construction to commence while negotiations are finalized. Such agreements will be sought and negotiated by Developer strictly in accordance with the Law and only with the prior written consent of TxDOT. If Developer exercises the use of a TxDOT PUA, Developer must obtain a deed or commence action on condemnation proceedings by forwarding a condemnation packet to TxDOT for approval within six months from the date of the PUA.

m) Be open to all reasonable settlement requests (that comply with the regulations as outlined in this section) from the property owners, which are feasible and help expedite the Project ROW acquisition process. Developer acknowledges and understands that TxDOT encourages all positive and creative solutions which satisfy the property owner and promote the success of the Project.

n) Developer shall prepare and deliver a final offer letter to the property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, no sooner than 30 days from the date of the offer letter in accordance with Senate Bill 18 or as codified. The letter shall be on Developer's letterhead and shall be signed by the ROW Acquisition Manager. The final offer letter shall allow a property owner, lessee, licensee, occupant or other holder of compensable interest at least fourteen (14) Days as the consideration time period to review the final offer. Developer shall submit to TxDOT, a copy of the final offer letter within two days after delivery to the property owner.

If the Final Offer Letter is not accepted, Developer shall follow the procedures established for condemnation.

7.4.2 Relocation Assistance

Developer shall coordinate and perform the administrative requirements necessary to relocate any occupants and personal property from Project ROW and certain remainders, as authorized by TxDOT. All Work prepared by Developer with respect to relocation assistance shall be performed in accordance with applicable Law, including the Uniform Act and TxDOT standards, and in accordance with all provisions of this Agreement.

Developer shall maintain a relocation office (meeting ADA requirements) within reasonable proximity of the Project area as approved by TxDOT. At a minimum, the office hours of the relocation office shall be posted to meet the following timetables:

a) Monday thru Friday: 8:00 am to 5:00 pm
b) Saturday: 9:00 am to 12:00pm
c) Sunday: office may be closed

In addition to the office hours listed above, Developer shall be available to all displacees for relocation services at the convenience of the displacees.

Developer's major activities with respect to the relocation assistance of occupants from Project ROW include:

a) Prepare a Relocation Plan in accordance with the TxDOT *Right of Way Manual*, Volume 3, Chapter 8 (Relocation Program Planning and Construction) within 90 Business Days after receipt of NTP1.
b) Monitor relocation assistance activities.
c) Prevent fraud, waste and mismanagement.
d) Assist with all requests and be responsible for carrying out decisions made by TxDOT, the review/appeal process and judicial reviews.
e) Provide written notice to all property owners, lessees, licensees, occupants, other holders of compensable interests, and other potential displacees regarding relocation assistance and produce and provide them with a relocation assistance brochure that has been approved by TxDOT. Developer shall perform relocation interviews, complete and maintain interview forms and discuss general eligibility requirements, programs, and services with potential displacees. Developer shall maintain a written record of all verbal contacts.
f) Give written notice of the pending acquisition to any non-eligible occupants. Any questions as to the eligibility of a potential displacee shall be directed in writing to TxDOT's ROW Administrator.
g) Contact and provide relocation assistance to those parties affected by the Project ROW acquisition and complete forms for all displacees, as required.
h) Locate, evaluate and maintain files on comparable available housing, commercial, retail, and industrial sites.
i) Calculate replacement supplement benefits.
j) Compute and submit requests for relocation rental/housing supplement to TxDOT prior to submission to relocatees. All relocation supplements shall be subject to TxDOT's written approval.
k) Perform a Decent, Safe and Sanitary (DSS) inspection for each replacement housing comparable, photograph the comparable and complete the DSS inspection form, TxDOT Form ROW-R116 (Replacement Housing Inspection).
l) Obtain at least two moving estimates from moving companies to effect relocation of personal property or consistent with the Uniform Act.
m) Prepare moving plan with appropriate photos, sketches and inventory of personal property to be moved.

n) Coordinate moves with displacees and moving companies in accordance with TxDOT standards and the Uniform Relocation Act.
o) Maintain relocation contact logs on a TxDOT Form ROW-R96-R (Relocation Advisory Assistance – Parcel Record).
p) Attend all closings on replacement properties, if requested by any party involved, and assure supplemental payments, if any, are properly distributed.
q) Process and compute increased interest payments on the mortgage of owner-occupied dwellings, as required.
r) Deliver to displacees a 90 Day notice of eligibility letter simultaneous with the delivery of the relocation benefits package. Deliver a 90 Day letter to displacees with the location of the comparable property used to compute the supplement.
s) Deliver a 30 Day notice to displacees and property owners upon Possession of Project ROW.
t) Notify TxDOT's ROW Administrator office immediately if a displacee has not moved after 30 Day notice expires. Prepare a written recommendation to facilitate the displacee's move.
u) Be available for any appeals or hearings.
v) Prepare relocation payment claim submissions for all displacees and all relocation assistance benefits.
w) Verify DSS dwelling criteria on all replacement housing as selected by the displacees.
x) Secure dwellings and structures no later than ten Days after vacancy and protect the Project ROW following acquisition and relocation.
y) Maintain a complete file, separate from acquisition files, on each displacee and make available for inspection.
z) Be responsible for all relocation activities that may occur after deposit of the special commissioner's award in the courts, including instances when a parcel referred to the Attorney General's office for eminent domain also has a relocation issue. Relocation computations shall be adjusted based on the approved administrative settlement and court award.
aa) Prepare all correspondence to the displacees or their representative(s) on Developer's designated relocation letterhead and have Developer's correspondence signed by the Project ROW relocation agent.
bb) Deliver to each displacee the relocation assistance payments according to the TxDOT ROW Manual Vol. 3 Relocation Assistance – Chapter 4 Program Administration – Section 1 Procedures – Delivery of Payment.
cc) Assist TxDOT and the Attorney General's office with eviction proceedings. Serve notice of eviction proceedings to the occupant(s) of the property who have not complied with move dates. Coordinate the eviction process with the local authorities and accompany the Sheriff's Department when the local authorities are carrying out eviction.

7.4.3 Closing Services

For purposes of closing services, Developer shall:

a) Provide closing submittals to TxDOT for review a minimum of 24 hours prior to closing. Closing submittals shall include the following:
    i. a reference to the disposition of any environmental matters;

ii. an updated title commitment, no more than fifteen (15) Days prior, with notations indicating the disposition of all schedule "C" items;
iii. a copy of the executed warranty deed to be delivered;
iv. a proposed closing statement indicating disposition of all proceeds;
v. a copy of any and all releases of liens;
vi. a copy of any miscellaneous documents and other curative matters required to be delivered at closing and g) a copy of the closing memorandum outlined in item b below.

b) Prepare the escrow agreement and closing documents, including a closing memorandum identifying all parties involved in the closing, and listing all documents to be executed and/or delivered in connection with the closing.
c) Attend closings; provide curative documents and exhibits as required and in conjunction with the applicable title company. Confirm that all conditions to closing are satisfied and notify TxDOT of all closing appointments.
d) Obtain an issued title policy based on the approved updated title commitment within 30 Days following closing and transmit the same to TxDOT.
e) Obtain and deliver to TxDOT one certified copy of each instrument of conveyance immediately after closing, and provide the original title policy to TxDOT within five Business Days after receipt. Cause to be delivered to TxDOT the original recorded deed within ten Days after the title company receives the recorded deed.

7.4.4 Condemnation Support

Developer shall provide an individual or individuals having sufficient knowledge of the design of the Project to appear as an expert witness for testimony at the special commissioners' hearing or other proceedings. This individual(s) is also responsible for preparing exhibits as requested by TxDOT or the Office of the Attorney General in support of said testimony.

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

a) Notify TxDOT of any potential condemnation and document the reason(s) for condemnation including recommendations for property closure.
b) Conduct all applicable eminent domain-condemnation activities in accordance with the policies and procedures as described in the TxDOT *Right of Way Manual*, Volume 4: "Eminent Domain "; in the TxDOT *ROW Appraisal and Review Manual*, Chapter 7 "Eminent Domain-State Acquisition" or as revised; and in Chapter 21, Texas Property Code and Senate Bill 18.
c) After non-response or upon receipt of a copy of the rejected final offer from a property owner or other property right holder entitled to compensation, request an updated title report from the title company issuing the original title commitment.
d) Provide to TxDOT, within ten Days following non-response or rejected certified mailing, notification thereof together with a signed and sealed parcel description and parcel plat, and a bisection clause and access clause, if necessary, with the clauses attached to a property exhibit containing the parcel description and parcel plat.
e) Use the information from the title report to join all parties having a property interest on applicable the TxDOT form. Spouses of property holders with compensable rights must also be joined.

f) Upon completion of TxDOT Form ROW-E-49 (Request for Eminent Domain Proceedings), prepare a condemnation packet containing two copies each of the following documents: the completed TxDOT form, negotiation logs, the updated title report not more than 90 Days old, appraisal receipt acknowledgment, pre-appraisal contact sheet, signed and sealed field notes, parcel sketch, bisection clause and access clause exhibits (if necessary), initial offer letter and final offer letter reflecting latest appraisal, complete minute order request form (form to be provided by TxDOT), any correspondence sent by Developer or from the owner of the compensable interest or representatives, one copy of the appraisal report not more than 180 Days old from the effective date of the appraisal report and evidence of a bona fide offer to the property owner. Submit two (2) complete Condemnation Packages to TxDOT's ROW Administrator for review and approval.

g) Send a copy of the complete petition to the title company and confirm with the title company that the appropriate parties were joined in the case and that no changes in title have occurred since the original litigation guaranty was issued.

h) File the petition for condemnation with the appropriate court clerk after a determination that a timely settlement is not feasible. Send a copy of the petition, by certified mail, return receipt requested, to the owner, lessee, licensee, occupant or other holder of compensable interest.

i) Coordinate and provide legal and technical support to TxDOT, as required to facilitate filing the petition, assignment of a court, and setting of a hearing date.

j) Make available to TxDOT on behalf of the Attorney General's office an agent who will be expected to assist in making arrangements for conferences with witnesses prior to trial, filing the condemnation petition, informing all parties as to the filing date of the petition and the case number assigned to the suit, and perform any other duties which will assist in the successful prosecution of the suit, including his or her attendance in court and filing necessary documents to complete all eminent domain proceedings.

k) Depending on the market conditions or if over six months have elapsed since the date of the initial offer, contact the attorney handling the case for TxDOT and confer about the advisability of preparing an updated appraisal. If it is determined that an updated or new appraisal is necessary or desirable, obtain such appraisal using the same procedures as described in Section 7.3.5.1 above. Developer must also undertake appraisal review as described in Section 7.3.5.2.

l) Coordinate with TxDOT on behalf of the Attorney General as to land planners and/or other expert witnesses as required by the Attorney General. Developer, at its cost, shall provide the land planner or other expert at the request of TxDOT or the Attorney General. The land planner or other expert report, if required, shall be completed and forwarded to the appraiser before the updated appraisal is completed.

m) Appear or provide for the appearance of expert witness(es) or fact witness(es) when requested by TxDOT or the Attorney General's Office. The appearances may include pre-commissioner's hearing preparations, special commissioner's hearings, and subsequent proceedings including jury trials and related proceedings.

n) Submit the updated appraisal to TxDOT and the attorney handling the case for TxDOT for review and approval, which review and approval shall occur within ten Business Days of receiving the updated appraisal. TxDOT and Developer must approve any revised offer in writing prior to an offer letter being sent. If a revised offer is approved, prepare a final offer letter, make the revised

offer to the property owner or other holder of a compensable interest, as applicable, and submit a copy of the final offer letter to TxDOT for written approval.

o) Communicate with TxDOT as to the parcel status on a monthly basis and in the Project progress report or as requested by TxDOT.

p) Serve in person, a "Notice of Hearing" not later than twenty (20) Days before the date of the special commissioners' hearing or other hearings and notice requirements as directed or authorized by the court.

q) Call and send a reminder letter two to three weeks in advance of any hearing to the assigned attorney, engineer, technical experts, appraiser, the commissioners, court reporter, and TxDOT's ROW Administrator concerning hearing dates.

r) Upon completion of the hearing, prepare TxDOT Form ROW-E-73 (Data Sheet – Special Commissioner's Hearing) and commissioners' time sheets. Developer shall make payment to all commissioners involved in the hearing and include payment for commissioners as part of general Project ROW services.

s) Coordinate and provide support to TxDOT's counsel and facilitate distribution of copies of award, prepare request for payment, and file notice of deposit. Developer shall coordinate with TxDOT on behalf of the Office of the Attorney General regarding expert witnesses needed to testify on behalf of the State at the special commissioners' hearing and subsequent proceedings including jury trials. At the request of the Office of the Attorney General or TxDOT, Developer shall provide and pay for all necessary expert witnesses including: engineering, land planners, real estate consultants, cost estimators, outdoor advertising sign experts and environmental consultants and Developer shall appear as expert witness or fact witness, as requested. Developer shall also make any Subcontractors available to appear as an expert witness or fact witness, as requested at the special commissioners' hearing or subsequent proceedings. The selection of all expert witnesses to be used for jury trials shall be determined by the Attorney General's Office.

t) Schedule and pay for all court reporter services, transcription costs, expert witness fees, exhibits, and exhibit workbooks as directed by TxDOT.

u) Be responsible for coordinating the pre-hearing meeting with TxDOT on behalf of the Attorney General's office and all others required for testimony or exhibit preparation. Developer shall require expert witnesses with all exhibits and documents to be present at a pre-hearing meeting.

v) Timely file and provide proper service of objections if requested by TxDOT after completion of the special commissioner's hearing and promptly provide evidence of filing and copies of all filed documents to TxDOT. Within three days after objections have been filed, Developer, at its cost, shall order transcripts of such hearing.

w) Developer shall provide an individual or individuals having sufficient knowledge of the design of the Project to appear as an expert witness for testimony at the Special Commissioner's Hearing or other proceedings. This individual(s) is also responsible for preparing exhibits as requested by TxDOT or the Office of the Attorney General in support of said testimony. Exhibits shall be left in the custody of TxDOT at the close of the hearing.

7.4.5 Clearance/Demolition of Project ROW

Prior to demolition of any improvements, Developer shall provide to TxDOT, photographs of the property and all improvements, unless the special commissioner's hearing has been completed and objections have not been filed. Developer shall also have photos of personal property and any other items

of dispute in and of a quality suitable for presentation as evidence in court. Following acquisition or possession of any parcel of Project ROW, Developer shall:

a) Within ten (10) Days from vacancy of the property and improvements, secure and protect the buildings, improvements and fixtures on the Project ROW until they are disposed of or demolished. Developer shall board-up, mow, fumigate and winterize as required by TxDOT or applicable Law.
b) Coordinate with the owner and occupants to assure the clearance of personal property from the Project ROW, as applicable.
c) Provide for any insect and rodent control and initiate extermination as required to protect the adjacent properties and rid the Project ROW from infestations.
d) Secure Governmental Approvals required for demolition and environmental surveys or tests, and notify TxDOT in writing of all such activities.
e) To the extent required by Section 7.2.11, prepare necessary documentation for disposal of improvements, fixtures and buildings in accordance with applicable Laws and submit the same to TxDOT.
f) Provide written notification to TxDOT of any real and/or personal property remaining on the Project ROW after vacated by the occupants and not acquired as part of the acquisition.
g) Terminate all utility service(s) when appropriate.
h) Process all required forms, documents and permit applications in order to proceed with the timely demolition or removal of any and all improvements, buildings and fixtures located within the Project ROW, as applicable.
i) Demolish and/or remove all improvements.
j) Notify TxDOT upon completion of the demolition and clearance of the Project ROW, as applicable.

7.4.6 Payment Submittals

Developer must submit a payment submittal for any item that is a TxDOT payment responsibility as outlined in this Section 7. A payment submittal shall consist of:

a) Completed Payment Request forms for each type of payment
b) All required appropriate documents as shown on each Payment Request form.
c) Form AP-152 (Tax Payer Identification Number).

The State's warrant will be returned to the Developer's ROW Acquisition Manager.

7.4.7 Property Fence

In connection with fences, Developer shall comply with the policies and procedures of the TxDOT *Right of Way Manual*, as well as the specifications found in the current TxDOT Standard Specifications. Fencing standards for Developer-provided fencing shall conform to the overall aesthetics requirements found elsewhere in these Contract Documents and referenced standards.

7.4.7.1 Property Fencing for Public Properties

Where public facilities now exist that are in high risk areas for public use (particularly those containing parks, sport areas, schools or any highly traveled pedestrian areas), Developer shall construct similar like

fence as in the preexisting condition, or at a minimum, construct a 6-foot-high chain-link fence with metal posts if no fence was in the preexisting condition. Developer shall use Good Industry Practice in fencing public properties to control public access to the Project.

7.4.7.2 Property Fencing for Private Properties

Developer shall instruct the appraiser to use the "Cost to Cure" format to compensate an owner of private property for a replacement fence when the Project ROW line leaves one or more unfenced remainder property(s) that were fenced before the taking. Compensation for the new fencing will be based upon the same type of fence as the property owner's existing fence.

When the property owner is paid through the appraisal process for the cost to rebuild the fence on the remainder property, Developer shall include in the memorandum of agreement or the purchase agreement for such property the following clause:

"It is further understood and agreed that the Grantor has been compensated for the construction of a new fence and shall be responsible for constructing the necessary fencing within 30 Days from the date of closing. Grantor specifically understands and agrees that the fences are the property of the Grantor and they shall be liable and responsible for any reconstruction, maintenance, or adjustment with regard to such fencing."

Developer shall make reasonable and good faith efforts to ensure that the property owners, who have been compensated for fencing of the remainder properties, erect the fence in accordance with the construction schedule.

If necessary to maintain the Project construction schedule and to control unauthorized access to the Project ROW by the public or livestock, Developer shall be responsible for providing temporary fencing in cases where the property owner refuses to fence the property within the allotted timeframe.

After the property owner's retention period has expired and if any existing fencing remains, Developer shall remove the existing fences from the newly acquired Project ROW and will be responsible for all costs associated therewith.

7.5 Early ROW Acquisition

TxDOT shall notify the Developer if certain Project ROW parcels are scheduled to be acquired by Governmental Entities prior to issuance of NTP1. The Developer will be updated regularly on the status of the acquisition process for each parcel.

After NTP1, Developer shall be responsible for coordinating the scheduling of any remaining early Project ROW acquisition by other Government entities with the Project Schedule. Based on the status of each parcel, TxDOT at its sole discretion may require the Developer to complete the acquisition and/or relocation of certain parcels including the removal of improvements.

8 GEOTECHNICAL

8.1 General Requirements

Developer shall perform all geotechnical investigations, testing, research, and analysis necessary to effectively determine and understand the existing surface and subsurface geotechnical conditions of the Project to be used by Developer to carry out the Work. Developer shall ensure the geotechnical investigations and analyses are both thorough and complete in accordance with TxDOT and FHWA geotechnical requirements, so as to provide accurate information for the design of roadways, pavements, foundations, structures, embankments, excavations, slopes and other facilities that result in a Project that is safe, and meets the requirements of the Contract Documents.

References to mainline pavement in this section shall include general purpose lanes and managed lanes.

8.2 Design Requirements

8.2.1 Subsurface Geotechnical Investigation by Developer

The subsurface investigation shall include but not be limited to soil borings, test pits, rock coring, and pavement coring. Developer shall determine the specific locations, depths, frequency, and scope of all subsurface geotechnical investigations, testing, research, and analysis Developer considers necessary to provide a safe and reliable roadway, pavement, foundation, structure, embankment, excavation, slope and other facilities for the Project in accordance with TxDOT and FHWA geotechnical requirements. Visual pavement surveys, and other field testing including Falling Weight Deflectometer (FWD) testing as deemed necessary for rehabilitation design of existing pavement shall also be performed.

Developer shall employ field investigation measures that avoid groundwater contamination and shall be responsible for all mitigation and/or restoration associated with geotechnical investigations.

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

a) The geology of the Project area, including soil and/or rock types, and drainage characteristics.
b) Field investigations and laboratory test results used to characterize conditions. Field investigations shall include descriptions of the soil/rock, Texas Cone Penetration test results, in-situ test results, and recovery and RQD for rock cores. If laboratory testing is required then the results shall include moisture content, plasticity index, gradations for each major soil strata change, levels of shrink/swell potential, levels of sulfate (on-site and borrow), soil compressibility, compaction characteristics (Proctor tests), resilient modulus tests, short-term and long-term strength properties in accordance with TxDOT and ASTM geotechnical testing standards. Other field exploration and laboratory testing shall be performed as appropriate.
c) A discussion of conditions and results with reference to specific locations on the Project.
d) Design and construction parameters resulting from the geotechnical investigation and analysis, including parameters for the design of pavements, pipes, foundations, structures, slopes, retaining walls, noise walls and embankments in accordance with TxDOT and FHWA geotechnical requirements.

e) 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 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.
f) Plan view locations of field sampling (Boring Locations Plan), boring logs and other field data, laboratory test results, calculations, and analyses that support design decisions.

The report shall:

a) Ensure that adequate investigation, testing, analysis, design, mitigative 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, pavements, and earth retaining structures. The report shall address all design features and facility characteristics that could affect expansive soil behavior.
b) Provide design and construction parameters derived from geotechnical investigations for the design of structure foundations, pipes, pavements, slopes, embankments and earth retaining structures.
c) 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.

8.2.2 Pavement Design

The TxDOT *Pavement Design Guide* shall be the basis for all pavement designs for the Project, and is supplemented with the requirements contained within this Section 8 as identified in the paragraphs in this section. Where there are conflicts between the requirements in these two documents, the requirements in this document shall take precedence.

Lane distribution factors for both flexible and rigid pavement designs shall be applied in accordance with the following criteria:

Table 8-1: Lane Distribution Factors

Total Number of Lanes in One Direction	Lane Distribution Factor
One or two lanes	1.0
Three lanes	0.7
Four or more lanes	0.6

Developer should expect that subgrade materials will vary throughout the Project Limits. Developer shall verify that the materials encountered or imported meet the effective modulus of subgrade reaction (rigid pavement), resilient modulus (flexible pavement), or other design subgrade support value as utilized for the structural section design. If the Project site subgrade materials have a lower value than used for the Proposal-phase pavement designs, Developer shall submit an adjusted pavement design for review and acceptance by TxDOT.

Developer shall prepare separate pavement designs and submit to TxDOT for review and approval, as applicable, for the following:

1. Managed Lanes, General Purpose Lanes, Frontage Roads, Auxiliary Lanes and Ramps

Developer shall design and construct roadway pavements for Managed Lanes, frontage road lanes, and General Purpose Lanes, including auxiliary lanes and exit/entrance ramps based upon Developer's determination of traffic projections over the Term of the Agreement. Developer must meet, at a minimum, the requirements for corridor traffic data provided in Attachment 8-1. Improvements and/or upgrades required to meet performance requirements that are a result of increases in traffic beyond what is shown in Attachment 8-1 or beyond the Developer's projections will be the responsibility of the Developer. The following categories are anticipated for these lanes:

a. Existing Pavements: This category includes existing pavement sections to remain without any improvements. These pavements will be operated under their current condition. Routine maintenance necessary to meet the requirements set forth in Section 19 will be the responsibility of the Developer.
b. Rehabilitated Pavements: This category includes existing pavements that will be retained but will require resurfacing, restoration or rehabilitation. Developer shall evaluate the existing pavement structure and provide a rehabilitation strategy to TxDOT for review, that ensures that the rehabilitated pavements will meet the following criteria:
    i. A minimum additional ten (10) years of life.
    ii. At Substantial Completion, these pavements shall meet the performance criteria provided in Table 19-5.
    iii. For ten (10) years after Substantial Completion, renewal work and routine maintenance necessary to meet the requirements of Table 19-5 will be the responsibility of the Developer.
    iv. Throughout the Term of the Agreement, routine maintenance necessary to meet the requirements set forth in Section 19 will be the responsibility of the Developer.
c. New Pavements: includes all new pavement sections on the project and pavements constructed for widening of Existing or Rehabilitated pavement sections or for addition of new traffic lanes.
    i. For New Pavement in Ultimate Areas, Developer shall design and construct pavement sections to ensure a design life of thirty years which covers the 25-year maintenance and operations period plus an additional five (5) years of life to remain after Handback. Renewal Work shall be performed as required to meet the five-year Handback Requirements.

ii. New Pavement in other areas shall be designed for a 30-year life with no Handback Requirements and will be treated as Rehabilitated Pavement during the O&M Period.

iii. New pavement sections shall meet the performance criteria provided in Table 19-5 for the Term.

2. Other

a. Managed Lane gantry pavement sections (see Section 21)
b. Cross-road pavements
c. Service driveways and parking areas
d. Temporary pavement construction areas

Developer shall submit the following to TxDOT for review:

a) Pavement Design Reports and any subsequent supplements or amendments. The reports shall include results of the field explorations and testing of pavement sections as well as recommended pavement rehabilitation methods and designs for new pavements.
b) Verification of Proposal phase pavement thickness designs
c) Traffic Control Plans associated with subsurface geotechnical or pavement investigations
d) A list of all geotechnical and pavement design software proposed for use
e) Verification plan for effective modulus of subgrade reaction (rigid pavement) and/or resilient modulus (flexible pavement)

8.2.2.1 Methodology Enhancements

Recognizing that the development of pavement design methods, products, and procedures are under continuous enhancement within the pavement community, the Developer and TxDOT understand that new methods, procedures, and products may present opportunities for improved pavement design and management during the time frame of this Agreement. Both parties mutually agree to consider the use of new design technologies provided that any such technologies and methods are agreed to by the Developer and approved by TxDOT in writing prior to final implementation.

8.2.2.2 Related Pavement Materials Specifications

Unless otherwise specified herein, pavement material requirements are defined in the TxDOT Standard Specifications and per special provisions as provided these Contract Documents. Test procedures identified herein shall be identified in the Materials Test Procedures, AASHTO or ASTM standards or equivalent guidance as approved or provided by TxDOT.

8.2.2.3 Pavement Type Selection

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

Both flexible and rigid pavements are allowed. This Project has corridor average daily traffic (ADT) greater than 100,000 vehicles per day requiring a design life of 30 years for both rigid and flexible for new pavements. In the case of rigid pavement selection, only Continuously Reinforced Concrete Pavement (CRCP) pavement is acceptable. In the case of flexible pavement selection, perpetual pavement design is not required; however, pavement design(s) shall be prepared for full-section depth construction during the D&C Period. Staged pavement construction is not permitted.

Shoulders. Pavement for the shoulders of all roadways shall be the same section (materials and depths) as the adjacent roadway pavement.

Toll Zone(s). Toll Zone(s) gantry areas may be exempted from required use of CRCP. The Developer shall coordinate with TxDOT for special reinforcing or pavement design, within toll zone areas. Concrete Pavement Contraction Design (CPCD) shall be selected when Glass Fiber Reinforced Polymer (GFRP) Bars are used. Final design details used on the Project shall be submitted to TxDOT for acceptance.

Ramp Pavement. Ramp pavements shall be constructed with the same section (materials and depths) as the adjacent mainline pavement.

Facility Access Parking. Facility access parking areas shall be Jointed Concrete Pavement (JCP) in accordance with TxDOT Concrete Pavement Contraction Design (CPCD) standards. The JCP shall have a minimum concrete thickness of eight (8) inches unless otherwise specified by TxDOT.

Developer shall provide documentation of criteria and rationale for the construction approaches selected to widen pavement sections. Developer shall comply with TxDOT *Pavement Design Guide*, historical performance, and district policy when designing the widened sections and selecting construction approaches. Construction joints along the existing and new pavement sections shall be placed a minimum of four (4) inches from the wheel path to improve performance. Geotextiles or stress absorbing membrane interlayer (SAMI) shall be placed over the widening joint to delay reflective cracking.

For all widened sections, the interface between the new widened pavement and the existing pavement shall provide a uniform surface of the same material type across all adjacent lanes. In areas where an existing asphalt surface is in place and widening is required, a new surface course will be required.

8.2.2.3.1 Rigid Pavement

Design Specification. Rigid pavement shall be designed in accordance with the TxDOT's *Pavement Design Guide* using the design inputs as summarized in the table below.

Table 8-2: Rigid Pavement Design Inputs

28 day Concrete Modulus of Rupture, psi	620
28 day Concrete Elastic Modulus, psi	5,000,000
Effective Modulus of Subbase/Subgrade Reaction, psi/inch	300 max.
Serviceability Indices ▪ Initial Serviceability Index ▪ Terminal Serviceability Index	 4.5 2.5
Load Transfer Coefficient	*
Drainage Coefficient	**
Overall Standard Deviation	0.39

Reliability %	90 (≤ 5 million ESALs) 95 (> 5 million ESALs)
Design Traffic, 18 Kip Equivalent Single Axle Load (ESAL)	Determined by the Developer
* Table 8-1, *TxDOT Pavement Design Guide* ** Table 8-2, *TxDOT Pavement Design Guide*	

Effective Modulus of Subgrade Reaction. The effective modulus of subgrade reaction (k in psi/in) is to be used for design and the value to be achieved at all times during construction activities.

Potential Vertical Rise (PVR). Developer shall design the overall new subgrade and new pavement structure to have a PVR no greater than 1.5 inch as calculated in accordance with TEX-124-E from soil tests in a soil column 15 feet deep as measured from the proposed finished pavement grade. Alternatively, provide materials that result in an Effective Plasticity Index (PI) of less than 25 when calculated to a depth of 8 feet from finished pavement surface for mainline pavements, and to a depth of 7 feet from finished pavement surface for non-mainline pavements. Calculation and sampling requirements for determination of Effective PI are stated in Section 8.3.1.

8.2.2.3.2 Flexible Pavement

Design Methodology. For flexible pavement design, the Developer shall use the TxDOT online *Pavement Design Guide*. The pavement designs shall utilize either the TxDOT FPS 21 procedure or the 1993 *AASHTO Guide for the Design of Pavement Structures* and the latest version of the DARWin computer program, approved by AASHTO. All pavement thickness designs shall be checked using the Modified Texas Triaxial Class design method, and other analyses techniques necessary to prevent premature failure from rutting and fatigue.

The pavement design(s) for new pavements shall be based on renewal strategies to only replace the surface course during the O&M Period.

Performance Period Requirements. The design life for the Project will be based on the following:

a) *Mainline and Ramps.* For areas in Section 8.2.2 "*Pavement Design*" of the Technical Provisions where a thirty (30) year design life is required, an initial performance period of at least fifteen (15) years, after which the pavement will be overlaid and other rehabilitation measures are applied.
b) *Frontage Road and Cross Roads.* For areas in Section 8.2.2 "*Pavement Design*" of the Technical Provisions where a thirty (30) year design life is required, an initial performance period of twelve (12) years when projected traffic loads are less than 1 million ESALs and fifteen (15) years for more than 1 million ESALs. After the initial performance period, a pavement overlay will be placed and other rehabilitation measures will be taken.

Potential Vertical Rise. Developer shall design the overall new subgrade and new pavement structure to have a PVR no greater than 1.5 inch for mainline and 1.5 inches for non-mainline pavements as

calculated in accordance with Tex-124-E from soil tests in a soil column 15 feet deep as measured from the proposed finished pavement. Alternatively, provide materials that result in an Effective Plasticity Index of less than 25 when calculated to a depth of 8 feet from finished pavement surface for mainline and to a depth of 7 feet from finished pavement surface for non-mainline pavements. Calculation and sampling requirements for determination of Effective PI are stated in Section 8.3.1 *Pavement Material Requirements*.

Design Modulus. The Developer shall establish the design modulus using laboratory resilient modulus tests conducted on representative samples of the soils supporting the pavement structures. This design modulus shall be used for either the FPS 21 or AASHTO design procedures, and shall not exceed the Effective Resilient Modulus as described below. Design moduli shall be determined for other pavement layers where the maximum value does not exceed values established from methods and criteria stated below. Design moduli determined from methods identified are irrespective of the pavement design method used, where the material is placed in the pavement structure, and depth of the layer. When it is in the interest of TxDOT to use alternative methods for determining material moduli proposed by the Developer, justification and documentation shall be provided to demonstrate that an equivalent pavement structure will be provided.

a) ***Effective Resilient Modulus, (MR).*** Effective Resilient Modulus testing is only applicable to subgrade materials; that is, natural subgrade or materials imported as embankment and are not stabilized. Determine the MR using the AASHTO laboratory test method T307 for subgrade soil samples over the Project, or segments of the Project, with an adjustment of test results for seasonal variations, per AASHTO *Guide for the Design of Pavement Structures, 1993*. Only load sequence number 7 of 15 (4 psi confining pressure, 4 psi maximum axial stress for Type 2 materials; 10 psi confining pressure, 10 psi maximum axial stress for Type 1 materials) will be used to determine the test result.

   Where multiple layers of material are present, MR shall be determined for the predominant soil within three feet in depth from the finished pavement subgrade elevation. Where rock is the predominant subgrade and MR determination is not practical, a maximum MR of 25,000 psi may be assumed.

   Run tests on samples at optimum moisture content (OMC), 2% dry of OMC, and 2% wet of OMC. Optimum moisture content shall be determined by the appropriate TxDOT compaction procedure; molding shall be governed by the appropriate method for the material tested as identified in AASHTO T307.

   Distribute MR values as shown in Table 8-3 for the region in which the Developer will be constructing the Project. Determine which distribution to apply by selecting the rainfall range appropriate for the Project location from Figure 8-1.

Table 8-3: Regional Distribution of Months Used to Determine Effective Resilient Modulus

Region	Annual Rainfall Range	Moisture Content Weighting in Months		
		- 2% OMC	@ OMC	+ 2% OMC
1	0 – 12	6	4	2
2	12 – 24	4	4	4
3	24 – 36	2	5	5
4	36 – 48	2	4	6
5	48 – 56	0	3	9

b) ***Unbound Base and Subbase.*** Only material meeting the definition of Unbound Base in Section 8.3.1 will be considered; all other unbound materials used as a pavement layer that do not meet this definition shall be considered subgrade/embankment. For materials meeting the requirements of Item 247, TxDOT Standard Specifications, the design modulus shall not exceed three times the Effective Resilient Modulus for the layer immediately below the unbound base or subbase layer, and shall not exceed 75,000 psi.

c) ***Stabilized Base***. Stabilized base materials shall meet the requirements of Stabilized Base in Section 8.3.1, or shall be considered a subgrade or subbase material that may require stabilization. The design moduli of stabilized base materials shall be established by the greater of: (a.) the ratio of stress to strain in a near-linear portion of the loading curve during UCS testing, or (b.) ten times the Effective Resilient Modulus for subgrade, whichever is greater. Refer to Table 8-4 for asphalt stabilized base moduli.

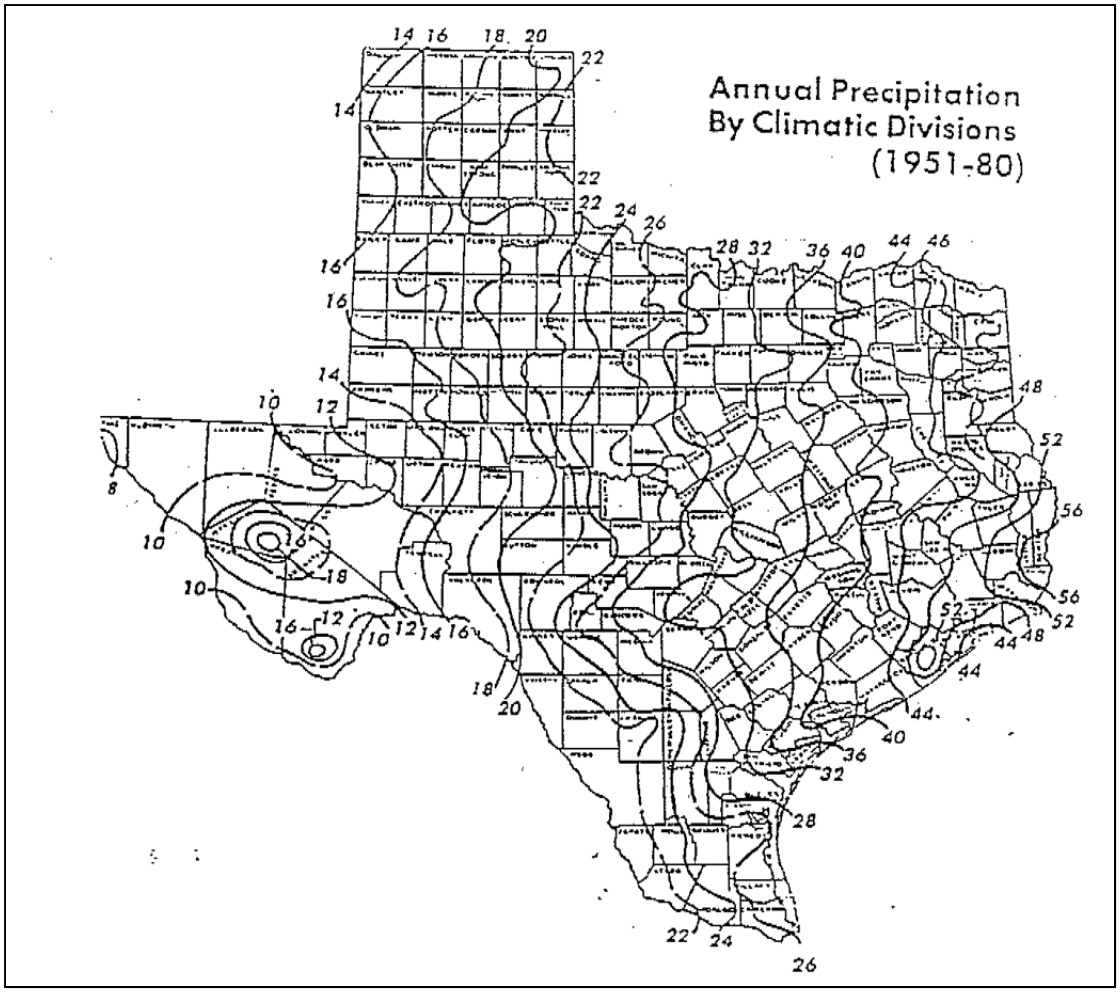

Figure 8-1: Rainfall Graph for Determining Regional Soil Testing Requirements

d) ***Stabilized Subbase and Stabilized Subgrade.*** Materials shall meet the requirements of Subbases in Section 8.3.1 or the material shall be regarded as subgrade material and may be subject to MR measurements. Stabilized subgrade and stabilized Subbases may be incorporated as a structural layer and shall have a design modulus equal to the greater of: (a.) the ratio of stress to strain in a near linear portion of the loading curve during UCS testing, or (b.) two times the value of the Effective Resilient Modulus of the subgrade.

e) ***Design Structural Values.*** Use Table 8-4 for structural material design values. For materials not listed, provide documented testing establishing the design value appropriate for the design procedure being used.

Table 8-4: Design Structural Values

Material Type	TxDOT Standard Specifications	Maximum Modulus for FPS 21	AASHTO layer coefficient (max.)
New Dense-Graded Hot Mix Asphalt	Item 340 (for temporary pavement), 341 (for permanent pavement)	Combined HMA thickness: ≤8" use 500ksi > 8.0" use 650ksi	 0.44 0.45
Permeable Friction Course	Item 342	300 ksi	0.30
Performance Design Mixtures	Item 344	Combined HMA thickness: ≤ 6.0" use 650ksi 6"<T≤8" use 700ksi > 8.0" use 850ksi RBL: 350ksi	 0.45 0.46 0.47 RBL: 0.40
Stone-Matrix Asphalt	Item 346	Same as Item 344	Same as Item 344
Unbound Base	Item 247, Grade 1	*75ksi	0.14
Stabilized Base ▪ Cement ▪ Asphalt	 Items 275 and 276 Item 292	 *200ksi 350 ksi	 0.16 0.34
Stabilized Subgrade or Sub-base ▪ Hydrated Lime ▪ Cement	 Item 260 Item 275	 *30ksi *30ksi	 0.12 0.12

* Maximum design values.

Poisson's Ratio. The Poisson's ratios for this Project shall meet the requirements of TxDOT Pavement Design Guide..

Truck Volumes. Developer shall determine the percentage of truck traffic as well as the annual growth percentage in truck volumes for pavement design.

Initial ADT and projected ADT. Developer shall determine the Initial ADT and the projected ADT.

Serviceability Indices. The serviceability indices for this Project shall meet the requirements of TxDOT Pavement Design Guide.

Terminal (Minimum Acceptable) Serviceability Index. The terminal serviceability index at the end of any performance period for this Project shall be 3.0 (mainline and frontage roads). A serviceability index of 2.5 may be used if the HMAC thickness exceeds eight inches.

Design Reliability or Confidence Level. The reliability factor shall be 95% for ESALs > 5 million and 90% for ESALs ≤ 5 million.

Maximum Period of Overlay. The maximum planning period for any overlay following the initial performance period of this Project shall not exceed fifteen (15) years.

Overall Standard Deviation (AASHTO design only). Use 0.49.

8.2.3 Rehabilitation of Existing Pavements

Pavement rehabilitation includes the resurfacing and restoration work undertaken to restore serviceability, to extend the service life of existing pavements, and to achieve the performance measures identified in Table 19-5. This can include partial recycling of the existing pavement, placement of additional surface materials, or other work necessary to return existing pavements to a condition of structural or functional adequacy.

The Developer shall prepare and submit a pavement rehabilitation plan after evaluating the existing pavements to determine the adequacy of past performance, determine failure mechanisms, and determine the extent of rehabilitative effort necessary. The structural and functional characteristics shall be evaluated by nondestructive and/or destructive tests and surveys as outlined in *TxDOT's Pavement Design Guide*. Destructive testing involves coring and boring to obtain representative samples for laboratory evaluation and to observe the in situ condition of the various layers. Nondestructive tests, such as FWD testing, and visual surveys are performed to acquire data that can be reduced to determine structural properties, presence of moisture, degree of distress, friction properties, and smoothness. Based on the pavement evaluation, the Developer shall select and submit to TxDOT for approval the rehabilitation plan to achieve the performance requirements. The plan should take into consideration cost, existing problems, and prevention of future problems.

8.2.3.1 Flexible Pavement Rehabilitation

The flexible pavement rehabilitation shall include but is not limited to overlay, milling and overlay, or other methods outlined in *TxDOT Pavement Design Guide*. The rehabilitation scheme shall mitigate the effects of rutting, cracking, and other distresses as identified during the evaluation of the existing pavements; and provide for a low maintenance surface course that provides for uniformity across adjacent lanes. The required voids on mineral aggregate (VMA) and the asphalt concrete binder shall be selected based on the pavement cores collected as part of the pavement rehabilitation plan.

Hot In-place Recycling (HIPR) and Cold In-place Recycling (CIPR) shall only be used to rehabilitate AC pavements that have adequate support by the underlying base layers, but exhibit surface distresses and texture issues. HIPR and CIPR shall not be used for pavements with delaminations in the top 2 inches, rutted pavements, heavily patched pavements, and chip-sealed pavements. The HIPR technique shall be used to mill the top one to two inches of the existing AC layer then place back two inches of AC overlay. The CIPR shall be used to mill 4 to 6 inches of existing AC pavements. Flexible pavement hot mix overlays shall be designed in accordance with *TxDOT's Pavement Design Guide* using FPS 21. Flexible pavement rehabilitation shall conform to Items 351 and 358 of TxDOT Standard Specifications.

8.2.3.2 Rigid Pavement Rehabilitation

Acceptable rigid pavement rehabilitation methods are provided in *TXDOT Pavement Design Guide.* Rigid pavements full depth repair (FDR) may be used if the rehabilitated area is at least six (6) feet long and at least half a full lane width. The limits of the FDR rehabilitation can be determined by visual inspection as

part of the pavement survey. Only diamond-bladed concrete saw-cuts can be used to saw-cut the pavement sections. The saw-cut operations shall be adjusted so that the subsequent repair operations can immediately follow. Concrete used to rehabilitate rigid pavements shall conform to Items 360, 361, and 421 of TxDOT Standard Specifications with a maximum water-cement ratio of 0.45. Concrete strength shall be estimated using TxDOT Tex-426-A test (Estimating Concrete Strength by the Maturity Method).

Partial pavement depth repair (PDR) shall be limited to shallow spallings with depths less than four inches.

Concrete overlays can be used to rehabilitate CRCP pavements. The thickness of concrete overlays shall be determined based on the structural capacity of the existing pavement and the design structural capacity required based on future traffic demands. Longitudinal steel shall be used in the overlay only if the overlay thickness exceeds 40% of the existing CRCP thickness. Concrete overlays shall only be placed on roughened surfaces prepared using shotblasting to increase the bond between the overlay and the existing concrete pavements. The concrete and the aggregates used in the overlay shall be compatible with those of the existing pavement. The maximum aggregate size of the concrete overlay shall be less than one-third the overlay thickness.

8.3 Construction Requirements

8.3.1 Pavement Materials Requirements

The Developer shall incorporate the following requirements into the preparation of the initial pavement designs for the proposal and the subsequent final pavement designs, plans, quality control and quality assurance programs, and the field construction procedures. Subject to approval by the TxDOT, alternate material specifications and construction requirements may be proposed by the Developer provided the objectives of the Project are met and an equivalent pavement structure is provided.

Subgrade Material Composition. The Developer shall analyze subgrade material composition, design the pavement structure, and perform necessary construction procedures to eliminate soluble sulfate induced heave. When soluble sulfates may present a potential for a reaction detrimental to the pavement structure, Developer shall submit alternate designs and/or construction procedures for TxDOT approval.

When quantities of soluble sulfates detected are greater than 500 ppm, the Developer shall determine the source of the sulfate and whether there are greater concentrations existing or that would be created when pulverized in and surrounding the sampled location. Use the TxDOT Guidelines for Treatment of Sulfate-Rich Soils and Bases in Pavement Structures to assist with testing and detection and construction practices. No soil shall have additives introduced to such material that would cause a detrimental reaction to the pavement structure or its ride quality as measured by the International Roughness Index (IRI).

Effective Plasticity Index (PI). The same method of determining Effective PI shall be used for both design and verification of design. Developer shall determine the Effective PI for un-stabilized subgrade to the depth specified below finished pavement surface. The Effective PI shall be determined, using Tex-106-E, via a process that proportionately accounts for the plasticity contribution of the soil binder (material passing the #40 sieve) for each individual one foot layer, or portion thereof, to the depth specified. The Effective PI is ultimately a weighted average of the Plasticity Indices of the material in the

soil column analyzed. For example, the sum of all PI measurements representative of each one foot deep sample tested divided by the total depth designated by the pavement type. Use soil to the depth of 8 feet for mainline pavements and 7 feet for non-mainline pavements for calculation of Effective PI. Concrete, hot mix asphaltic concrete, stabilized base courses, granular base, and stabilized subgrade/embankment are considered to be non-swelling with no PI. Stabilized materials shall meet material requirements stated herein.

Unbound Base. Provide the appropriate unbound base as recommended in the TxDOT *Pavement Design Guide*. A minimum placement thickness of 6 inches is required.

Stabilized Base. Stabilized base may either be modified with chemical additives or asphaltic binders. Materials to be stabilized shall meet the requirements of either Grade 1, Grade 2, or Grade 5 base as defined by Item 247 of the TxDOT Standard Specifications or appropriate special provisions, and shall have a minimum thickness of 6 inches. Asphalt stabilized base material will meet the requirements of Item 292 of the TxDOT Standard Specifications. When chemical additives are used to stabilize base, Table 8-5 will be used to determine the stabilizer content. Stabilized base will be designed to achieve the unconfined compressive strength shown in Table 8-5 immediately following a ten (10) day capillary moisture conditioning. Moisture conditioning will be conducted in a similar method as that used in TEX-121-E.

Table 8-5: Minimum and Maximum Retained Unconfined Compressive Strength Values to be Achieved When Using Chemical Additives for Stabilization, by Pavement Type

Pavement Type	Minimum UCS (psi)	Maximum UCS (psi)
Flexible Pavement	300	500
Rigid Pavement	500	750

Subbases.

a) ***Granular Materials***. Materials classified by the Unified Soil Classification System as any of the following: GP, GM, SW, SP, SM, SC, ML, shall be stabilized if present within 30 inches of the finished pavement surface. The aforementioned materials may be used as a subbase and included as a structural layer when stabilized and meet the requirements of stabilized subbase as defined herein. These materials shall be stabilized, when required, to achieve a minimum layer thickness of 6 inches. Untreated granular base meeting the requirements of Item 247, Grade 1 or 2 may replace these materials without restriction.

b) ***Stabilized Subbase.*** Materials not included in Granular Materials above, do not meet the requirements of Item 247, TxDOT Standard Specifications, or materials that have a Plasticity Index (PI) value less than 25, may be stabilized and used as a structural layer. For structural layers, provide a minimum 6-inch thickness of compacted material. Stabilized subbase materials shall be designed to achieve not less than 100 psi unconfined compressive strength immediately following a ten (10) day capillary moisture conditioning. Moisture conditioning will be conducted in a similar method as that used in TEX-121-E. These materials shall be designed as defined in test methods used for the selected additive.

c) ***Stabilized Subgrade.*** If subgrade stabilization is used for purposes of providing a working platform then no structural benefits can be claimed and the stabilized subgrade shall not be included in the pavement design. For structural layers, provide a minimum 6-inch thickness of compacted material. If a structural layer is required, design and mold subgrade material with the desired additive using the TxDOT test method appropriate for the additive incorporated. The design shall achieve not less than 100 psi unconfined compressive strength immediately following a ten (10) day capillary moisture conditioning conducted in a method similar to that used in TEX-121-E.

Underseal. The developer shall place a one (1) course surface treatment as an underseal directly on top of any untreated or treated base layer and/or prior to all hot mix asphalt concrete overlays.

Surface Course. The surface course for all roadways utilizing flexible pavement design shall be a minimum of 2 inches of asphaltic concrete pavement.

Mix Selection. Where flexible pavement structures are selected, the final surface mix for mainline lanes and ramps shall be Stone Matrix Asphalt (SMA) meeting the requirements of Item 346 or a Permeable Friction Course (PFC) meeting the requirements of Item 342. The final surface mix for frontage roads and cross roads shall be Stone Matrix Asphalt (SMA) meeting the requirements of Item 346 when the combined HMA thickness is greater than 6.0 inches, or a regular dense-graded mix Type C or Type D meeting the requirements of Item 341 when the combined HMA thickness used is less than 6.0 inches.

8.3.2 Construction Verification

General. The independent Construction Quality Acceptance Firm (CQAF) shall perform the Developer's quality acceptance. The construction verification tasks described below are part of the CQAF quality acceptance efforts.

Effective Modulus of Subgrade Reaction. The Developer shall verify that the design effective modulus of subgrade reaction has been achieved through the field construction activities. This verification process shall include field sampling and testing activities designed to provide confirmation of the design effective modulus of subgrade reaction. This verification process shall be described in a plan that includes, but not limited to, the verification methodology, example calculations, reference documents, and frequency of field sampling and testing. The Developer shall submit this verification plan to the TxDOT for review and comment.

Effective Resilient Modulus, (MR). The Developer shall provide subgrade modulus verification testing in accordance with AASHTO T307. Retrieve a randomly selected verification sample at a minimum rate of one sample (three replicates per sample) for each 2500 linear feet of roadbed; where the roadbed has a dimensioned width greater than 100 feet, one additional sample will be collected and tested. Frontage and other access roads are sampled and tested independently if more than 100 feet separates the roadbeds or are not parallel to the mainline alignment. Additional samples shall also be taken at each location where a significant and recognizable change in subgrade material (a change in USCS classification) is encountered during grading operations.

Where multiple layers of material are present, MR shall be determined for the representative soil within three feet in depth from the finished pavement subgrade elevation. Where rock is the predominant subgrade and MR determination is not practical, a maximum MR of 25,000 psi may be assumed.

Regardless of the position of the layer or material sampled and tested, use only the AASHTO T307 load sequence number 7 of 15 for verification testing (4 psi confining pressure, 4 psi maximum axial stress for Type 2 materials; 10 psi confining pressure, 10 psi maximum axial stress for Type 1 materials). The MR results from this testing shall be compared to the Effective MR selected for use in designing the pavement structure, to confirm that the material meets the design criteria. If the materials fail to meet the criteria, Developer shall be responsible to take corrective action that is acceptable to the TxDOT.

Effective Plasticity Index (PI). The Developer shall demonstrate to TxDOT that the specified design requirements are met by randomly selecting at least one location per 2,500 linear feet of roadbed and shall sample the subgrade materials to a depth below finished pavement surface as designated by the pavement design. Mainline roadbeds, ramps, and frontage roadbeds are considered independently. Sampling shall also take place when a recognizable change in the subgrade material is encountered during grading operations as determined by a change in Unified Soil Classification System classification.

The Developer shall provide for the testing of these materials in accordance with Tex-106-E to determine the Effective PI. The results shall be compared to design requirements to confirm that the strata meet the design criteria. If the materials fail to meet the criteria, Developer shall be responsible to take corrective action that is acceptable to TxDOT.

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

Article 585.3D. Acceptance Plan and Pay Adjustments. The entire section is voided and replaced by the following:

TxDOT will evaluate profiles based on the CQAF test results to determine acceptance and corrective action. Corrective action acceptable to TxDOT is required, at Developer's sole expense, for any 0.1-mile section that measures an average IRI in excess of 75 inches per mile for rigid pavements, or in excess of 65 inches per mile for flexible pavements. After making corrections, re-profile the pavement section to verify that corrections have produced the required improvements.

Use diamond grinding or other methods approved by TxDOT to correct surface areas that have more than 1/8 inch variation between any two contacts on a 10-foot straightedge. Use diamond grinding or other approved methods to remove localized roughness as determined using an inertial profiler in accordance with TEX-1001-S. For asphalt concrete pavements, fog seal the aggregate exposed from diamond grinding.

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

9 LAND SURVEYING

9.1 General Requirements

Developer shall provide accurate and consistent land surveying and mapping necessary to support ROW acquisition, design, and construction of the Project.

Developer shall review existing survey data and determine the requirements for updating or extending the existing survey and mapping data. Developer is responsible for the final precision, accuracy, and comprehensiveness of all survey and mapping.

9.2 Administrative Requirements

9.2.1 Standards

Developer shall ensure that all surveying conforms to the *General Rules of Procedures and Practices* of the Texas Board of Professional Land Surveying. Developer shall ensure that any person in charge of a survey field party is proficient in the technical aspects of surveying.

9.2.2 Right-of-Entry

Developer shall secure written permission prior to entering any private property outside the ROW. It shall be Developers' sole responsibility to negotiate this permission and Developer shall be responsible for any and all damages and claims resulting from that ingress. Proper documentation of right-of-entry shall be maintained at all times by Developer.

9.2.3 Survey by TxDOT

In performing surveys for other adjoining projects, TxDOT may need to verify and check Developer's survey work. Developer shall coordinate with the developer of the adjoining project regarding planned construction activities. Developer shall notify TxDOT within two (2) Business Days if TxDOT stakes and marks are altered or disturbed.

9.3 Design Requirements

9.3.1 Units

All survey Work shall be performed in U.S. customary units system of measurement. Work shall conform to state plane coordinates.

The surface adjustment factors for the Project are as follows:

Table 9-1: Surface Adjustment Factors

County	State Plane to Surface (NAD 83)	Surface to State Plane (NAD 83)
Tarrant	1.000120000	0.999880014
Dallas	1.000136506	0.999863513

9.3.2 Survey Control Requirements

Developer shall base all additional horizontal and vertical control on the Level 2 and Level 3 control provided by TxDOT.

Developer shall establish and maintain additional survey control as needed and final ROW monumentation throughout the duration of the Project. Developer shall tie any additional horizontal and vertical control for the Project to the TxDOT-supplied Secondary (Level 3) control network. If Developer chooses to use GPS methods, Developer shall meet the accuracy of the appropriate level of survey as defined in the TxDOT *GPS User's Manual* and shall utilize the survey control to be provided by TxDOT. Additionally, GPS survey shall require the use of the State's VRS Network, observed three (3) times during the day and read to +/- 0.04 hundredth of a foot.

All control points shall be set and/or verified by a Registered Professional Land Surveyor licensed in the State of Texas.

Developer shall establish and maintain a permanent survey control network. The control network should consist of, at a minimum, monuments set in intervisible pairs at spacing of no greater than two (2) miles.

Monuments shall be TxDOT bronze survey markers installed in concrete and marked as directed by the TxDOT Survey Manual. Developer shall replace all existing survey monuments and control points disturbed or destroyed. Developer shall make all survey computations and observations necessary to establish the exact position of all other control points based on the primary control provided.

Developer shall deliver to TxDOT a listing of all primary and secondary control coordinate values, original computations, survey notes, and other records, including GPS observations and analysis made by Developer as the data are available.

9.3.3 Conventional Method (Horizontal and Vertical)

If Developer chooses to use conventional methods to establish additional horizontal control, Developer shall meet the accuracy of the appropriate level of survey as defined in the following tables.

9.3.3.1 Horizontal Accuracy Requirements for Conventional Surveys

Horizontal control is to be established (at a minimum) on the Texas State Plane Coordinate System NAD 83.

Table 9-2: Horizontal Requirements for Conventional Surveys

	Level 3	Level 4	Remarks and Formulae
Error of Closure	1: 50,000	1:20,000	Loop or between monuments
Allowable Angular Closure	$\pm 3'' \sqrt{N}$	$\pm 8'' \sqrt{N}$	N= number of angles in traverse
Accuracy of Bearing in Relation to Course *	± 04"	± 10"	Maximum for any course
Linear Distance Accuracy (Minimum Length of Line)	1: 50,000 (2,500 feet)	1: 20,000 (1,000 feet)	

	Level 3	Level 4	Remarks and Formulae
Positional Tolerance of Any Monument	*AC*/50,000	*AC*/20,000	*AC* = length of any course in traverse
Adjusted Mathematical Closure of Survey (No Less Than)	1:200,000	1:200,000	

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

All data shall be tied to TxDOT's VRS network, collection of data shall be adjusted to Dallas and Denton County scale factor.

9.3.3.2 Vertical Accuracy Requirements for Conventional Surveys

Vertical control shall be established (at a minimum) on the North American Vertical Datum of 1988 (NAVD 1988).

Table 9-3: Vertical Control Accuracy Requirements for Conventional Surveys

	1st ORDER	2nd ORDER	3rd ORDER	REMARKS AND FORMULAE
Error of Closure	0.013 feet $\sqrt{K}$	0.026 feet $\sqrt{K}$	0.039 feet $\sqrt{K}$	Loop or between control monuments
Maximum Length of Sight	250 feet	300 feet		With good atmospheric conditions
Difference in Foresight and Backsight Distances	±10 feet	±20 feet	±30 feet	Per instrument set up
Total Difference in Foresight and Backsight Distances	±20 feet per second	±50 feet per second	±70 feet per second	Per total section or loop
Recommended Length of Section or Loop	2.0 miles	3.0 miles	4.0 miles	Maximum distance before closing or in loop
Maximum Recommended Distance Between Benchmarks	2000 feet	2500 feet	3000 feet	Permanent or temporary benchmarks set or observed along the route
Level Rod Reading	± 0.001 foot	± 0.001 foot	± 0.001 foot	
Recommended Instruments and Leveling Rods	Automatic or tilting w/ parallel plate micrometer precise rods	Automatic or tilting w/ optical micrometer precise rods	Automatic or quality spirit standard, quality rod	When two or more level rods are used, they should be identically matched
Principal Uses	Broad area control, subsidence or motion studies jig & tool settings	Broad area control, engineering projects basis for subsequent level work	Small area control, drainage studies, some construction and engineering	

9.3.4 Right of Way Surveys

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

9.3.4.1 Accuracy Standard

In performing right of way surveys consisting of boundary locations, Developer shall meet the accuracy standards of the appropriate level of survey as defined in the following table.

Table 9-4: Chart of Tolerances

	URBAN / RURAL	URBAN BUSINESS DISTRICT	REMARKS AND FORMULAE
Error of Closure	1:10,000	1:15,000	Loop or between Control Monuments
Angular Closure	15" $\sqrt{N}$	10" $\sqrt{N}$	N = Number of Angles in Traverse
Accuracy of Bearing in Relation to Source *	20 "	15 "	Sin α = denominator in error of closure divided into 1 (approx.)
Linear Distance Accuracy	0.1 foot per 1,000 feet	0.05 foot per 1,000 feet	Sin α x 1000 (approx.) where ± = Accuracy of Bearing
Positional Error of any Monument	*AC*/10,000	*AC*/15,000	*AC* = length of any course in traverse
Adjusted Mathematical Closure of Survey (No Less Than)	1:50,000	1:50,000	

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

9.3.5 Survey Records and Reports

Developer shall produce a horizontal and vertical control report including coordinate listing, maps showing control, preparation of standard TxDOT data sheets for all primary control, monument description and location description of all primary and secondary survey control points installed, marked and referenced along with a listing of the existing control used to create the installed control points. Control from adjoining, incorporated, or crossed roadway projects, which are currently in design, will be located and a comparison of the horizontal and vertical values will be shown. Developer shall provide survey records and reports to TxDOT upon request.

Developer may use an electronic field book to collect and store raw data. Developer shall preserve original raw data and document any changes or corrections made to field data, such as station name,

height of instrument, or target. Developer shall also preserve raw and corrected field data in hardcopy output forms in a similar manner to conventional field book preservation.

Field survey data and sketches that cannot be efficiently recorded in the electronic field book shall be recorded in a field notebook and stored with copies of the electronic data.

All field notes shall be recorded in a permanently bound book. (Loose leaf field notes will not be allowed). Developer shall deliver copies of any or all field notebooks to TxDOT upon request.

9.4 Construction Requirements

9.4.1 Units

All survey Work shall be performed in the U.S customary units system of measurement. Work shall conform to state plane coordinates.

9.4.2 Construction Surveys

Developer shall perform all construction surveys in accordance with the design requirements.

9.5 Deliverables

9.5.1 Survey Records

Developer shall deliver to TxDOT, for its review and acceptance, a listing of all primary, secondary control coordinate values, original computations, survey notes and other records including GPS observations and analysis made by Developer within ninety (90) days of Final Acceptance.

9.5.2 Final ROW Surveying and Mapping

Developer shall coordinate with TxDOT regarding the assignment of right of way Control Section Job (CSJ) numbers for each new mapping project.

The documents produced by the Surveyor, or the Surveyor's Subcontractors, are the property of TxDOT, and release of any such document must be approved by TxDOT. All topographic mapping created by Developer shall be provided to TxDOT in digital terrain model format using the software and version thereof being used by TxDOT at the time the mapping is developed.

9.5.3 ROW Monuments

Upon final submittal of the ROW documents to TxDOT, Developer shall set, using permanent and stable monuments as defined in Section 663.17 of the General Rules of Procedures and Practices of the Texas Board of Professional Land Surveying (TBPLS), all significant points along all ROW lines of the Project including the following:

a) Points of curvature (PCs)
b) Points of tangency (PTs)
c) Points of intersection (PIs)
d) Points of compound curvature (PCCs)
e) Points of reverse curvature (PRCs)

f) All intersecting crossroad ROW lines and all property line intersections with the ROW line. These monuments shall be ½-inch iron rods, driven just below surface level, capped by a TxDOT-labeled aluminum cap (rod-and-cap monument)
g) All beginning and ending points of Control of Access (Denied) lines

Upon completion of the ROW acquisition and all construction work, such that the final ROW lines will not be disturbed by construction, Developer shall replace all rod-and-cap monuments located on the final ROW line at all points of curvature (PCs), points of tangency (PTs), points of intersection (PIs), points of compound curvature (PCCs), and points of reverse curvature (PRCs), and all intersecting crossroad ROW lines, with TxDOT Type II monuments (constructed according to current TxDOT specifications). Developer shall monument with a TxDOT Type II monument all final ROW lines where the distance between such significant ROW line points exceeds 1500 feet. ROW line intersections with property lines shall remain monumented by a ½-inch iron rod with a TxDOT aluminum cap (rod-and-cap monument).

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

Developer shall submit updated maps with the monumentation information. (This is for final monumentation set, for example, type II, and type of monuments set, etc.) All deed recording information to be added to the map sheets in the ownership blocks on the map sheets.

9.5.4 Record Drawings and Documentation

Developer shall submit the following as part of the Record Drawings and as a condition of Final Acceptance:

a) A listing of all primary and secondary control coordinate values, original computations and other records including Global Positioning System (GPS) observations and analysis made by Developer
b) Copies of all survey control network measurements, computations, unadjusted and adjusted coordinate and evaluation values; and
c) Survey records and survey reports.

Developer shall produce reports documenting the location of the as-built alignments, profiles, structure locations, Utilities, and survey control monuments. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. Developer's as-built data shall include the coordinate types (x, y, and/or z) and feature codes in the same format in which the preliminary construction data was generated. Where data has been provided to Developer from TxDOT in an x, y, z only coordinate format, or z only coordinate format, Developer shall provide TxDOT with data in an x, y, z only coordinate format or z only coordinate format.

10 GRADING

10.1 General Requirements

Developer shall conduct all work necessary to meet the requirements of grading, including clearing and grubbing, excavation and embankment, removal of existing buildings, pavement and miscellaneous structures, subgrade preparation and stabilization, dust control, aggregate surfacing and earth shouldering, in accordance with the requirements of this Section 10.

Developer shall demolish or abandon in place, all existing structures within the Project ROW, including but not limited to, pavements, bridges, and headwalls that are no longer required for service, or are required to be treated as described in Section 4. Any features that are abandoned in place shall be removed to at least two (2) feet below the final finished grade or one (1) foot below the pavement stabilized subgrade and drainage structures. Developer shall restore all disturbed areas and provide appropriate grading material, topsoil, and vegetation to produce a smooth, uniform surface. Developer shall ensure that abandoned structures are structurally sound after abandonment.

10.2 Preparation within Project Limits

Developer shall develop, implement, and maintain, for the Term, a Demolition and Abandonment Plan that considers types and sizes of Utilities and structures that will be abandoned during the Term. The plan shall ensure that said structures are structurally sound after the abandonment procedure. The plan shall account for conditions in the Ultimate Project and phased Schematic configuration and shall be submitted to TxDOT for approval no later than 60 days prior to the scheduled date for NTP2.

TxDOT reserves the right to require Developer, at any time to salvage and deliver to a location designated by TxDOT within the TxDOT District in which the Project is located, any TxDOT-owned equipment and materials in an undamaged condition, provided however, recycled asphalt pavement and concrete traffic barrier shall be handled as set forth below. TxDOT reserves the right to require Developer to salvage and deliver to a reasonable location designated by TxDOT any ITS equipment and materials in an undamaged condition.

Developer may reuse recycled asphalt pavement for the construction of any Element within the Project. Excess amounts not salvaged or used on the Project may be used at the discretion of the Developer.

Developer may reuse concrete traffic barrier in association with the construction of the Project, provided that the barrier meets the requirements described in the Technical Provisions. Excess amounts not used in association with the construction of the Project may be used at the discretion of the Developer.

Developer shall salvage and deliver to a TxDOT designated storage location aluminum railing material that is deemed salvageable by TxDOT.

Developer shall remove the existing pedestrian facility near SH 183 Station EGPX 3367+00. Removal of the facility shall include all components within the ROW and any above ground structural components outside the ROW. The Developer shall coordinate with and obtain approval, including any required permitting, from the impacted Governmental Entity for all removal aspects including work times and post

construction conditions. The Developer shall be responsible for regrading and reseeding the disturbed areas associated with this removal to match adjacent landscape.

Unless otherwise specified by TxDOT, the material from structures designated for demolition shall be Developer's property. All material removed shall be properly disposed of by Developer outside the limits of the Project.

TxDOT reserves the right to remove buildings to level one finished floor or other appropriate condition on ROW acquired by TxDOT for the Project.

10.3 Slopes and Topsoil

Developer shall exercise Good Industry Practice regarding design limitations and roadside safety guidelines associated with the design of slopes along roadways. Developer shall adjust grading to avoid and minimize disturbance to the identified waters of the U.S.

Developer shall perform finished grading and place topsoil 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. Developer shall use only materials and soils next to pavement layers that do not cause water or moisture to accumulate in any layer of the pavement structure. For areas outside or within the O&M Limits, Developer shall provide stable slopes. For slopes steeper than 4:1, Developer shall submit to TxDOT a slope stability analysis that demonstrates the adequacy of Developer's design. Developer shall submit the slope stability analysis to TxDOT for approval with the Released for Construction Documents.

10.4 Sodding

Block sod shall be placed at all grate inlets, manholes and culvert headwalls.

11 ROADWAYS

11.1 General Requirements

The objectives of the Project include the provision of a safe, reliable, cost-effective, and aesthetically-pleasing corridor for the traveling public. The requirements contained in this Section 11 provide the framework for the design and construction of the roadway improvements to help attain the Project objectives.

Developer shall coordinate roadway design, construction, maintenance, and operation with other Elements of the Project to achieve the objectives of the Project.

Where changes to the roadway geometrics result in revisions to the Project ROW, Developer 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. Developer shall perform all ROW services that are necessitated by proposed changes in accordance with the Contract Documents.

11.2 Design Requirements

Developer shall integrate its roadway design with the design of all other components of the Project, including aesthetics. The Project roadways shall be designed to integrate with streets and roadways that are adjacent or connecting to the Project. All design transitions to existing facilities shall be in accordance with the TxDOT Roadway Design Manual.

Developer shall design all Elements in accordance with the applicable design criteria and Good Industry Practice based on the Design Speeds for various Elements.

The Project roadways shall be designed to incorporate roadway appurtenances, including fences, noise attenuators, barriers, and hazard protection, as necessary to promote safety and to mitigate visual and noise impacts on neighboring properties.

Existing concrete traffic barrier may be reused in Interim Areas on the Project. The reused concrete barrier shall be free of Defects, appropriately placed and correctly installed at the correct height and distance from roadway and obstacles and shall comply with all applicable provisions and standards of new construction including NCHRP 350. Developer shall comply with applicable installation standards for transitions between existing and new barrier. Use of one barrier type (existing or new) shall be limited to a minimum length of one mile and to both sides of any roadway type (general purpose, managed lane, direct connector, etc.) Exceptions to the one mile criteria apply where the required length of barrier replacement is less than one mile.

11.2.1 Control of Access

Unless otherwise shown in the final parcel plat, Developer shall maintain all existing property accesses, including those not shown on the Draft Schematic, and shall not revise control of access without TxDOT review and the written agreement of the affected property owner(s).

11.2.2 Roadway Design Requirements

Developer shall comply with the design criteria shown in Attachment 11-1, Roadway Design Criteria.

Design requirements not specifically covered in the Technical Provisions shall meet the requirements of TxDOT Roadway Design Manual. Design requirements for the managed lanes that are not covered in the Technical Provisions shall comply with AASHTO Guide for High-Occupancy Vehicle Facilities Developer shall coordinate design and construction requirements of the improvements on crossing streets with the Governmental Entity having jurisdiction over said roadway in the case such requirements are not covered in the Technical Provisions or TxDOT Roadway Design Manual.

At newly constructed intersections, the Developer shall:

- Design and construct the cross sectional elements as shown in the Draft Schematic
- Design and construct the roadside features as shown in the Draft Schematic
- Design and construct applicable aesthetic features
- Install and/or adjust utilities to accommodate the intersection improvements
- Design and construct street crossing features to accommodate pedestrian and bicycle travel

At reconstructed intersections, the Developer shall design and construct or adjust the existing facilities as needed to implement the following:

- Cross sectional elements as shown in the Draft Schematic
- Roadside features as shown in the Draft Schematic
- Applicable aesthetic features
- Utilities installed and/or adjusted to accommodate the intersection improvements
- Street crossing features to accommodate pedestrian and bicycle travel

11.2.3 Superelevation

Existing superelevation may be retained in areas where ramps are to connect to existing pavement. Pavement widening shall be constructed by extending the existing pavement cross slope. Existing superelevation rates may be retained along sections of rehabilitated or widened pavement. Superelevation transitions shall be designed and constructed such that zero percent cross-slopes will not occur on bridges or on longitudinal roadway grades flatter than 0.35 percent.

Developer may maintain the existing pavement normal crown in overlay sections so long as it is not flatter than 1.5 percent. At normal crowns, pavement widening adjacent to existing pavement shall be constructed on a 2.5 percent cross slope. The transition from existing cross slope to 2.5 percent shall occur within 1-foot of the closest lane line to the roadway widening. Existing cross slopes less than 1.5 percent in areas within superelevation transitions may be retained.

11.2.4 Roadway Design Deviations

TxDOT will provide Design Deviations for the Draft Schematic at the locations indicated in RID Exhibit 11-1, Roadway Design Deviations. This Exhibit reflects Design Deviations associated with Elements in the Minimum Base and Additional Scope Components. Design Deviations for Elements in the Minimum Base Scope shall not apply to Additional Scope Component Elements that are included in the Base Scope.

If, upon further design, additional deviations are identified, the Developer shall submit a request for design exception, variance, or waiver to TxDOT for review. Any additional design exceptions, variances, or waivers not listed below are the responsibility of Developer and subject to TxDOT and FHWA Approval. Developer shall optimize the final design to minimize or eliminate deviations.

11.2.5 Miscellaneous Roadway Design Requirements

All newly constructed roadside safety devices used on the Project shall meet current crash test and other safety requirements in accordance with TxDOT standards. Developer shall evaluate and upgrade safety devices in accordance with Chapter 4, Section 3 "Safety Enhancements" of the *TxDOT Roadway Design Manual* in areas where no work will be performed or where work is limited to pavement rehabilitation within the Project Limits. All existing roadside safety devices used on the project shall meet the requirements of Table 19-5 as appropriate.

Driveways shall be designed in accordance with the guidelines, which will be considered requirements, specified in TxDOT's *Roadway Design Manual* – Appendix C, "Driveways Design Guidelines" to be functionally adequate for land use of the property being served.

The border width, measured from back of curb or edge of pavement in areas without curb, along frontage roads and crossing streets shall be 15 feet minimum except in areas where the Developer can demonstrate this minimum cannot be attained. Areas not meeting the minimum criteria must be approved by TxDOT and approval may be limited to only those areas shown in the Draft Schematic.

12 DRAINAGE

12.1 General Requirements

Efficient performance of the drainage system is an integral part of the performance of the Project. Developer shall account for all sources of runoff that may reach the Project, whether originating within or outside the Project ROW, in the design of the drainage facilities.

If existing drainage conditions are revised due to the Work, then the Developer shall design and construct a solution that does not adversely impact property owners outside the ROW.

12.2 Administrative Requirements

12.2.1 Data Collection

To establish a drainage system that complies with the requirements and accommodates the historical hydrologic flows in the Project, Developer is responsible for collecting all necessary data, including those elements outlined in this Section 12.2.1. See Section 3.5.3 of the Agreement regarding authorization to enter right of way.

Developer shall collect available 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; FEMA mapped floodplains; and official documents concerning the Project, such as the FEIS 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. Developer shall also identify watershed boundaries, protected waters, county ditches, areas classified as wetlands and floodplains as defined by governmental agencies, and boundaries between regulatory agencies (e.g., watershed districts and watershed management organizations).

Developer shall acquire all applicable municipal drainage plans, watershed management plans, and records of citizen concerns. Developer shall acquire all pertinent existing storm drain plans and/or survey data, including data for all culverts, drainage systems, and storm sewer systems within the Project Limits, as well as those outside of the Project Limits that require restoration or reconstruction due to impacts by the Work. Developer shall also identify existing drainage areas that contribute to the highway drainage system and the estimated runoff used for design of the existing system.

Developer shall obtain photogrammetric and/or geographic information system (GIS) data for the Project Limits that depicts the Outstanding National Resource Waters and/or impaired waters as listed by the TCEQ. Developer shall conduct surveys for information not available from other sources.

If documentation is not available for Elements of the existing drainage system within the Project Limits and scheduled to remain in place, Developer shall investigate and videotape or photograph the existing drainage system to determine condition, size, material, location, and other pertinent information.

The data collected shall be taken into account in the Final Design of the drainage facilities.

12.2.2 Coordination with Other Agencies and Local Governmental Entities

Developer shall coordinate all water resource issues with affected interests, Governmental Entities and regulatory agencies. Developer shall document the resolutions of water resource issues.

Drainage improvements determined necessary by local Governmental Entities that exceed the requirements of the Contract Documents shall be handled by Developer with a third party agreement between the local Governmental Entity and the Developer. The cost associated with any such third party agreements shall be the responsibility of the Developer and the Governmental Entity. Such third party agreement shall be subject to TxDOT approval and shall be provided to TxDOT for review thirty (30) days prior to the anticipated date of execution of the agreement.

Developer 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 Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) with FEMA, if a map revision is found to be warranted.

Drainage areas and structures that fall under the jurisdiction of the United States Army Corps of Engineers (USACE) shall comply with all USACE requirements. Developer shall coordinate review and approval of the design and construction, if necessary, with the USACE on any such facilities. Information regarding the status of permits for work with the USACE is included in the Reference Information Documents.

Developer shall also be responsible for performing additional hydraulic analyses and securing appropriate construction approval/permits for all structures, embankment or other elements(s) within the Dallas Floodway not included in the Section 408 submittal to the USACE.

In areas surrounding railroad facilities, the Developer shall coordinate with the appropriate railroad owner in accordance with Section 14.

12.3 Design Requirements

Developer shall design all Elements of the drainage facilities in accordance with the applicable design criteria, the TxDOT Hydraulic Design Manual and Good Industry Practice.

Drainage design shall include reconfiguration of the existing drainage features and design of new drainage features within the Project Limits. The Developer is responsible for the final design of all drainage facilities in accordance with this Section 12.

Developer shall provide facilities compatible with existing drainage systems and all applicable municipal drainage plans or approved systems in adjacent properties. Developer shall preserve existing drainage patterns wherever possible, provided they meet the requirements of this Section 12. Elements failing to meet such requirements shall be replaced, modified, or supplemented by the Developer. The existing bridges to remain over the Elm Fork of the Trinity River will be exempted from meeting such requirements.

General

Developer shall provide calculations and other information for the final design of these drainage systems in the Drainage Design Report.

In areas within the ROW where Work is not being performed and no additional runoff is produced by the Project, Developer shall assess the adequacy of existing drainage features and upgrade or provide rehabilitation measures for those features if needed to allow for their intended hydraulic capacity and performance.

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

The use of slotted concrete barriers will not be allowed in Ultimate Areas where the lane configuration is consistent with the Ultimate Configuration of the Project. Developer must provide sufficient information, demonstrating inconsistencies between the interim (as intended in the Draft Schematic) and ultimate lane configuration, to obtain TxDOT's approval on the use of slotted concrete barriers in Ultimate Areas.

At newly constructed intersections, the Developer shall design and construct drainage features as needed to ensure adequate drainage through the intersection.

At reconstructed intersections, the Developer shall design and construct or adjust existing drainage features as needed to ensure adequate drainage through the intersections. At intersections which will be re-used or undergo only minor rehabilitation the Developer shall assess the adequacy of existing drainage features that may be impacted by the Project and upgrade or provide rehabilitation measures for those features if needed to allow for their intended hydraulic capacity and performance.

Developer shall utilize the TxDOT Dallas District Standards and TxDOT Statewide Standards, in that order of preference, for inlets, manholes, and any other drainage system components.

Any existing steel reinforced concrete pipe and culverts located in tolling zones shall be replaced with pipe and culverts containing glass fiber-reinforced polymer rebar (GFRP).

Developer's design of the Gauwyler Road Turnaround, as stated in Section 1.2 shall not impact the Irving Flood Control District sump near Station 20+00.

Developer shall design and construct the following drainage features shown in RID Exhibit 12-1 Diamond Interchange Ultimate Drainage Systems based on ultimate conditions within ROW and fully-developed conditions outside the ROW. The design must be consistent with either the design (alignment, profile and size) shown in this exhibit or a TxDOT approved alternative.

- Line 1 (Station 46+50 to 56+50) and all associated drainage features under Ultimate Areas within the specified ranges
- Line 2-F (Station 10+30 to 23+83) and all associated drainage features under Ultimate Areas within the specified range

Any partial or complete drainage system that is contributing to a stormwater storage facility at the same location of that shown in RID Exhibit 12-2 Diamond Interchange Area 3 Pond, shall accommodate the lines and grades of the facility shown in RID Exhibit 12-2.

12.3.1 Surface Hydrology

12.3.1.1 Design Frequencies

Developer shall use the design frequencies listed in Table 12-1 below.

Table 12-1: Drainage Design Frequencies

Functional classification and structure type	Design Annual Exceedance Probability (AEP)				
	50% (2-yr)	20% (5-yr)	10% (10-yr)	4% (25-yr)	2% (50-yr)
Freeways (main lanes):					
Culverts					X
Bridges					X
Principal arterials:					
Culverts				X	
Small bridges				X	
Major river crossings					X
Minor arterials and collectors (including frontage roads):					
Culverts			X		
Small bridges				X	
Major river crossings					X
Local roads and streets					
Culverts		X			
Small bridges		X			
Off system projects					
Culverts	FHWA policy is 'hydraulically same or slightly better" than existing.				
Small bridges					
Storm drain systems on Interstate and controlled access highways (main lanes):					
Inlets			X		
Storm drain pipes			X		
Inlets for depressed roadways*					X
Storm drain systems on other highways and frontage roads:					
Inlets and drain pipe		X			
Inlets for depressed roadways*				X	

Notes.
* A depressed roadway provides nowhere for water to drain even when the curb height is exceeded.
1. Storm drains on facilities such as underpasses, depressed roadways, etc., where no overflow relief is available shall be designed for the 2% AEP event.
2. All facilities must be evaluated to the 1% AEP event. The intent of evaluating the 1% AEP event is not to force the 1% AEP through the storm drain, but to examine where the overflow would travel when this major storm does occur and to ensure the requirements of this Section are met.
3. For structures extending under both general purpose lanes and frontage roads, the structure shall be designed using the design frequency established for mainlines.

12.3.1.2 Hydrologic Analysis

Hydrologic calculations for use in the design of all drainage structures are dependent on the location of the structure along the corridor improvements.

Developer shall design and construct all drainage features under Ultimate Areas based on ultimate conditions within ROW and fully-developed conditions outside the ROW. Such criteria shall also apply to drainage structures crossing all roadways (ROW to ROW) and bridges with the exception of those along SH 114, LP 12, SH 183 between Main Street and SH 161, and SH 183 general purpose and managed lane roadways between SH 161 and Belt Line.

In Interim Areas, Developer shall design and construct all drainage features based on interim conditions within ROW and existing conditions outside the ROW.

12.3.1.3 Additional Requirements

Increase in water surface elevation is not allowed between the existing and the interim conditions and between the existing and ultimate conditions upstream or downstream of TxDOT ROW. Modifications shall be made to new or existing drainage features to achieve no rise in water surface elevation outside TxDOT ROW or in existing drainage easements due to the Work.

Increases in discharge, velocity or water surface elevation are not allowed at the outfalls to the Irving Flood Control District Levee System.

Mitigation to offset increases from above mentioned criteria shall be in the form of detention, or other TxDOT approved storm water management best practices at locations within the Project right of way.

12.3.2 Storm Sewer Systems

Where precluded from handling runoff with open channels by physical site constraints, or as directed in this Section 12, Developer shall design enclosed storm sewer systems to collect and convey runoff to appropriate discharge points.

Developer shall prepare a storm sewer drainage report encompassing all storm sewer systems that contains, at a minimum, the following items:

a) Drainage area maps for each storm drain inlet with pertinent data, such as boundaries of the drainage area, 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.

b) Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, catch basin spacing, detailed structure designs, and any special designs.
c) Specifications for the pipe bedding material and structural pipe backfill on all proposed pipes and pipe alternates.
d) 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.

This report shall be a component of the Drainage Design Report.

Freeboard for storm sewer systems is dependent on the location of the structure along the corridor improvements as described below:

Ultimate Areas

The maximum allowable hydraulic grade line elevation for the design frequency shall not exceed one foot below:

- the lip of gutter;
- the top of grate inlet; and
- the top of manhole cover.

Interim Areas

The maximum allowable hydraulic grade line elevation for the design frequency shall not exceed:

- the lip of gutter;
- the top of grate inlet; and
- the top of manhole cover.

General

Runoff within the jurisdiction of the USACE shall be conveyed in accordance with applicable laws and permits.

12.3.2.1 Pipes

Stockpiled on the northern edge of the former Texas Stadium site is approximately 480 linear feet of 66-inch Class III and IV and 400 linear feet of 72-inch Class III reinforced concrete pipe and fittings that is available for construction of the Project at no cost to the Developer. Arrangements can be made to inventory the material. The site shall be cleared of this material at Substantial Completion.

All new storm sewer pipes shall meet the requirements of this Section 12.3.2.

Storm sewer pipes with design flow velocities less than 2 feet per second (fps) shall be designed for full flow at 80% of the internal diameter to account for sedimentation in the pipe. Other storm sewer pipes shall be designed using the full internal diameter. Storm sewers shall be designed to prevent surcharging

of the system at the flow rate for the design year event. All storm sewers shall be designed and constructed to sustain all loads using fill heights and D-loads for determining pipe classifications.

All pipes shall be reinforced concrete except in toll gantry areas.

The minimum inside pipe size diameter shall be 18" for laterals, 24" for laterals placed under pavement, and 24" for trunklines. The minimum box culvert height, inside dimension, shall be 2 feet.

- Pipes shall be designed with the following additional requirements:
- Pipe depth of cover: 1 foot desirable, 6 inches minimum (top of pipe to bottom of treated subgrade)
- Lateral connection will be 45°/60° to trunk line in direction of flow.
- Pipe Slope: ≥ 0.50% desirable, 0.30% minimum.
- Outfall Velocity Criteria: 6 Fps Desirable, > 8 Fps Provide Outfall Protection
- When outfall protection is provided, calculations must be performed to determine protection material and area protected downstream of the outfall location.

12.3.2.2 Ponding

Developer shall design drainage systems to limit ponding to the widths listed below for the design frequency event:

Table 12-2: Allowable Ponding Widths by Roadway Classification

Roadway Classification	Design Storm Allowable Ponding Width	Check Storm Allowable Ponding Width
Interstate, Controlled Access Highways	Low shoulder plus one-half the width of the outer lane	One lane free of encroachment
Barrier-Separated Managed Toll Lanes: Single Lane Multiple Lanes	Low shoulder plus 2 ft. Low shoulder plus one-half width of the outer lane	Safe passage of one lane of traffic in each direction
Principal Arterials/ Highways*	Low shoulder plus 1 lane	Safe passage of one lane of traffic in each direction
Ramps, Direct Connectors	Low shoulder plus 2 ft.	Safe passage of one lane of traffic
Frontage Roads	Low shoulder plus 1 lane	Safe passage of one lane of traffic in each direction
Minor Cross Streets	Width and depth to allow safe passage of one lane of traffic in each direction	No adverse impact on adjacent property

* Highways with two or more lanes in each direction

12.3.3 Miscellaneous Drainage Design Requirements

12.3.3.1 Drainage Software

Developer shall employ software that is compatible with the software in use by TxDOT or fully transferrable to TxDOT's systems.

12.3.3.2 Roadside Channel Design

Roadside Ditches

Hydrologic calculations for use in the design of all roadside ditches are dependent on the location of the structure along the corridor improvements.

Ultimate Areas

Roadside ditches shall be designed to convey the 10-yr design storm and provide a minimum of 0.5 feet of freeboard from the bottom of treated subgrade or top of ditch, whichever is lowest.

Interim Areas

Roadside ditches shall be designed to convey the 10-yr design storm with a maximum water surface elevation below the edge of pavement.

General

For both Ultimate and Interim areas, if a roadside ditch lies within an area with a depressed roadway and it is the only means of outfall, it shall be designed to convey the 50-yr event.

12.3.4 Pump Stations

New or existing pump stations to be replaced shall accommodate drainage associated with the 2% AEP for the Ultimate Project. The pump bay shall have submersible, non-clogging, non-overloading, centrifugal type pumps that provide adequate redundant capacity to pump 100% of the Developer's calculated design flow with a failure of one pump. The automatic pump control system shall provide for equal operating time for each pump and prevent pumps from overheating. A natural gas backup generator shall be provided for standby power.

12.3.5 Stormwater Storage Facilities

Developer shall complete design of the stormwater storage facilities to meet requirements for water quality, water quantity, and rate control, as determined by the Texas NPDES regulations. Local requirements, if more stringent, shall be handled by Developer with a third party agreement.

Developer shall ensure that stormwater storage facilities meet the requirements listed above by performing all required analyses. Such analyses shall include flood routing analysis, which includes a detailed routing analysis for ponds affected by significant environmental issues such as hazardous waste or groundwater concerns.

12.3.6 Hydraulic Structures

12.3.6.1 Culverts

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

Where the culvert design is influenced by upstream storage, the analysis of the storage shall be incorporated into the design of the culvert.

Culvert freeboard is dependent on the location of the structure along the corridor improvements as described below:

Ultimate Areas

The maximum allowable headwater elevation for the design frequency shall not exceed one foot below the shoulder point of intersection elevation or one and a half (1.5) feet below the top of curb point of intersection elevation of the appropriate roadway low point.

Interim Areas

The maximum allowable headwater elevation for the design frequency shall be the edge of pavement elevation or the top of curb of the applicable roadway low point.

General

In all areas, the maximum allowable headwater elevation shall not exceed the high point flow line of an adjacent roadside ditch.

- Culverts are classified as major or minor, as follows:
- Major Culvert: A culvert that provides an opening of more than 35 square feet in a single or multiple installations. A major culvert may consist of a single round pipe, pipe arch, closed-bottom box, or multiple installations of these structures placed adjacent or contiguous as a unit. Certain major culverts are classified as bridges when they provide an opening of more than 20 feet, measured parallel to the roadway; such culverts may be included in the bridge inventory. Bridge class culverts shall have a minimum rise of four (4) feet, except at locations where the receiving system outside the Project ROW has a rise of less than four feet, in which case, a minimum rise of three (3) feet is allowed.
- Minor Culvert: Any culvert not classified as a major culvert.

Existing culverts to remain will be studied in the following manner to ensure their long term integrity. Bridge class culverts shall be rehabilitated in accordance with provisions of Section 13. Other major and minor culverts (non-bridge class) shall be inspected and rehabilitated as necessary to a good condition of equal standard to rehabilitated bridge class culverts. The Developer shall perform a load rating for all culverts subject to traffic loading. Structures failing to meet an operating load rating of HS-20 shall be rehabilitated to an inventory load rating of HS-20 or replaced using LRFD design and HL-93 loading meeting this requirement or better.

Outfall velocities greater than 8 fps shall incorporate adequate outfall protection to protect against erosion. Minimum velocities shall be established to avoid sedimentation, and appropriately designed erosion protection shall be used in areas where erosion potential exists.

12.3.6.2 Bridges

All bridge hydraulic computations, designs, and recommendations shall be consistent with past studies and projects in the area by the USACE and other State or federal agency studies and projects.

Where bridge design is influenced by upstream storage, the analysis of the storage shall be considered in the design of the bridge.

Developer shall evaluate bridges for contraction scour and pier scour concerns and incorporate protection in accordance with Good Industry Practice. Developer shall provide a scour analysis in accordance with TxDOT's *Geotechnical Manual* (Chapter 5 – Section 5 Scour) for all new bridges. If necessary, the Developer shall provide countermeasures for any instability and scour problems in accordance with FHWA Hydraulic Engineering Circular No. 23 - *Bridge and Scour and Stream Instability Countermeasures Experience Selection and Design Guidance*.

Developer shall design riprap at abutments in accordance with the procedures outlined in HEC-23. For bridge abutments, Developer shall install protection in accordance with the Project's aesthetic plan.

Scour design is dependent on the location of the structure along the corridor improvements as described below:

Ultimate Areas

Bridges shall provide a minimum of two (2) feet of freeboard under the bridge low chord for the design storm.

Interim Areas

Bridges shall pass the design event beneath the structure without overtopping the edge of the roadway. For all spans where negative or zero freeboard conditions occur, provide shear keys between the outside beam and the first interior beam on the upstream side of the structure at abutments and bents of affected spans. Example details may be obtained as working drawings from TxDOT's Bridge Division.

12.3.6.2.1 Method Used to Estimate Flows

Developer shall ensure that the selected hydrologic method is appropriate for the conditions in the watershed.

For all crossings located within a FEMA studied floodplain (Zone AE) with peak flow information, Developer shall gather and utilize, as appropriate, the current effective model.

For a crossing not located within a FEMA Zone AE but on the same waterway as a stream gauging station with a length of record of at least 25 years, Developer shall collect and use the flow data available from the station, as appropriate, to determine design flows within the following limitations, provided there is no major control structure (e.g., a reservoir) between the gauge and the Project:

a) For crossings near the gauging station on the same stream and watershed, use the discharge directly for a specific frequency from the peak stream flow frequency relationship.
b) For crossings within the same basin but not proximate to the gauging station, transposition of gauge analysis results is allowable.
c) For crossings not within a gauged basin, the peak-flow flood frequency shall be developed using data from a group of several gauging stations based on either a hydrologic region (e.g., regional regression equations), or similar hydrologic characteristics.

d) If no significant changes in the channel or basin have taken place during the period of record, the stream gauging data may be used. The urbanization character of the watershed must not be likely to change enough to affect significantly the characteristics of peak flows within the total time of observed annual peaks and anticipated service life of the highway drainage facility.

For crossings not located within a FEMA Zone AE or on a gauged waterway, Developer shall select the appropriate method for calculating the design flows based on site conditions, and Good Industry Practice.

12.3.6.2.2 Design Frequency

Major waterway crossings, bridges, culverts and storm drain systems shall be designed for the ARI corresponding to the functional classification of the associated roadway. The functional classification for each roadway is shown in Section 11.

12.3.6.2.3 Hydraulic Analysis

Developer shall select the appropriate method for calculating hydraulics based on site conditions and Good Industry Practice.

12.3.6.2.4 Bridge/Culvert Waterway Design

Bridge waterway design shall maintain the existing channel morphology through the structure, if possible.

12.3.6.2.5 Bridge Deck Drainage

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

Open deck drains are not permissible for bridges passing over waterways or other roadways. If ponding width limits require, runoff shall be conveyed in a closed system through the bridge columns to the roadway drainage system below. The bridge deck drainage system shall outlet at the bottom of the substructure either into a storm sewer system or into an open channel and in no case shall be allowed to discharge against any part of the structure.

12.3.6.2.6 Drainage Report for Major Stream Crossings

As part of the Drainage Design Report, Developer shall prepare a report for each major stream crossing. Major stream crossings are defined as waterways listed as a FEMA studied floodplain (Zone AE) or requiring a bridge or major culvert structure. The report shall include the detailed calculations and electronic and printed copies of the computer software input and output files, as well as a discussion about hydrologic and hydraulic analysis and reasons for the design recommendations. At a minimum, for each crossing the report shall include the requirements provided in Attachment 12-1.

This report shall be a component of the Drainage Design Report.

Major Stream Crossings are defined as waterways requiring a structure with a total opening width greater than or equal to twenty feet and a minimum depth of four (4) feet. Any other waterway will be by default a minor stream crossing.

12.4 Drainage Design Report

A preliminary Drainage Design Report shall be submitted with the preliminary design plan submittal. The preliminary Drainage Design Report shall include at a minimum everything included in the final Drainage Design Report. With the final design submittal and at least thirty days prior to construction of any drainage element, the Developer shall submit a final Drainage Design Report for the drainage element to TxDOT.

Within 30 days of Substantial Completion, Developer shall submit to TxDOT, as part of the record set documents, a final Drainage Design Report, which shall be a complete documentation of all components of the Project's drainage system.

At a minimum, the Report shall include:

a) Record set of all drainage computations, both hydrologic and hydraulic, and all support data.
b) Hydraulic notes, models, and tabulations
c) Bridge and culvert designs and reports for major stream crossings
d) Pond designs, including graphic displays of treatment areas and maintenance guidelines for operation
e) Correspondence file
f) Drainage system data (location, type, material, size, and other pertinent information) in a suitable electronic format
g) Storm sewer drainage reports

12.5 Construction Requirements

Developer shall design drainage to accommodate construction staging. The design shall include temporary erosion control ponds and/or other Best Management Practices needed to satisfy the NPDES and other regulatory requirements. The water resources notes in the plans shall include a description of the drainage design for each stage of construction.

13 STRUCTURES

13.1 General Requirements

The structural Elements of the Project, including bridges, culverts, drainage structures, signage supports, illumination assemblies, traffic signals, retaining walls, and noise walls, shall be designed and constructed in conformance with the requirements of the Contract Documents, in order to provide the general public a safe, reliable, and aesthetically-pleasing facility.

13.2 Design Requirements

Developer shall submit a Corridor Structure Type Study and Report (CSTSR) for new bridges, retaining walls, bridge class culverts, noise walls, sign structures, and other structure components 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 CSTSR. Evaluation of existing structures that will be retained shall be included in the Study and Report. The CSTSR shall clearly define Developer's action to achieve a seventy five (75)-year service life for new Project bridges, walls, culverts and miscellaneous structures; and necessary rehabilitation or replacement for existing structures to meet loading requirements from Section 13.2.2 and condition ratings specified in Section 13.2.11. In addition, the Study and Report will describe the structural system to be used on the Project, design parameters for the system, materials, performance history of the chosen system and ability to meet the Residual Life requirements at Handback, impacts to the public during construction, and other information to describe the chosen system.

Developer shall prepare a detailed plan for each Element constructed on the Project with recommended design, construction and maintenance activities to achieve service life that meets the Residual Life requirements at Handback as defined in Section 19.

Bridges crossing over the Project shall, at a minimum, be designed to accommodate the Ultimate Project and all planned expansions or updates of each facility by its respective owner as designated in the owner's current transportation master plan. Developer shall design bridge structures required for the Interim Configuration, if applicable, to the total length and span arrangement required for the Ultimate Project, including spanning future lanes that will be constructed below the structure as a part of the Ultimate Project.

Developer shall design bridge structures to accommodate the Ultimate Project and construct bridge structures to the width required by Section 13.4. Developer shall ensure that bridges constructed for the interim configuration can be widened to the Ultimate Project width at a later date with minimal or no impact to aesthetics and traffic.

Direct-connect structures shall be constructed to satisfy the Ultimate Project, unless directed otherwise by Section 13.4. In locations where the interim configuration does not call for the construction of the direct-connect structures, Developer shall make provisions to accommodate the future construction.

Developer shall obtain National Bridge Inventory (NBI) numbers from TxDOT for all bridges and bridge class culverts. The NBI numbers shall be shown on the applicable layout sheets of the Final Design Documents.

All components of new structures and exterior caps, columns, beams, railing, and retaining walls of widened structures shall include aesthetic treatments in accordance with Section 15. Lengthened portions of existing bridges shall match existing aesthetic treatments.

No later than 180 days prior to Substantial Completion, Developer shall provide to TxDOT both an inventory and an operating rating of the constructed structures using a form provided by TxDOT.

All electronic and paper files and calculations design notebooks shall be made available at TxDOT's request.

13.2.1 Design Parameters

The plans shall clearly show the specifications, including the edition and dates, employed in each design.

Unless otherwise noted, design for all roadway and pedestrian structural elements shall be based on the Load and Resistance Factor Design (LRFD) methodology included in TxDOT's *Bridge Design Manual – LRFD,* Bridge Design Specifications listed at http://www.txdot.gov/inside-txdot/division/bridge/specifications.html and the AASHTO *LRFD Bridge Design Specifications*. *LRFD* provisions apply to both new structures, widened portions of existing structures and existing structures originally designed to LRFD provisions.

Design of rehabilitation of existing structures or unmodified portions of existing structures not originally designed to LRFD provisions will be governed by their original design requirements as defined in the *AASHTO Standard Specifications for Highway Bridges,* but never less than HS-20 loading.

Structures carrying railroad loads shall comply with requirements of American Railway Engineering and Maintenance of Way Association (AREMA) specifications.

Design of foundations shall in compliance with provisions of the *TxDOT Geotechnical Manual*.

Sidewalks shall be provided on bridge structures in accordance with the provisions of Section 20. Developer shall design sidewalks to meet the criteria of the AASHTO *Roadside Design Guide*.

Steel bridges 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 District practices. These can be found at:

http://ftp.dot.state.tx.us/pub/txdotinfo/library/pubs/bus/bridge/district_corrosion.pdf.

Segmental bridges shall additionally conform to the requirements of AASHTO *Guide Specifications for Design and Construction of Segmental Concrete Bridges.*

Pedestrian bridges shall additionally conform to the requirements of AASHTO LRFD *Guide Specifications for Design of Pedestrian Bridges*.

Hydraulic design shall be in accordance with *TxDOT Hydraulic Manual, FHWA Hydraulic Engineering Circular (HEC)-18 and HEC-23.*

Developer shall inspect all structures that are to be reused, lengthened or widened in accordance with AASHTO *Manual for Bridge Evaluation* and *TxDOT Bridge Inspection Manual*.

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

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.*

13.2.2 Bridge Design Loads and Load Ratings

a) Live Loads

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

New Construction: An HL-93 loading as modified by the TxDOT *Bridge Design Manual*.

Existing Bridge Structures: Inventory load rating of HS-20. Structures failing to meet this standard shall be rehabilitated to an inventory load rating of HS-20 or replaced using LRFD design and HL-93 loading.

Existing Bridge Class Culverts: Operating load rating of HS-20. Structures failing to meet this standard shall be rehabilitated to an operating load rating of HS-20 or replaced using LRFD design and HL-93 loading.

Widenings: HL-93 loading for widening and HS-20 for existing portion (designate both existing and widening loading on bridge layouts).

Partial Replacement: HL-93 loading for portions replaced and HS-20 for existing remaining in place (designate both existing and partial replacement loading on bridge layouts).

All pedestrian bridges shall be designed to accommodate the following live loads:

Pedestrian bridges & Sidewalks of Vehicular Bridges: Loaded in accordance with requirements in the AASHTO *LRFD Bridge Design Specifications* and the AASHTO *LRFD Guide Specifications for Design of Pedestrian Bridges*.

Pedestrian bridges: Shall also be designed to accommodate an AASHTO H-10 truck live load (as defined in the AASHTO *Standard Specifications for Highway Bridges*) to account for maintenance and emergency vehicles.

b) Additional Loads

Unless otherwise indicated, outside bays of new and widened structures shall each be designed for an additional 400 plf utility load to be distributed between two beams.

13.2.3 Bridge Decks and Superstructures

Fracture critical members shall not be used for bridges without written authorization from TxDOT, and if allowed by TxDOT, fracture critical members shall be designed to allow full access for inspection.

The type of bridge is not restricted to those typically used by TxDOT. Other types and components may be used, but will be allowed only if:

a) They have been accepted for general use by the Federal Highway Administration (FHWA); and
b) Developer can demonstrate that the design of the bridge type and components will meet the functional requirements of the Project.

Modular joints shall be used when anticipated movement exceeds 5 inches and shall be designed and tested for fatigue loading.

Developer shall minimize the number of deck joints wherever possible. Developer shall verify that joints and bearings are suitable for unit lengths chosen. Developer shall locate joints to provide for maintenance accessibility and future replacement. Joints for all grade separation structures shall be sealed.

Developer shall make bridge superstructures, joints, and bearings accessible for long-term inspection and maintenance. Developer shall make open-framed superstructures accessible with walkways or by use of ladders or an under-bridge inspection truck. All Elements shall conform to the Handback Requirements.

The Developer shall proportion bridge spans to avoid uplift at supports.

Steel and concrete box girders and caps (substructure) shall be accessible without impacting traffic below. Developer shall make steel and concrete box girders and caps (substructure) with a minimum inside depth of six (6) feet to facilitate interior inspection. Developer shall include a minimum access opening of 3’-0” diameter into and between all cells of the girders to allow free flow of air during inspections. The outside access opening cover shall hinge to the inside of the box girder and caps (substructure). An electrical system (110V and 220V) shall be incorporated inside the box girder and caps (substructure) with lighting and power outlets. Developer shall install locked entryways on all hatches and points of access. Access hatches shall allow for access to all cells, but shall not be farther than 500’ apart.

Segmental bridges shall additionally conform to the following:

a) Segmental bridge decks shall use deck protection systems to prevent infiltration of corrosive agents into reinforcing in the superstructure. The deck protection system used shall be such that cracking is minimized and adequate bond strength is developed with the superstructure.
b) If monolithically cast overlay is used as part of the deck protection system, the Developer shall develop fully engineered design guidelines for the thickness of the monolithic concrete removed and replaced in a manner that keeps distress and changes in surface profile at the time of concrete removal to levels that do not reduce the structural integrity of the structure.

c) All expansion joints shall be sealed or drained. External tendons, if used, shall be protected with a water-tight duct jointing system.
d) The design, detail and construction of segmental bridges shall provide for the easy addition of supplemental post-tensioning.

13.2.4 Bridge Foundations

Integral abutments, where the superstructure is structurally framed (either completely or partially) into the abutment, shall not be permitted. Mechanically Stabilized Earth (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 shall be designed and constructed to mitigate settlement immediately behind abutment backwalls.

Developer's bridge span arrangement and foundation locations shall accommodate the Ultimate Project. Developer's bridge design shall accommodate the lines and grades of the stormwater storage facility shown in RID Exhibit 12-2.

Spread foundations are not allowed.

13.2.5 Bridge Railing and Barriers

All barrier systems used on the Project, except for those on existing bridges that have no rehabilitation or widening requirements, shall meet current crash test and other safety requirements as determined by TxDOT. All testing and associated costs for non-standard railings shall be the sole responsibility of Developer and shall be accomplished through a third party acceptable to TxDOT. A current list of standard railing is provided in TxDOT *Bridge Railing Manual*.

Developer shall protect sidewalks from vehicular impact using TxDOT-approved bridge railings as applicable to meet the requirements of the TxDOT *Bridge Railing Manual.* .

13.2.6 Hydraulic Design

Developer shall ensure that new bridges crossing over waterways withstand a 500-year frequency event with no loss of structural integrity.

Developer shall analyze scour at existing structures and reconstruct substructures or provide scour countermeasures for structural components failing to meet original design standards. Hydraulic design shall be in accordance with Section 12.

13.2.7 Retaining Walls

The type of wall shall not be restricted to those typically used by TxDOT. Other types and components may be used, but will be allowed only if:

a) They have been accepted for general use by FHWA; and
b) Developer can demonstrate that the design of the wall type and components shall meet the functional requirements of the Project.

Modular walls employing interlocking blocks shall not be used where surcharge loads from vehicular traffic are present.

Modifications to wall standards shall be detailed on plan sheets and communicated to wall suppliers.

The design of wall structures shall take into account live load surcharges. The Developer 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 the latest AASHTO *LRFD Bridge Design Specifications*, American Railway Engineering and Maintenance of Way Association (AREMA) specifications, or the requirements of the specific railroad and transit owner/operator, as appropriate.

Summaries of retaining wall analyses shall be provided on a wall by wall basis with results provided for each critical wall section.

Structural integrity of retaining walls shall be inspected and monitored in accordance with Good Industry Practice. Tolerances and mitigation measures shall be in accordance with the Maintenance Management Plan and Good Industry Practice.

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

To the extent possible, Developer shall design and construct components of the Project and Ultimate Project to provide embankments without the use of retaining walls. Where earthen embankments are not feasible, Developer may use retaining walls. These retaining walls shall be located and designed such that the Ultimate Project can be implemented, unless specified otherwise, with little to no rework or impact on traffic. The interim foundations shall be designed and constructed to include any additional height and weight associated with the Ultimate Project.

Metal walls, including bin walls and sheet pile walls, recycled material walls and timber walls are not allowed for permanent walls.

If pipe culverts are to extend through the retaining walls or noise walls, the pipe shall be installed so that no joints are located within or under the wall.

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

13.2.8 Noise/Sound Walls

Developer shall design and construct all noise walls necessary to achieve the decibel reduction requirement in the applicable NEPA Approval(s) as summarized in Attachment 4-1 Permits/Commitments/Mitigation. The Developer shall coordinate the extent and height of noise walls with TxDOT to ensure compliance with the requirements and commitments of the NEPA Approvals. Certain noise walls were previously constructed along the SH 183 corridor. Any damage to noise walls caused by Developer-Related Entities shall be repaired in accordance with TxDOT's Standard Specifications. Damage caused by third parties shall be repaired in accordance with the Contract Documents.

Developer shall submit a noise wall system to TxDOT for approval.

Panel design and construction shall limit the risk of falling debris resulting from traffic impacting the noise wall.

Timber noise walls are not allowed.

13.2.9 Bridge Class Drainage Structures

In developing the design of drainage structures, Developer shall account for maximum anticipated loadings in both the interim configuration and Ultimate Project.

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

For drainage structures that are to be reused or widened, Developer shall perform video inspections. Developer shall submit 3 copies of the video to TxDOT. Developer shall analyze those structures and shall include recommendations for rehabilitation or replacement efforts as needed to accommodate the Project. These analyses and subsequent recommendations shall be subject to TxDOT Approval.

Developer shall analyze existing drainage structures for capacity and as necessary retrofit or replace elements to accommodate any additional loads, settlements, and/or other structural impacts associated with the Project.

13.2.10 Sign, Illumination, and Traffic Signal Supports

For bridges and walls longer than 500 feet, sign supports shall be provided at 500-foot intervals. The sign supports shall accommodate sign areas up to and including 16 square feet.

Developer shall design overhead and cantilever sign supports to accommodate the Ultimate Scope. Cantilever and sign bridge supports shall be placed outside the clear zone or shall be otherwise protected by appropriate safety measures.

13.2.11 Rehabilitation of Structures to be Widened, Extended, or Reused

The following structures are to be widened, extended, or reused and shall be rehabilitated:

Table 13-1: Bridges to be Rehabilitated

Scope	Bridge Description	Bridge ID #
Minimum Base Scope	BEAR CREEK BRIDGE	02-220-0-0094-02-071
Minimum Base Scope	BEAR CREEK BRIDGE	02-220-0-0094-02-094
Minimum Base Scope	3-10'x10' MBC FROM SDTA 63+12.38 TO 63+68.31	18-057-0-0094-03-017
Minimum Base Scope	8-7'X6' MBC FROM STA 128+40	18-057-0-0094-03-018
Minimum Base Scope	S.H. 183 INTERCHANGE AT BELT LINE ROAD EASTBOUND FREEWAY OVERPASS	18-057-0-0094-03-270
Minimum Base Scope	S.H. 183 INTERCHANGE AT BELT LINE ROAD WESTBOUND FREEWAY OVERPASS	18-057-0-0094-03-271
Minimum Base Scope	S.H. 183 STORY ROAD OVERPASS	18-057-0-0094-03-038
Minimum Base Scope	S.H. 183 STORY ROAD OVERPASS	18-057-0-0094-03-039
Minimum Base Scope	S.H. 183 MACARTHUR BLVD. OVERPASS	18-057-0-0094-03-040
Minimum Base Scope	S.H. 183 MACARTHUR BLVD. OVERPASS	18-057-0-0094-03-041
Minimum Base Scope	S.H. 183 O'CONNOR ROAD OVERPASS	18-057-0-0094-03-042
Minimum Base Scope	S.H. 183 O'CONNOR ROAD OVERPASS	18-057-0-0094-03-043

Scope	Bridge Description	Bridge ID #
Minimum Base Scope	S.H. 183 ST. L., S.F. & T. OVERPASS	18-057-0-0094-03-022
Minimum Base Scope	S.H. 183 CARL ROAD OVERPASS	18-057-0-0094-03-048
Minimum Base Scope	S.H. 183 CARL ROAD OVERPASS	18-057-0-0094-03-049
Minimum Base Scope	SH 183 OVERPASS AT LOOP 12	18-057-0-0094-03-092
Minimum Base Scope	EASTBOUND FRONTAGE ROAD OVERPASS	18-057-0-0094-03-093
Minimum Base Scope	ELM FORK TRINITY RIVER BRIDGE	18-057-0-0094-07-051
Minimum Base Scope	REGAL ROW OVERPASS	18-057-0-0094-07-031
Minimum Base Scope	REGAL ROW OVERPASS	18-057-0-0094-07-102
Minimum Base Scope	LOOP 12 ELM FORK TRINITY RIVER	18-057-0-0581-02-053
Minimum Base Scope	LOOP 12 ELM FORK TRINITY RIVER	18-057-0-0581-02-101
Minimum Base Scope	OLD SH 114 OVERPASS	18-057-0-0581-02-133
Minimum Base Scope	OLD SH 114 OVERPASS	18-057-0-0581-02-413
Minimum Base Scope	SPUR 482 OVERPASS	18-057-0-0353-06-097
Minimum Base Scope	SPUR 482 OVERPASS	18-057-0-0353-06-098
Minimum Base Scope	SH 114 EB TO LP 12 SB DIRECT CONNECTOR	18-057-0-0353-06-358
Minimum Base Scope	SH 114 LOOP 12 SBML U/P	18-057-0-0353-06-397
Minimum Base Scope	LP 12 NB TO SH 114 WB DIRECT CONNECTOR	18-057-0-0353-06-395
Minimum Base Scope	SH 114 LOOP 12 NBML U/P	18-057-0-0353-06-398
Minimum Base Scope	SH 114 CISTERIAN RD WBML O/P	18-057-0-0353-06-351
Minimum Base Scope	SH 114 CISTERIAN RD EBML O/P	18-057-0-0353-06-352
Minimum Base Scope	SH 114 CISTERIAN RD WBML O/P	18-057-0-0353-06-409
Additional Scope Component	RADIO ROAD OVERPASS	18-057-0-0353-04-116
Additional Scope Component	RADIO ROAD OVERPASS	18-057-0-0353-04-117
Additional Scope Component	HACKBERRY CREEK BRIDGE	18-057-0-0353-04-061
Additional Scope Component	HACKBERRY CREEK BRIDGE	18-057-0-0353-04-062
Additional Scope Component	SH114 EB ML, FR, & RAMP OVER FIELD CREEK	18-057-0-0353-06-066
Additional Scope Component	SH 114 WB & SPUR 348 OVER FIELD CREEK	18-057-0-0353-06-065
Additional Scope Component	SPUR 348 EASTBOUND CONNECTION	18-057-0-0353-06-091
Additional Scope Component	COTTONWOOD CREEK WESTBOUND FREEWAY STRUCTURE	18-057-0-0353-06-069
Additional Scope Component	COTTONWOOD CREEK EASTBOUND FREEWAY STRUCTURE	18-057-0-0353-06-070
Additional Scope Component	WESTBOUND NEW O'CONNOR ROAD OVERPASS	18-057-0-0353-06-093
Additional Scope Component	WESTBOUND NEW O'CONNOR ROAD OVERPASS	18-057-0-0353-06-094

RID Exhibit 13-1, Bridge Condition Rating Summary contains a table that provides the most current condition ratings for structures.

For existing structures to be widened, extended, or reused, Developer shall perform a condition survey including condition rating, load rating, remaining service life and recommended rehabilitation or replacement. Developer shall submit a rehabilitation report to TxDOT for approval 60 Days prior to performing rehabilitation activities on the bridge.

Any component with a condition rating less than 7 as determined in the condition survey and any other defects discovered by the Developer shall be rehabilitated. Developer 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.

Developer shall clean and repair existing expansion joints and provide new seals full width of existing and widened structures including sealing any existing open joints.

Developer shall inspect all existing bridge bearings. As necessary, Developer shall rehabilitate, repair, or replace existing bridge bearings to accommodate design loads and expansion.

Developer 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.

Developer shall remove rust, clean, and paint all existing steel bridge superstructures and associated steel bridge bearings. Developer 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 deck replacements shall consist of 8.5” thick class S concrete 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 13.2.2.

For existing bridge structures that are to be lengthened or widened with a current asphalt overlay, Developer shall mill and overlay with overlay extending across the widened or lengthened portion of the structure.

13.3 Construction Requirements

Construction shall be in accordance with TxDOT Standard Specifications.

13.3.1 Concrete Finishes

All concrete surfaces that do not have aesthetic treatments shall have a uniform texture and appearance. Color treatment, where required as an aspect of the aesthetic treatment of the concrete, shall be uniform in appearance. Ordinary Surface Finish shall be applied to the following as a minimum:

a) Inside and top of inlets
b) Inside and top of manholes
c) Inside of sewer appurtenances
d) Inside of culvert barrels
e) Bottom of bridge slabs between girders or beams

f) Vertical and bottom of surfaces of interior concrete beams or girders.

Concrete Surface Treatment (TxDOT Specification 428) is not required on decks of new or rehabilitated bridges.

13.3.2 Structure Metals

Welding shall be in accordance with the requirements of the AASHTO/AWS D1.5 *Bridge Welding Code* and TxDOT Standard Specification *Item 448, Structural Field Welding*.

13.3.3 Steel Finishes

Except for weathering steel, all structural steel shall be protected. The color for structural steel paint shall conform to the aesthetic scheme of the Project.

If weathering steel is used, the Developer shall protect all components of the structure (superstructure and substructure) that are susceptible to corrosion and/or staining from weathering steel run-off.

13.3.4 Steel Erection

Steel Erection shall be in accordance with AASHTO/NSBA Steel Collaboration 510.1-2007. Inspection of steel erection will include oversight by TxDOT personnel.

13.3.5 Noise/Sound Walls

The Developer shall construct the noise walls in the early construction phases of the Project to help minimize construction noise. The Developer shall construct noise walls prior to construction of roadway Work located in the vicinity of the required noise wall.

13.4 Bridge Construction Limits

Trinity River Bridges

Minimum Base Scope

WB SH 183 over Trinity River shall be constructed to:

- Ultimate configuration from west terminus over Grauwyler Road to station 548+80 +/-.
- Interim configuration of five lanes, including four lanes and one lane taper, from station 548+80 +/- to station 553+50 +/-.
- Ultimate configuration from station 553+20 +/- to 559+00 +/-.
- Interim configuration of five lanes, including four lanes and one lane taper, from station 559+00 +/- to station 563+80 +/-.
- Ultimate configuration from station 563+80 +/- to east terminus.

Stations above are along Baseline PWB183GP.

WB Frontage Road Entrance to WB SH 183 Trinity River Bridge shall be constructed to:

- Ultimate Configuration from eastern terminus to station 564+70+/- on Baseline PWB183FR4.

- Interim Configuration of 1 lane from station 564+70 +/- on Baseline PWB183FR4 to connection with SH 183 over Trinity River Bridge. Substructures shall be designed and constructed to be included in the Ultimate Configuration.

WB SH 183 Exit Ramp Trinity River Bridge to WB Frontage Road shall be constructed to an interim configuration of one lane. To the extent practical, substructures shall be designed and constructed to be included in the Ultimate Configuration.

Additional Scope Component 2

EB SH 183 over Trinity River shall be constructed to:

- Interim configuration of five lanes, including 4 lanes and one lane taper, from west terminus over Grauwyler Road to Station 541+00.
- Interim configuration of four lanes from Station 541+00 to 568+00.
- Interim configuration of five lanes, including 4 lanes and one lane taper, from station 568+00 to east terminus.

Stations above are along Baseline P2-183EBGP.

EB SH 183 Exit Ramp Trinity River Bridge to EB Frontage Road shall be constructed to the Ultimate configuration.

EB Frontage Road Entrance to EB SH 183 shall be constructed to the Ultimate Configuration.

14 RAIL

14.1 General Requirements

This Section 14 sets forth the criteria: a) for Work impacting existing railroad right-of-way (ROW); and b) to accommodate and/or construct a rail corridor. Developer shall coordinate the Work impacting existing railroad ROW for the rail facilities within the Project corridor(s) including:

- BNSF and DART Railroad under SH 183 at approximate Station 405+00
- BNSF and DART Railroad over SH 114 at approximate Station 967+50
- DART adjacent SH 114 from approximate Station 965+00 to 1050+00

Developer's Project Management Plan (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.

14.2 Railroad Design Standards

The design for all railroad elements of the Project shall be based on the most recent American Railway Engineering and Maintenance of Way Association (AREMA) publications including but not limited to the *Manual for Railway Engineering* and *Communications & Signal Manual of Recommended Practices* and the requirements of operating railroad. Developer's design shall minimize service interruptions to existing rail lines to the maximum extent possible with the use of non-revenue/non-operating service hours as the primary option. If the railroad elements of the Project are being constructed within an existing Quiet Zone, any new or changes to existing crossing protection(s) must be approved by the Railroad Company and comply with the Supplemental Safety measures as outlined in 49 CFR Parts 222 and 229 and must not negatively impact or degrade the existing Quiet Zone classification.

All work involving railroad companies, work on railroad ROW, and the development and execution of railroad programs shall be in accordance with State and federal law and the practices, guidelines, procedures and methods contained in the TxDOT *Traffic Operations Manual*, Railroad Operations Volume as amended per Attachment 14-1, *Amendments for the TxDOT's Traffic Operations Manual*, Railroad Operations Volume, February 2000. Additionally, the requirements of the owner of each facility crossed shall be compared to the requirements in the TxDOT manual, and the most restrictive criteria shall be utilized.

At highway-rail grade crossings, the roadway and drainage design parameters shall be maintained at the crossing with exception to 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 the Developer and crossing a rail line, shall be in accordance with the operating railroad's design criteria. Developer shall coordinate, design and construct the construction staging, including any shooflies, with the operating railroad.

Developer's design shall minimize service interruptions to existing rail lines. Coordination with the impacted railroad and other appropriate Governmental Entities for anticipated service interruptions shall be thirty (30) Business Days in advance.

Where signalized intersections occur near new or existing at-grade rail crossing, the Developer's design shall minimize the potential for traffic stacking across the railroad tracks and provide adequate turn lanes of sufficient length and appropriate crossing protection.

14.2.1 Design Criteria

Unless otherwise approved by the operating railroad, the minimum vertical clearance as shown in Chapter 11 of Book 2 of the AREMA *Manual for Railway Engineering* shall be required over the entire railroad ROW within the Project Limits.

14.3 Administrative Requirements

14.3.1 Project Work Affecting Railroad Operations

The Project crosses railroad ROW owned by BNSF and DART, an operating railroad. Developer shall coordinate the Work with the operating railroad. The design and installation of all railroad warning devices and traffic signals shall be coordinated with the appropriate Governmental Entities and operating railroads.

14.3.2 Railroad Agreement

Developer shall be responsible for obtaining the required approvals, permits, and agreements as required for the Work, including any railroad related Work. Construction and Maintenance (C&M) Agreements shall be between TxDOT, Developer, the appropriate railroad company and appropriate Governmental Entities and may take twelve (12) months or more to obtain from the railroad company. Current approved templates for TxDOT/railroad company agreements are available from the TxDOT Rail Division at Rail-Highway.Section@txdot.gov.

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

a) Preliminary Engineering – Most railroads require preliminary engineering agreements in order to proceed with the development and review of plans. This agreement authorizes reimbursement to the railroad company for preliminary engineering and estimating performed by the railroad or their consultant(s).
b) License to Cross and C&M Agreement – Developer shall prepare template agreement to be executed between railroad, Developer and TxDOT. A License to Cross railroad right of way is normally required when the highway project involves a new crossing or grade separation of the railroad. A separate easement agreement may be obtained in lieu of the License to Cross. Developer shall prepare all the documents required to obtain the License and C&M Agreement, including preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT. Developer shall submit the draft License and C&M Agreement to TxDOT for transmittal to the railroad. After all comments have been incorporated or satisfactorily resolved by either Developer, railroad or TxDOT, Developer shall submit a complete and final agreement to TxDOT for execution. This agreement shall include provisions for each party's access to the facilities for regular inspection, maintenance as well as emergency repairs as required.
c) Aerial Easements (for grade separations only) – Developer may be required by the railroad company to enter into a separate easement agreement to obtain air rights to cross railroad ROW.

If an aerial easement is required, the "License" portion of the C&M Agreement will be modified to identify the aerial easement as right to cross railroad right of way with the new highway facility.

d) Temporary Construction Easements – Developer may be required to purchase a temporary construction easement for the railroad company. This requirement will be stipulated in and be a part of the C&M Agreement.
e) Railroad's Contractor Right-of-Entry Agreements (Texas approved versions only) – In order to enter the railroad's ROW to perform the Work, Developer or their Subcontractor shall secure a railroad Right-of-Entry agreement and shall coordinate the arrangements of the necessary agreements directly with the railroad.

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

14.3.3 Agreement for Construction, Maintenance, and Use of Right of Way

Whenever a license agreement for construction, maintenance, and use of railroad ROW (hereinafter called the "License Agreement") between the operating railroad and TxDOT is required, Developer shall prepare all the documentation required to obtain the License Agreement, including preparation of the License Agreement application on behalf of TxDOT, the Plans and specifications, making necessary modifications as required, and preparation of the License Agreement.

Developer shall submit the draft License Agreement to TxDOT for transmittal to the operating railroad. After all comments have been incorporated or satisfactorily resolved by either Developer, railroad or TxDOT, Developer shall submit a complete and final License Agreement to TxDOT for execution.

Construction and Maintenance (C&M) Agreements shall be between TxDOT, Developer, the appropriate railroad company and appropriate Governmental Entities and may take twelve (12) months or more to obtain from the railroad company. Current approved templates for TxDOT/railroad company agreements are available from the TxDOT Rail Division at Rail-Highway.Section@txdot.gov.

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

a) Preliminary Engineering – Most railroads require preliminary engineering agreements in order to proceed with the development and review of plans. This agreement authorizes reimbursement to the railroad company for preliminary engineering and estimating performed by the railroad or their consultant(s).
b) License to Cross and C&M Agreement – Developer shall prepare template agreement to be executed between railroad, Developer and TxDOT. A License to Cross railroad ROW is normally required when the highway project involves a new crossing or grade separation of the railroad. A separate easement agreement may be obtained in lieu of the License to Cross. Developer shall prepare all the documents required to obtain the License and C&M Agreement, including preparation of the plans and specifications and estimates, making necessary modifications as required on behalf of TxDOT. Developer shall submit the draft License and C&M Agreement to TxDOT for transmittal to the railroad. After all comments have been incorporated or satisfactorily resolved by either Developer, railroad or TxDOT, Developer shall submit a complete and final agreement to TxDOT for execution. This agreement shall include

provisions for each party's access to the facilities for regular inspection, maintenance as well as emergency repairs as required. Developer shall be responsible for all costs associated with the construction of the crossing including any construction performed by the railroad company as specified in the railroad agreement. The railroad company shall be responsible for constructing the track, signal, warning protection improvements portion of the crossing and any grade crossings or other permitted improvements located within the rail ties; or as otherwise specified in the railroad agreement.

c) Aerial Easements (for grade separations only) – Developer may be required by the railroad company to enter into a separate easement agreement to obtain air rights to cross railroad ROW. If an aerial easement is required, the "License" portion of the C&M Agreement will be modified to identify the aerial easement as right to cross railroad right of way with the new highway facility.
d) Temporary Construction Easements – Developer may be required to purchase a temporary construction easement for the railroad company. This requirement will be stipulated in and be a part of the C&M Agreement.
e) Railroad's Contractor Right-of-Entry Agreements (Texas approved versions only) – In order to enter the railroad's right-of-way to perform the Work, Developer or their Subcontractor shall secure a railroad Right-of-Entry agreement and shall coordinate the arrangements of the necessary agreements directly with the railroad.

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

Whenever a license agreement for construction, maintenance, and use of railroad ROW (hereinafter called the "License Agreement") between the operating railroad and TxDOT is required, Developer shall prepare all the documentation required to obtain the License Agreement, including preparation of the License Agreement application on behalf of TxDOT, the Plans and specifications, making necessary modifications as required, and preparation of the License Agreement.

Developer shall submit the draft License Agreement to TxDOT for transmittal to the operating railroad. After all comments have been incorporated or satisfactorily resolved by either Developer, railroad or TxDOT, Developer shall submit a complete and final License Agreement to TxDOT for execution.

14.3.4 Operation Safety

Developer shall arrange with the operating railroad for railroad flagging as required. Developer 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.

14.3.5 Railroad Right of Entry Agreement

In order to enter the operating railroad's ROW to perform the Work, Developer shall secure a railroad Right of Entry Agreement and shall coordinate the arrangements of the necessary agreements directly with the operating railroad.

Executed railroad agreements in entirety, shall be submitted as part of the Final Design Documents.

14.3.6 Developer Right of Entry Agreement

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

14.3.7 Insurance Requirements

Developer shall procure and maintain, prior to working adjacent to and entry upon operating railroad property, insurance policies naming TxDOT, TxDOT's Consultants, and railroad as named insured.

Developer shall obtain the following types of insurance:

a) Railroad Protective Liability Insurance Policy
b) Comprehensive General Liability Insurance
c) Contractors' Protective Liability Insurance.

All insurance policies shall be in a form acceptable to the operating railroad. Copies of all insurance policies shall be submitted to TxDOT prior to any entry by Developer upon operating railroad property.

14.4 Construction Requirements

Developer shall comply with all construction requirements and specifications set forth by the operating railroad.

Developer 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. Developer shall be responsible for all costs associated with the railroad/transit force account work.

14.4.1 Flagging

Developer shall arrange for railroad flagging as required with the railroad company to ensure the safe passage of rail traffic throughout the Project Limits effecting railroad right of way.

Developer shall notify the railroad representative at least ten (10) Business Days in advance of Developer commencing its work and at least thirty (30) Business Days in advance of any Work by Developer in which any person or equipment will be within twenty-five (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 to within twenty-five (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 twenty-five (25) feet of any track(s) unless authorized by the railroad. Upon receipt of such thirty (30)-day notice, the railroad representative will determine and inform Developer whether a flagman need be present and whether Developer needs to implement any special protective or safety measures.

14.4.2 Safety Certification

Developer shall comply with the railroad's requirements for contractor safety training prior to performing Work or other activities on the railroad's ROW and shall maintain current registration prior to working on railroad property.

15 AESTHETICS AND LANDSCAPING

15.1 General Requirements

This Section 15 defines requirements with which Developer shall design, construct, operate and maintain aesthetic treatments for the roadway, structures, drainage, and landscaping Elements of the Project. Aesthetics and Landscaping shall conform to the current TxDOT Landscape and Aesthetics Design Manual and other aesthetic guidelines and drawings in Section 15.2.1. Aesthetic treatments shall be designed to harmonize with the local landscape and architecture, as well as the developed themes of the local setting. Developer shall coordinate with Governmental Entities to achieve this harmonization.

15.2 Administrative Requirements

This Section 15 presents minimum aesthetics and landscape design requirements for the Project. To assure sufficient attention is given to aesthetics on the Project an aesthetic allowance has been established per Section 11.1.7 of the Agreement for aesthetic Elements. This aesthetic allowance will be used solely for aesthetic treatments and aesthetic enhancements that are above the base elements described below and that are included in the standard design and construction requirements for the aesthetic Element(s). For example, an enhanced (aesthetic) bridge rail may be proposed on the Project. However, the aesthetic allowance will cover only the aesthetic enhancement cost above the cost of providing a standard bridge rail. Developer is responsible for the cost of providing the standard bridge rail.

Base elements are those standard elements or features that are required to satisfy TxDOT design criteria and standards and construction specifications. Base elements will not be paid for as part of the Aesthetic Allowance. For the purposes of this Project, the following list of items will be considered base elements of the Project:

a) Removal of existing trees and vegetation;
b) Mitigation (replacement of the same or greater size than existing) for damage to existing trees;
c) Native Seeding;
d) Topsoiling;
e) Project grading to achieve project requirements;
f) Permanent and Temporary Erosion Control, including placement of a base rock mulch (i.e. type of rock mulch predominantly used in the corridor for the purpose of controlling erosion in ditches, swales or other drainage elements);
g) Permanent and Temporary Dust Control;
h) Materials and finish, including standard formliners and texture, of all bridge elements required for the project, including (but not limited to) railings/parapets, fine surface finish colored to match base color, columns, abutment walls, girders, fencing, etc.;
i) Materials and finish of all roadway elements, including (but not limited to) roadway paving, sidewalk paving, curb and gutter, signage, roadway and pedestrian lighting, etc.;
j) Materials and finish of all slope paving;
k) Materials and finish, including standard formliners and texture, of all retaining, sound or freestanding walls required, vertical rustication is standard finish treatment used for these elements;
l) Materials and finish of all light poles and mast arms;
m) Materials and finish of all signal and sign poles;

n) Fencing, including pedestrian and right-of-way;
o) Roadway striping, including crosswalks;
p) Corridor theme color paint, stain, and integral pigment applied to all new structures and any existing structures impacted by the project;
q) Costs for maintenance of Right of Way for trash, debris and graffiti removal; and
r) Cost for Design of project including development of Aesthetics Concepts, and Aesthetics and Landscape Plan.

Aesthetic elements are those enhanced elements or features that are above TxDOT design criteria and standards and construction specifications. Aesthetic elements will be paid for as part of the aesthetic allowance. For the purposes of this Project, the following list of items will be considered the aesthetic elements of the project:

a) Aesthetic features of bridges, this may include material, finish, color, shape, and texture;
b) Aesthetic treatments of barriers and railings, this may include material, finish, color and texture;
c) Paved slope treatments, including accent color, texture, and finish;
d) Color staining/painting for corridor accent color(s) on applicable project elements, including, but not limited to, bridge parapets, columns, girders, walls, etc;
e) Aesthetic treatments of retaining walls, noise walls (if any), or freestanding walls, this may include finish, accent color(s) and texture;
f) Sculptural and artistic features including stand alone and those related to other structures;
g) Aesthetic treatments of light poles and mast arms,;
h) Decorative sidewalk paving, median and island paving, or pedestrian specialty paving, including material, color, and finish (i.e. the cost difference between concrete paving and decorative concrete paving);
i) Decorative crosswalk paving, if appropriate;
j) Aesthetic hardscape at interchanges and intersections, including decorative walls, paving and artistic elements;
k) Aesthetic fencing, including right of way and pedestrian fencing;
l) Aesthetic signage, including decorative street identification and treatments to highway sign posts or sign bridges, if appropriate;
m) Trees, shrubs, and other plant material, excluding native seeding and mitigation plantings;
n) Irrigation and irrigation sleeving, above that required for mitigation, or listed under basic elements; and
o) Decorative light fixtures, including decorative or ambient lights, decorative pedestrian lighting on bridges and excluding roadway, high mast or other base requirements;
p) Material finish and color of light poles and mast arms, ambient lighting colors.

15.2.1 Aesthetics Concepts

Aesthetic Elements shall be designed as corridor-wide enhancements. To the extent practicable, the aesthetic Elements shall remain consistent in form, materials, and design throughout the length of the Project.

The Project is adjacent to, and intersects with, various other roadway projects for which aesthetic guidelines have been created. These projects include both tolled and non-tolled facilities, as well as projects which are in the project planning and development stage. Additionally, the City of Irving has

created conceptual drawings for their vision of the Project aesthetics. Aesthetic guidelines and drawings for these adjacent projects are provided in the Reference Information Documents:

- City of Irving – Aesthetic Concepts SH183
- SH183 Sound Walls
- NTE – Aesthetic and Landscaping Plan (ALP)
- Diamond Interchange – Aesthetic Details for Retaining Walls
- Diamond Interchange – Aesthetic Details for Sign Columns
- Diamond Interchange – Aesthetic Details for Bridges
- Trinity Parkway Landscape and Aesthetic Design Guidelines November 2008

The Project shall incorporate complementary aesthetics to the adjacent projects and, to the extent feasible, strive to meet the aesthetic vision of Governmental Entities and local stakeholders. Within ten (10) Days of issuance of NTP1, The Developer shall meet with all appropriate Governmental Entity staff to identify desired aesthetic treatments and enhancements to be implemented in the aesthetic concepts for the Project. TxDOT shall be invited and provided a 48-hour advance notice to all meetings with Governmental Entities. With input from meeting(s) with Governmental Entities, the Developer shall prepare two (2) aesthetics concepts for the Project that provide a design intent and estimated costs for these concepts for presentation to Governmental Entities and local stakeholders. It shall be understood that these concepts will need to be adapted to site specific conditions. Before presenting the aesthetics concepts to the Governmental Entities, Developer shall meet with and review the proposed aesthetics concepts with TxDOT. The Developer shall present the aesthetic concepts to all appropriate Governmental Entity staff to identify a preferred aesthetic concept. The Developer shall base this presentation on the principles, requirements, and strategies provided in Section 15.3. After meeting with the Governmental Entity, the Developer shall prepare a final aesthetic concept and submit it to TxDOT for approval within sixty (60) Days of issuance of NTP1. The approved aesthetic concept shall be incorporated into the Aesthetics and Landscaping Plan for TxDOT approval.

15.2.2 Aesthetics and Landscaping Plan

Developer shall prepare an Aesthetics and Landscaping Plan in conformance with the Project's approved aesthetic concept which provides guidelines and requirements for the aesthetics design of the Project. Developer shall submit the Aesthetics and Landscaping Plan to TxDOT for review and approval within ninety (90) Days of issuance of NTP1. Developer acknowledges that approval of the Aesthetic and Landscaping Plan is necessary for review of design submittals and construction documents with aesthetic Elements. TxDOT approval of the Aesthetics and Landscape Plan is required prior to construction of any Elements affected by the Aesthetics and Landscaping Plan.

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

Aesthetics

a) A master plan that conveys the layout of the various roadway conditions (i.e., depressed sections, elevated sections, at-grade roadways, bridges, cantilevered structural sections, etc.).

b) All plans, sections, elevations, perspectives, isometrics, etc., as needed to fully communicate the aesthetic treatment and approach to aesthetic Elements including: walls, noise walls, bridges, traffic rail, and signage structures. Drawings showing locations of site-specific elements (i.e.., fences, signage, colored lighting, potential locations of community involvement improvements, etc.) improvement opportunity areas, gate way markers, bridge enhancements, landscaping).
c) Composite drawings showing the location of utilities as they relate to the location of aesthetic improvements and showing potential conflicts for proposed improvements.
d) Color schemes and their locations.

Landscape

a) Plan sheets that indicate plant palettes, locations of plants, plant types, and planting dates as well as composite drawings of all utilities and easements that would interfere with landscaping, markers, or any other identified enhancements.
b) Composite drawings of all utilities and easements that would interfere with landscaping, markers, or any other identified enhancements.

The Aesthetic and Landscaping Plan shall include all plans, elevations, perspectives, isometrics, etc., as needed to fully convey the aesthetic treatment.

Upon completion of the Aesthetic and Landscaping Plan, Developer shall consolidate the information, which establishes the requirements for engineering of the highway corridor aesthetics. The Aesthetic Concepts and subsequent Aesthetics Landscaping Plans shall serve as the primary standard guidance necessary to produce the intended aesthetic form, function, and appearance of this and future similar projects within and adjacent to the Project.

This Aesthetics and Landscaping Plan shall be presented in the following format:

a) 11 inches x17 inches
b) Front-sided only
c) Eight (8) paper copies, in color
d) Eight (8) CD copies, with guidelines in portable document format (PDF)

The Aesthetics and Landscaping Plan shall be incorporated into the final engineering design.

15.2.3 Personnel

Developer shall provide a landscape architect, registered in the State of Texas, with a minimum five years of experience in designing aesthetics and landscaping Elements for roadway projects of similar scope and size, to develop the Aesthetics and Landscaping Plan and coordinate design aspects with Governmental Entities.

15.3 Design Requirements

15.3.1 Aesthetics Principles and Strategies

Developer shall follow the guidelines and requirements of the approved Aesthetics and Landscaping Plan, as well as the aesthetics principles, requirements, and strategies established by TxDOT for the Project

design, including the following:

a) Aesthetics shall not interfere with safety, constructability, and maintenance requirements.
b) The Project design shall minimize impact on the existing natural environment to the extent possible.
c) The Project design shall emphasize and enhance the existing natural context and landscape to the fullest extent possible.
d) Recurring shapes for structures shall be used to the extent possible for continuity along the entire length of the Project.
e) All bridges and other structures shall reflect a unified design.
f) All structures shall be carefully detailed so as to achieve the greatest level of aesthetic quality and fit within the regional context.
g) Color, texture, and form shall be used appropriately for all structures.
h) Graphics, signage, and lighting shall be consistent along the entire length of the Project.
i) Existing trees and natural features shall be preserved to the greatest extent possible.
j) Aesthetics Elements shall be fully integrated with the overall landscape design.
k) Visual quality of the landscape shall be consistent along the entire length of the Project.
l) Native-area and/or naturalized plant materials that exhibit good drought tolerance shall be used to the extent possible.
m) Aesthetic Elements shall be easy to maintain and resistant to vandalism and graffiti.

15.3.2 Walls

Developer shall design noise/sound walls to be similar in color, texture, and style to those of retaining walls, and shall develop an aesthetics treatment that is consistent with other physical features such as structures, landscaping, and other highway components.

Developer shall apply aesthetic treatments to the vertical surfaces of retaining and noise/sound walls where the surface is visible from the roadway or adjacent houses, pedestrian paths, or other public spaces. Consistent treatments shall be used for retaining and noise/sound walls that articulate the design themes established for the Project.

The Developer shall clearly detail and identify how wall patterns shall be incorporated into the chosen design solution.

The roadside face of noise walls should have a consistent appearance throughout their length. The side of the noise walls facing away from the roadway may vary based upon community input gathered by the Developer.

15.3.3 Bridges and Other Structures

All aesthetic treatments for structural Elements shall be coordinated with Developer's structural design team to facilitate constructability and maintain safety requirements. All components of new structures and exterior caps, columns, beams, railing, and retaining walls of widened structures shall include aesthetic treatments in accordance with the Projects aesthetics concept. Lengthened portions of existing bridges shall match existing aesthetic treatments.

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

Developer shall ensure that a constant superstructure depth is maintained throughout the bridge length for all bridges other than direct connection structures and braided ramps. For direct connection structures and braided ramps, concrete beam spans shall be of constant depth throughout the structure.

15.3.4 Trees, Shrubs, and Other Plant Materials

All trees, shrubs, deciduous vines, and perennials shall comply with the applicable requirements of *ANSI Z60.1 American Standard for Nursery Stock*.

Developer shall consult with the agricultural extension agent of the applicable county and TxDOT Landscape Architect for recommended plant species lists. Developer shall use plant species native to the area or naturalized for the Project site.

In order to monitor and control weeds, Developer shall provide weed control measures in the Aesthetics and Landscape Plan.

Vegetation provided as a part of Developer's Aesthetic and Landscaping Plan, other than grassing, and erosion control measures, shall be incorporated with the following guidelines:

- Trees, if used shall be placed in accordance with TxDOT's minimum clearance zones and shall be placed in the Facility ROW between mainlanes and frontage roads. Trees shall be a minimum of six (6) feet high and shall have a three (3) inch caliper minimum.
- The mature canopy shall not overhang the travel lane or shoulder of any part of the roadway.

15.3.5 Paved Slope Treatment

Paved slope treatment shall be used in hard to reach mowing areas or under structures, such as, but not limited to, areas between, near, or next to guard fence posts, sign posts, bent columns, retaining walls, freeway ramp gores, paved ditches, flumes, and ditch inlets, to improve roadway appearance.

15.3.6 Lighting

Developer shall design the aesthetic enhancement lighting with the following aesthetic criteria:

- One pole type for the entire corridor during the design and construction phase and, to the extent practicable, the O&M Period. Developer shall provide a lighting layout plan that addresses each light fixture (i.e. roadside lighting, high mast lighting, under bridge fixture, etc.) and type of light fixture (i.e. LED lighting, point source lighting, HID, etc.)

15.3.7 Color Pallet

As part of the Aesthetics and Landscaping Plan, Developer shall submit a plan that indicates where each color is to be applied. This plan can be diagrammatic in nature, but shall list each element and its colors. In addition to integrated colors, painting, and staining, Developer may use colored lighting in selected areas to add color.

15.4 Construction Requirements

Developer shall provide TxDOT sample panels a minimum of sixty (60) Days in advance of starting construction of textured concrete surfaces or concrete surfaces finished with a coating of paint or stain. Developer shall construct sample panels in accordance with TxDOT Standard Specifications *Item 427.4.B.2.d* (Form Liner Finish) that comply with the principles, requirements, and strategies established by TxDOT and the approved Aesthetics and Landscaping Plan. TxDOT must review and approve the sample panels before any construction form liners may be ordered, obtained, or used. Developer shall provide sample panels having a textured portion at least 5.0 feet by 5.0 feet 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, Developer shall prepare a corresponding coated panel or surface area of an in-place Element for approval prior to the coating operation.

Color samples shall be provided from the Federal Standard 595 Colors Fan Deck. All sample panels shall be representative of the actual panel that will be placed. Primary, secondary and accent colors shall be displayed on the sample panels.

15.5 Maintenance

Developer shall coordinate with the Utility Owner(s) and ensure power service is initiated and provided/maintained for all irrigation controllers and aesthetic lighting within the Project Limits during the D&C Period. The Governmental Entity will maintain existing landscape at Loop 12 interchange. Developer shall be responsible for maintaining all new and modified landscape Elements during the D&C Period. Governmental Entities will be responsible for maintenance of landscape Elements and will provide/maintain power for irrigation controllers and aesthetic lighting within the O&M Limits during the O&M Period.

15.6 Aesthetic Enhancements

The Developer shall provide Governmental Entities the opportunity to enhance aesthetic and landscaping features consistent with the requirements herein and developed under Section 15.2.1. The additional capital and maintenance costs of the adjacent Governmental Entity improvements (Aesthetic Enhancements) beyond what would be attributable to Aesthetics Concepts and incorporated into the Aesthetics and Landscaping Plan shall be the responsibility of the adjacent Governmental Entity. Developer shall coordinate the necessary arrangements directly with the appropriate local Governmental Entity for Aesthetic Enhancements within the local Governmental Entity's jurisdiction if so required by the Work.

Aesthetic Enhancements shall be incorporated into the final aesthetic concept plan to be submitted to TxDOT for approval.

16 Signing, Delineation, Pavement Marking, Signalization, and Lighting

16.1 General Requirements

This Section 16 includes requirements with which Developer shall design, construct, operate, and maintain all signing, delineation, pavement markings, signalization, and lighting for the Project unless stated otherwise in the Agreement. Developer shall design, construct, operate, maintain, and be responsible for the cost of power to all signs, signalization and lighting for the Project during the D&C Period consistent with TxDOT agreements with Governmental Entities including the City of Fort Worth, the City of Euless, the City of Irving, the City of Dallas, the Dallas Fort Worth International Airport, the North Texas Tollway Authority, or in the Agreement.

16.2 Administrative Requirements

16.2.1 Meetings

Developer shall arrange and coordinate all meetings with Governmental Entities that will assume responsibility for maintaining and operating traffic signals and lighting for the Project as required in agreements with Governmental Entities. Developer 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.

Developer shall arrange and coordinate all meetings with requesting Governmental Entities or individuals regarding special signs.

16.3 Design Requirements

The Developer shall design all signing, delineation, pavement marking, and signalization in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and TxDOT's *Standard Highway Sign Design for Texas* (SHSD), TxDOT's Traffic Engineering Standard Sheets, the TxDOT Freeway Signing Handbook Manual, and TxDOT specifications. In addition, the Developer shall design signalization in accordance with requirements of Governmental Entities that will maintain the signalization. The Developer shall design all lighting and electrical power installations in accordance with the National Electrical Code (NEC) and TxDOT specifications. In addition, the Developer shall design lighting in accordance with requirements of Governmental Entities that will maintain the lighting.

Developer's design shall incorporate the following requirements:

a) Minimum size for all the proposed warning signs shall be 36"x36".
b) Install warning signs W8-13T (48"x48") "WATCH FOR ICE ON BRIDGE" in advance of all bridges.
c) Use R3-7R "RIGHT LANE MUST TURN RIGHT" and R3-7L "LEFT LANE MUST TURN LEFT" signs where required. Do not use R3-5R or R3-5L "Arrow and ONLY" signs. These signs shall not be installed at dedicated turn bays.
d) Install object markers OM-2Y under the route marker assembly located at the entrance ramp gore between the frontage road and mainlanes.

e) Install object markers OM-1 on each leg of large ground mounted signs where the signposts are not protected by concrete barrier or metal beam guard fence, similar to the exit sign at the exit gore.
f) Install appropriate added lane sign W4-3R (48”x48”) or merge sign W4-1R (48”X48”) on the mainlanes of the freeway in advance of each entrance ramp.
g) Install advisory exit speed limit sign W13-2 (48”x60”) on the mainlanes in advance of each exit ramp.
h) Design guide sign details according to the Standard Highway Sign Designs for TMUTCD and TxDOT current standard drawings “Typical Sign Requirements”, and the TxDOT Freeway Signing Handbook Manual.
i) Use the B-3 arrow for overhead guide sign panel at the exit ramps.
j) Design all overhead sign structures for Zone 4, 70 mph wind zone.
k) All proposed overhead sign panels shall be 46% below the centerline of the overhead sign structure truss (see standard SB (SWL-1)).
l) Advance and sequential signs outside the Project Limits shall have mileages verified and adjusted as needed due to the removal and / or relocation of an exit.
m) The bottom of the proposed overhead sign panels facing the same direction of traffic shall be on the same horizontal plane.
n) All the small signs shall be Aluminum Type A.
o) Design all large ground mounted signs for Zone 3 (Type 300) which is 70 mph wind zone. (See TxDOT current drawing “Large Roadside Guide Sign Post Supports Selection Worksheet).
p) All overhead sign panels shall be extruded aluminum.
q) All large ground mounted signs shall be extruded aluminum.

At newly constructed intersections the Developer shall design and install signing including general signs, street name signs, pedestrian signs, regulatory signs, warning signs, and guide signs.

At reconstructed intersections the Developer shall design and install or adjust signing including general signs, street name signs, pedestrian signs, regulatory signs, warning signs, and guide signs.

At intersections which will undergo minor rehabilitation the developer shall adjust signing including general signs, street name signs, pedestrian signs, regulatory signs, warning signs, and guide signs.

16.3.1 Final Design

Developer shall prepare and submit a preliminary operational signing and pavement marking schematic, based on the preliminary operational signing pavement marking schematic included in the Proposal, for review and approval by TxDOT and Federal Highway Administration (FHWA) prior to commencing Final Design. Before placing any signs, delineation, pavement marking, advance toll warning signs, third party signs, non-standard sign structures, pavement markings, traffic signals, and lighting, Developer shall provide TxDOT a layout indicating the proposed location of such items consistent with the approved preliminary operational signing and pavement marking schematic.

Developer shall advance the Final Design of the signing, delineation, pavement marking, signalization, and lighting based on the approved preliminary operational signing and pavement marking schematic.

16.3.2 Signing and Delineation

Developer shall design and install all signs as shown on the Final Design. Signs include new signs, as well as modifications to existing sign panels and structures. Developer's Final 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, dynamic message signs (DMS), lighting, and above and below ground structures.

Developer shall ensure that signs are clearly visible, provide clear direction and information for users, and comply with all applicable TMUTCD requirements.

Developer 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.

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

Signs shall meet the requirements of TxDOT's *Standard Highway Sign Design for Texas*.

16.3.3 Project Signs Outside of the Project ROW

For signs located outside the Project ROW but within a public ROW, Developer shall install the signs in existing rights-of-way controlled by Governmental Entities or other State agencies. Developer shall coordinate with appropriate Governmental Entities for the design and installation of these signs.

16.3.4 Advance Toll Information Signs

For advance toll information signs, Developer shall be responsible for determining sign locations and foundation types, and design and installation of the signs. Developer shall meet the requirements of the TMUTCD, coordinate with TxDOT and the North Texas Tollway Authority, and shall use Good Industry Practice in determining the locations for advance toll information signs. Developer shall meet the requirements of the Dallas Fort Worth Regional Express Lane Signing Standard in RID Exhibit 16-1.

The Developer shall prepare and submit a preliminary advance toll information signing schematic for review and approval by TxDOT at the same time as Developer submits the preliminary operational signing and marking schematic for the for the Project.

16.3.5 Third-Party Signs

In addition to the warning, regulatory, and guide signs within the Project ROW, TxDOT or Governmental Entities may request that third-party signs, including logo signs, be installed by a third party. Developer shall coordinate and cooperate with any third party performing such work. TxDOT may solicit input from Developer in reviewing applications for new third-party signs, but will retain sole authority for approving installation of these signs. All costs associated with fabricating and installing these signs shall be borne by the sign applicant. If approved by TxDOT, TxDOT may require Developer to fabricate and/or install these signs as a TxDOT-Directed Change.

16.3.6 Sign Support Structures

Developer shall determine foundation types and design sign foundations based upon geotechnical surveys/tests using Good Industry Practices. Designs for sign supports shall also comply with requirements in Section 13.

Developer shall design sign support structures to provide a vertical clearance of not less than 19'6" between the roadway and the bottom of the sign.

16.3.7 Pavement Marking

Developer shall ensure that the design and installation of all pavement markings comply with applicable TMUTCD requirements and TxDOT's Traffic Engineering Standard sheets.

Developer shall mark median noses of all raised islands and inside edges of exclusive turn lanes (channelized curbs) in accordance with the requirements of TMUTCD and TxDOT's Traffic Engineering Standard sheets.

Developer shall use contrast markings for skip lines on the managed lanes and general purpose lanes on concrete pavement and bridge decks. Contrast markings consist of black background in combination with standard TMUTCD marking colors.

16.3.8 Signalization

Traffic signal designs and modifications to existing traffic signals shall be completed in accordance with the current TxDOT standards and specifications, the TMUTCD, and the requirements of the appropriate Governmental Entity.

16.3.8.1 Traffic Signal Requirements

Developer shall design and install fully-actuated permanent traffic signals at all TxDOT-authorized intersections within the Project Limits. In addition, Developer shall modify, as appropriate, any existing traffic signals impacted by the Final Design. Developer shall coordinate with TxDOT and the appropriate Governmental Entities listed in Table 16-1 to define appropriate traffic signal design and traffic signal equipment and installation requirements; to determine Governmental Entity oversight of Developer's Work; and to gain final acceptance of traffic signal design and installation. Developer shall coordinate with the appropriate Governmental Entities for interconnection and synchronization of traffic signal networks.

Table 16-1: Existing/Proposed Traffic Signal Systems

Segment	Cross Street	Type	Governmental Entity (Owner)
SH 183 WBFR	FM 157 (Industrial Blvd)	New	Euless
SH 183 EBFR	FM 157 (Industrial Blvd)	New	
SH 183 WBFR	Ector Drive	New	Euless
SH 183 EBFR	Ector Drive	New	
SH 183 WBFR	Main Street	New	Euless
SH 183 EBFR	Main Street	New	
SH 183 WBFR	Esters Road	New	Irving
SH 183 EBFR	Esters Road	New	
SH 183 WBFR	North Story Road	New	Irving
SH 183 EBFR	North Story Road	New	
SH 183 WBFR	MacArthur Blvd	Modified/Re-used	Irving
SH 183 EBFR	MacArthur Blvd	New	
SH 183 WBFR	O'Connor Blvd	New	Irving
SH 183 EBFR	O'Connor Blvd	New	
SH 183 WBFR	Carl Road	New	Irving
SH 183 EBFR	Carl Road	New	
SH 183 EBFR	Maryland Drive	New	Irving
SH 183 EBFR	Regal Row	New	Dallas
SH 183 WBFR	Regal Row	New	

At newly constructed intersections the Developer shall design and install traffic signals, as warranted and authorized, including controller cabinets, controller cabinet assemblies, and other necessary signal equipment to satisfy the appropriate Governmental Entity.

At reconstructed intersections the Developer shall assess the adequacy of existing traffic and pedestrian signals and upgrade as needed to accommodate intersection and overall Project improvements, including, any controller cabinets, controller cabinet assemblies, and other necessary signal equipment to satisfy the appropriate Governmental Entity.

At intersections which will be re-used or undergo only minor rehabilitation the developer shall review the existing traffic and pedestrian signal timing and coordinate with appropriate Governmental Entities in accordance with any existing or new municipal maintenance agreements and adjust timing where applicable and as needed to accommodate traffic flows impacted by the Project.

Developer shall make existing signal systems compatible with the proposed interconnections. Developer shall ensure continuous communication with the traffic signal system within the Project Limits, and shall provide all communication hardware/equipment for the appropriate Governmental Entity to communicate with the signal systems within the Project Limits from their Traffic Management Center (TMC).

Developer shall provide pedestrian detectors and signals at all traffic signals within the Project Limits and shall comply with TxDOT's *Accessible Pedestrian Signal (APS) Guidelines*.

Developer shall provide vehicle detection equipment preferred by appropriate Governmental Entity for all traffic signals within the Project Limits.

Developer shall purchase and install traffic signals, as well as, controller cabinets, controller cabinet assemblies, and other signal equipment that meet the requirements of the appropriate Governmental Entity listed in Table 16-1. To effectively meet the Governmental Entity traffic signal requirements, as well as, the requirements for controller cabinets, controller cabinet assemblies, and other signal equipment; Developer may consider purchasing signal equipment using contracts that the local Governmental Entities have with signal vendors.

Developer is responsible for coordinating with TxDOT in the preparation of traffic signal agreements (or supplements thereto) for execution by TxDOT and the appropriate Governmental Entity having operation and/or maintenance responsibilities. Developer shall be responsible for the operations, maintenance and the cost of power for all traffic signal systems for the Term of the Agreement unless stated otherwise in agreements with Governmental Entities.

16.3.8.2 Traffic Signal Timing Plans

Developer shall design signal timing plans for all new and modified traffic signals. Developer shall coordinate signal timing plans for all new and modified traffic signals with appropriate Governmental Entities. Developer shall submit timing plans to TxDOT for review and approval. Developer shall coordinate and implement signal timing plans that optimize traffic flows and provide signal coordination with adjacent intersections and arterials for all existing and new traffic signals, modified signals, and interconnected signals. Unless signal timing maintenance is otherwise provided by a Governmental Entity, Developer shall be responsible for updating signal timing as necessary to maintain optimized flow signal timing for the Term of the Agreement. Signal phasing and timing plans at diamond interchanges shall conform to the coordinated signal phasing and timing of the corridor.

Developer shall provide copies of all final implemented signal timing plans to TxDOT and appropriate Governmental Entity.

16.3.8.3 Traffic Signal Warrants

As part of the Final Design process, Developer shall collect traffic data and prepare traffic warrant studies for intersections not signalized at the time of NTP1 and shall submit these signal warrant studies to TxDOT for review. The warrant studies shall address all signal warrant criteria in the TMUTCD.

Developer 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 from Governmental Entities and third parties within the Project ROW throughout the Term of the Agreement shall be subject to TxDOT approval. Requests for signals shall include supporting traffic warrant studies and traffic signal plans prepared in accordance with TxDOT standards.

Signal warrant studies shall be based on actual traffic volumes or opening year traffic volume projections. If actual traffic volumes are not available, but opening year traffic volume projections are available, Developer shall use the procedure in Section 3.5 of the TxDOT *Traffic Signals Manual* to determine the volumes to be analyzed. If opening year traffic volume projections are not available, opening year traffic volumes shall be calculated by applying a 50-percent reduction to the Design Year traffic projections. Developer 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, Developer 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.

16.3.8.4 Traffic Signal Support Structures

Developer shall coordinate with TxDOT and the appropriate Governmental Entities to determine the type of traffic signal support structures. Developer shall obtain the maintaining Governmental Entities' approval of traffic signal support structures to be used on new signal installations.

16.3.8.5 Traffic Signal Systems

Developer shall provide interconnection systems between new or modified signals within the Project Limits and any other signal system within one half-mile of the Project as required by TxDOT and appropriate Governmental Entities. Developer shall make existing signal systems compatible with the proposed interconnections. Developer shall ensure continuous communication with the traffic signal system within the Project Limits, and shall provide all communication hardware/equipment/materials for TxDOT or the appropriate Governmental Entity to communicate with the signal systems within the Project Limits from their TMC.

Developer shall provide to TxDOT, as part of the Final Design, an Acceptance Test Plan (ATP) for all traffic signals for TxDOT review. This ATP shall also be submitted to the appropriate Governmental Entities. The Developer shall conduct testing in accordance with the ATP and document those results to show conformance.

16.3.9 Lighting

Developer shall provide lighting along the managed lanes, general purpose lanes, and frontage roads where continuous lighting exists along the managed lanes, general purpose lanes, and frontage roads. Developer shall provide high mast lighting along collector distributor lanes and for direct connector ramps at major interchanges. Developer shall provide safety lighting at ramps and cross street

intersections. Developer shall design the lighting system to minimize or eliminate illumination of areas outside the Project ROW.

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

Developer shall design continuous and safety lighting systems in accordance with Chapters 5, 6, 7, and 9 of the TxDOT *Highway Illumination Manual*. At all times during the Term of the Agreement the Developer shall maintain safe lighting conditions within the Project Limits.

Developer shall evaluate all existing lighting elements within the Project Limits to determine appropriate repairs or replacement of existing elements necessary for the existing lighting system to satisfy Project lighting requirements. Developer shall prepare lighting studies that consider electrical sufficiency and illumination levels, uniformity, and sources for the roadways, interchanges, and special areas. Developer shall maintain an average horizontal luminance on the roadways as described below. Developer shall submit the electrical design calculations and photometric data results for all lighted areas within the Project Limits to TxDOT for review.

High mast and conventional lighting shall meet the photometric level requirements as stated in TxDOT Standards RID(LUM)-07, HMID(7)-03 and the AASHTO Roadway Lighting Design Guide. Developer shall provide an average to minimum uniformity ratio of 4:1 with a minimum lux of 2.0 and an average lux of 6.0 to 12.0 on all traveled roadways to be illuminated. Traveled roadways include: tolled managed lanes, general use lanes, auxiliary lanes, ramps, and ramp terminal intersections with cross streets.

Luminaire poles and breakaway bases shall be designed in accordance with AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. For all poles located within the clear zone of the roadways, Developer's design shall incorporate breakaway devices that are pre-qualified by TxDOT.

Developer shall place all understructure lighting in a configuration that minimizes the need for lane closures during maintenance.

If TxDOT standards cannot be used, Developer shall determine and design appropriate foundation types and lengths for permanent lighting structures for TxDOT review and approval.

Developer shall not place ITS cable, fiber-optic lines, signal conductors, or any other non-lighting related cables or conductors in the lighting conduit, ground boxes, or junction boxes.

Developer shall minimize the potential hazards of lighting poles through the careful consideration of mounting options and pole placements, including the following options:

- Placing mast arms on traffic signal poles
- Placing pole bases on existing or proposed concrete traffic barrier
- Placing poles behind existing or proposed concrete traffic barrier or metal beam fence
- Placing high mast lighting outside the clear zone, especially in roadway horizontal curves

Developer shall coordinate with TxDOT and the appropriate Government Entities to define additional illumination design preferences of the local maintenance and operation entity.

Developer shall ensure that lighting structures comply with 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, Developer 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, Developer shall find alternative ways of providing the required level of lighting.

Developer shall provide to TxDOT, as part of the Final Design, an Acceptance Test Plan (ATP) for TxDOT review for all illumination. This ATP shall also be submitted to the appropriate Governmental Entity. The Developer shall conduct testing in accordance with the ATP and document those results to show conformance.

16.3.9.1 Additional Requirements

Additional requirements are as follows:

a) High-mast lighting must not infringe into residential areas adjacent to the Project ROW.
b) Developer must coordinate with the FAA regarding installation of obstruction lights, if any, on a case-by-case basis.
c) At a minimum, underground conduit shall be Schedule 40 polyvinyl chloride (PVC) and shall not be less than 2 inches in diameter.
d) The minimum conductor size shall be #8 AWG copper on roadway and #12 AWG on underpass lights. Developer shall not use duct cable for illumination purposes.
e) Developer shall place bridge lighting brackets with a span length of no more than eight 8 feet or less than 4 feet from abutments or bents.
f) Non-standard light pole design shall be submitted to TxDOT for approval. For light poles with a base 25 feet above the elevation of surrounding terrain, Developer shall electronically submit design calculations and shop drawings to TxDOT, Bridge Division.
g) Minimum inside dimensions for ground boxes shall be 11.5 inches (width) by 21.0 inches (length) by 10 inches (depth), which is equivalent to a TxDOT Type A box.
h) Ground box covers shall be 2-inch-thick (nominal), non-conducting material and labeled "Danger High Voltage Illumination".
i) Riprap aprons shall be provided to ground boxes located in grassy areas.
j) Electrical services, including lights, shall have an identification tag denoting a contact person or office in case of emergency or for maintenance, and the address and telephone number.
k) Electrical part of the installation shall be designed and installed in conformance with the National Electrical Code (NEC), TxDOT standards and specifications.
l) Do not use cast iron junction boxes in concrete traffic barriers and single slope traffic barriers. Use polymer concrete junction boxes instead of the cast iron junction boxes shown on standard sheets CTBI (3), CTBI (4), AND SSCB (4). Mount the junction boxes flush (+ 0", - ½") with concrete surface of concrete barrier. Mount the polymer concrete junction boxes shown on the Concrete Safety Barrier (CSB) standard sheets recessed (- ¼ ", - ¾ ") and weld a ¼" steel plate to the captive bolts so that it is flush (+0", - ¼ ") with surface of concrete barrier.

m) 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.

n) Seal ground boxes for lighting circuits with polyurethane foam approved by the Engineer that will not adversely affect other plastic materials or corrode metal.

16.3.10 Visual Quality

Notwithstanding the requirements of Section 16.3.9, Developer shall make a reasonable attempt to provide luminaires of equal height along the roadway.

Developer shall not use timber poles for permanent signing, signalization or lighting installation.

Developer shall re-sod or re-seed areas of construction disturbed by the installation of signs, traffic signal systems, or lighting systems after final installation.

16.4 Construction Requirements

16.4.1 Permanent Signing and Delineation

Developer 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. Developer shall stake each sign location in the field and provide TxDOT 72 hour notice prior to installation of any sign.

Developer 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. Developer shall replace any other removed signs before the end of the work day.

Developer 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 Information System (MMIS).

All installed signs are required to meet the minimum retro-reflectivity values specified in TMUTCD Table 2A-2.1 (Minimum Maintained Retroreflectivity Levels).

Table 16-2: Retroreflectivity Values

Sign Colors	Sheeting Type (ASTM D4956-04)				Additional Criteria
	I	II	III	VII, VIII, IX	
White on Green	W*; G _	W*; G 15	W*; G 25	W 250; G 25	Overhead
	W*; G 7	W 120; G 15			Ground-mounted
Black on Orange or Black on Yellow	Y*; O*	W _50; G 50			See Note 1
	Y*; O*	W 75; G 75			See Note 2

Sign Colors	Sheeting Type (ASTM D4956-04)				Additional Criteria
	I	II	III	VII, VIII, IX	
White on Red	W 35; R 7				See Note 3
Black on White	W 50				—

Notes:
The minimum maintained retro-reflectivity levels shown in this table are in units of candelas per lux per square meter (cd/lx/m^2), measured at an observation angle of 0.2° and an entrance angle of -4.0°.
1 For text and fine symbol signs measuring at least 1200 millimeters (mm) (48 inches) and for all sizes of bold symbol signs
2 For text and fine symbol signs measuring less than 1200 mm (48 inches)
3 Minimum Sign Contrast Ratio _ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type should not be used for this color for this application.

Bold Symbol Signs

W1-1, -2 – Turn and Curve	W3-1 – Stop Ahead	W11-2 – Pedestrian Crossing
W1-3, -4 – Reverse Turn and Curve	W3-2 – Yield Ahead	W11-3 – Deer Crossing
W1-5 – Winding Road	W3-3 – Signal Ahead	W11-4 – Cattle Crossing
W1-6, -7 – Large Arrow	W4-1 – Merge	W11-5 – Farm Equipment
W1-8 – Chevron	W4-2 – Lane Ends	W11-6 – Snowmobile Crossing
W1-10 – Intersection in Curve	W4-3 – Added Lane	W11-7 – Equestrian Crossing
W1-11 – Hairpin Curve	W4-5 – Entering Roadway Merge	W11-8 – Fire Station
W1-15 – 270 Degree Loop	W4-6 – Entering Roadway Added Lane	W11-10 – Truck Crossing
W2-1 – Cross Road	W6-1, -2 – Divided Highway Plaques Begins and Ends	W12-1 – Double Arrow
W2-2, -3 – Side Road	W6-3 – Two-Way Traffic	W16-5p, -6p, -7p – Pointing Arrow Plaques
W2-4, -5 – T and Y Intersection	W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance	W20-7a – Flagger
W2-6 – Circular Intersection		W21-1a – Worker

Fine Symbol Signs – Symbol signs not listed as Bold Symbol Signs.

Special Cases

W3-1–Stop Ahead: Red retroreflectivity, 7

W3-2–Yield Ahead: Red retroreflectivity, 7, White retroreflectivity, 35

W3-3–Signal Ahead: Red retroreflectivity, 7, Green retroreflectivity, 7

W3-5–Speed Reduction: White retroreflectivity,_50

For non-diamond-shaped signs such as W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), and W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level.

16.4.2 Permanent Pavement Markings

All lane lines along the managed lanes and general use lanes shall be 6-inch in width. Lane lines along frontage road lanes shall be 4-inch in width. Developer 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 (3) days but not later than ten (10) days after application:

a) Type I, Thermoplastic, Pavement Markings:
- White markings: 250 millicandelas per square meter per lux (mcd/m2/lx)
- Yellow markings: 175 mcd/m2/lx

b) Type II, Paint & Beads, Pavement Markings:
- White markings: 175 mcd/m2/lx
- Yellow markings: 125 mcd/m2/lx

16.4.3 Signalization

16.4.3.1 Signalization during Traffic Control

Developer may need to modify existing traffic signals to accomplish construction phasing and traffic control for the Project. The Governmental Entity will maintain power for traffic signals with existing

electrical service to remain in service. Developer will provide/maintain power for existing signals that require new electrical service within the Project Limits that are modified during the D&C period. During all phases of construction and traffic control, temporary or existing traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system. Signal modification may include: adding, removing or relocating traffic signal heads; changing signal timing; and/or adding, removing, or relocating signal hardware and equipment. Developer shall coordinate signal modifications during construction with appropriate Governmental Entities. Developer shall submit signal modifications during construction to TxDOT for review. Developer shall be responsible for regularly evaluating and modifying, if necessary in coordination with local maintaining Governmental Entities, traffic signal timings to maintain acceptable traffic flow.

16.4.3.2 Permanent Signalization

Developer shall coordinate with the Utility Owner(s) and ensure necessary power service is initiated and provided/maintained to all permanent signal systems within the Project Limits during the D&C Period.Developer shall stake each pole location in the field and provide TxDOT 72 hour notice prior to installation of any foundation.

16.4.4 Lighting

16.4.4.1 Temporary Lighting

Where the Work impacts existing lighting, Developer shall maintain existing lighting as temporary lighting during construction and restore or replace prior to Substantial Completion. The Governmental Entity will maintain power for lighting with existing electrical service to remain. Developer will provide/maintain power for existing lighting with new electrical service that is modified during the D&C period.

16.4.4.2 Permanent Lighting

Developer shall coordinate with the Utility Owner(s) and ensure power service is initiated and provided/maintained for all permanent lighting systems within the Project Limits within the D&C Period. At all times during the term of the Agreement, Developer shall maintain safe lighting conditions along the Project roadway. Developer shall stake each pole location in the field and provide TxDOT 72 hours' notice prior to installation of any foundation.

Developer 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. Existing conductors shall be removed.

Developer shall place all bore pits safely away from traffic, provide positive barrier protection, and provide necessary signs to warn of the construction area.

Developer shall contact Utility Owners regarding their specific required working clearance requirements.

Developer shall affix an identification decal on each luminaire, ground box, and electrical service maintained and/or operated by Developer for inventory purposes and shall submit inventory information to TxDOT in a TxDOT compatible format for inclusion into the MMIS. This identification shall denote

that these are property of Developer and shall provide a contact phone number and address in the event of Emergency or necessary maintenance.

16.5 Maintenance

16.5.1 Signalization

The Governmental Entity will maintain, operate and provide power for existing traffic signals to remain. Developer will be responsible for maintaining and providing power for new or modified signalization within the Project Limits during the D&C period. The Governmental Entity will be responsible for maintaining, operating and providing power for signalization within the O&M limits during the O&M period.

16.5.2 Lighting

Developer shall be responsible for maintaining existing, modified, and new lighting during the D&C period. The Governmental Entity will be responsible for maintaining, operating and providing power for continuous lighting within the O&M limits during the O&M Period. Developer will be responsible for maintaining, operating and providing power for safety lighting within the O&M limits during the O&M Period.

17 INTELLIGENT TRANSPORTATION SYSTEMS

17.1 General Requirements

An Intelligent Transportation System (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.

TxDOT is already operating an ITS network that will need to connect to the new system provided by Developer. The Project ITS must be compatible with such in-place system(s) that TxDOT and other agencies (including other developers) are currently operating. Developer shall coordinate the ITS planning and implementation with TxDOT and other Governmental Entities that have roadways within or intersecting the Project. Upon Substantial Completion TxDOT will operate the ITS and continue to do so during the O&M Period. The Developer shall provide a five (5) year warranty for all ITS components commencing upon Substantial Completion.

Developer shall maintain and protect the use of the existing ITS functionality within the Project until Substantial Completion, except during force majeure events, periods of system maintenance or system crossovers, or other periods approved by TxDOT.

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

Developer shall be responsible for the planning, design, installation, testing, and operations support of safe and functional ITS for the Project using Good Industry Practice. All components of the ITS shall conform to the provisions of the National Transportation Communication for ITS Protocol (NTCIP). Developer shall maintain ITS interoperability over the D&C Periodwith TxDOT and other Governmental Entities. The ITS shall be coordinated with the Electronic Toll Collection System (ETCS) such that the communication requirements of the ETCS system are accommodated. The ITS shall interface with the ETCS (provided by TxDOT's systems integrator) as necessary to provide real time traffic speed and volume information from all lanes within the project.

The Project ITS shall operate under the North Texas Regional ITS Architecture and Center-to-Center (C2C) concept of operations. Communication and interoperability shall be achieved with other TMCs in the region, including, but not limited to DalTrans and TransVision (Tarrant County), such that with appropriate privileges, access to data, command, control and information sharing can occur among centers. All communication and access of information shall occur in near real-time (within logistical restraints).

The following list includes, but is not limited to, ITS elements with the most recent special specifications:

- SS2055 – Automated Barricade Gate
- SS2056 – Vehicle Arresting Barrier
- SS6014 – Fiber Optic Cable (Single Mode)

- SS6025 – CCTV Field Equipment
- SS6229 – Camera Pole Structure w/Cabinet (60 FT)
- SS6277 – Multiduct Conduit System
- SS6278 – RS232 Fiber Data Modem (One-time use)
- SS6890 – CCTV Central Equipment (One-time use)
- SS6893 – Communication Building (Satellite) (10' x 15') (One-time use)
- SS6894 – Communication Cabinet (Hub) (59" x 26") (One-time use)
- SS6896 – Fiber Optic Video Transmission Equipment
- SS8695 – CCTV High Mast Assembly
- SS8696 – System Integration (One-time use)
- SS8743 – Remove CCTV Field Equipment (One-time use)
- SS8791 – Install DMS (One-time use)
- SS8821 – Radar Vehicle Sensing Device (RVSD) (One-time use); Also use Spec. Prov. 8821-001 for HD

17.2 Design Requirements

Developer shall provide a complete and operational ITS network throughout the Project that is expandable as capacity is increased along the Project roadways, utilizes hardware and software components consistent and compatible with TxDOT in the manner described in this Section 17.2 and the other affected Governmental Entities, resistant to weather encountered in the Project area, and places components in locations that are not hazardous to Users. Prior to beginning ITS and toll design efforts, the Developer shall conduct an ITS and toll design workshop with TxDOT, the toll system integrator, the responsible entity for adjacent roadway ITS operations, and affected Governmental Entities (per TxDOT's direction) to confirm TxDOT's operational requirements, review the Developer's survey of existing ITS infrastructure and condition assessment, discuss concepts, identify potential resolutions for site-specific issues (as identified by the Developer), determine requirements for construction and coordination of activities with adjacent roadways, and confirm requirements of other affected parties and Governmental Entities. Developer shall prepare a preliminary ITS layout for review and concurrence by TxDOT to ensure adequate planning of the ITS implementation.

Subject to the specific requirements of this Section 17, Developer shall determine the number and specific locations of all ITS components.

Developer shall provide safe ingress/egress areas and structures to accommodate authorized personnel access to ITS components for maintenance and operation activities. Unless approved by TxDOT, ITS components shall be placed in locations that allow maintenance without a lane closure.

All components of the ITS shall conform to the provisions of the National Transportation Communication for ITS Protocol (NTCIP) and be compatible with the latest operating system being used by the Dallas and Fort Worth Districts.

All ITS devices and associated mountings shall meet the 100 mph wind load design standards.

The installed ITS Equipment shall provide TxDOT access to accurate and reliable data and quality video images and accurate control of field devices from DalTrans and TransVision on a real-time basis 24 hours a day, 7 days a week. Real-time is defined as correct data being available at DalTrans and TransVision within 30 seconds of being processed or the correct response of a field component within 1 millisecond of the command being sent.

Developer shall be responsible for ensuring the CCTV, DMS, and vehicle detection systems meet the reliability requirements specified in the most current TxDOT statewide and/or Dallas and Fort Worth District specifications as well as any standard publications provided by TxDOT at the time of actual design work.

The design and construction requirements, together with the design criteria presented in the most current TxDOT statewide and Dallas and Fort Worth 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 the Developer. Any recommended modifications to the specifications shall be presented by the Developer at the ITS and toll design workshop and shall be subject to TxDOT approval. The Developer may supplement these requirements in order to access the data and video images and control of the CCTV for the sole purpose of managing the Project. As between the parties, TxDOT shall retain ownership and all rights to the data and video images and the Developer shall not provide access to the data or video images to any third party without the authorization of TxDOT's representative.

The Developer is responsible for designing and constructing lightning protection, grounding and surge suppression for each ITS structure and equipment cabinet. Ground mounted equipment cabinets next to ITS support structures will not be allowed and must be mounted to the support structure.

The Developer shall be responsible for the design, installation and access to power required to operate the ITS devices including all utility costs until Substantial Completion of the Segment and Project Final Acceptance by TxDOT, at which time the utilities will be transferred to TxDOT.

The Developer shall maximize the placement of ITS devices at locations where the Ultimate Project configuration will be constructed in this Project.

17.2.1 ITS Communications Requirements

Developer 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, Developer shall provide communication node buildings and cabinets to support the communications network.

The current TxDOT communications network backbone is a 10 Gigabit Multiple Protocol Label Switching (MPLS) 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 existing devices shall not be assigned within the same network path or otherwise daisy-chained to avoid possible inconsistencies in communication protocols.

The Developer shall install 48 strands of single mode hub-to-hub fiber optic cable, plus another 48 strands of single mode fiber between satellite buildings as the trunkline fiber. No splicing of the trunkline fiber is allowed unless approved by TxDOT. Pull boxes shall be spaced at each ITS device location, Toll Zone, satellite building and a maximum of every 700' along the Project corridor. The Developer is responsible for confirming that 48 strands of fiber can support the proposed ITS deployment and providing additional fiber at no cost to TxDOT, as needed, to ensure that no more than 50% of the throughput capacity of a sub-network path is exceeded.

Furthermore, the Developer shall provide, install and test single mode fiber for toll systems communications. Fiber shall be placed in a dedicated vault in the duct banks along the corridor and shall consist of four (4) strands for each Toll Zone – two from the closest satellite buildings north and south of the Toll Zone. Daisy-chaining of toll zones will not be permitted. All fiber, conduit and ground boxes for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems. Fiber strands for ITS devices which will be connected to the tolling communication network shall adhere to the general ITS communication network requirements identified above. The Developer shall calculate the number of fiber strands needed for tolling and toll-related ITS purposes, provide 100% spares, and round to the next standard number of ITS strands. These calculations shall be provided to TxDOT as part of the preliminary plans. The Developer shall coordinate and cooperate with TxDOT and the Toll Systems Integrator during design and construction to allow for integration of the toll systems communications network in a timely fashion.

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

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

17.2.2 Conduit

Developer shall recommend, with TxDOT's concurrence the type, quantity, and design of the conduit above and below ground, ground boxes, and all communication cable and electrical conductors to support the ITS network and operations. No exposed conduit sections will be permitted. All sections shall have a minimum of 48" of cover over all ITS conduit except where boring is required to cross under intersections or to reach locations within the Managed Lanes or on the opposite side of the Managed Lanes, or in the case of large bridge crossings, built into the bridge structure, unless approved by TxDOT during preliminary design efforts. Approval will only be considered for existing structures. One conduit will be used for tolling. The Developer shall provide separate conduits for tolling and toll-related ITS communication, tolling and toll-related ITS power, general ITS communication and general ITS power. Two spare 3-inch Schedule 40 conduits for future expansion shall be provided.

Developer shall maintain adequate separation between proposed conduits and existing TxDOT installation for construction, maintenance, and repair.

Developer shall repair each communication cable or electrical conductor that is severed or otherwise rendered not usable within a reasonable amount of time, given the circumstances of the occurrence.

The Developer shall provide materials and use construction methodology in conformance at a minimum with the most current or applicable TxDOT statewide and/or Dallas and Fort Worth District specifications, including placement of a trace wire within the conduit, providing the required 48" or more of cover, placing locator tape and installing above ground markers. During the pre-design workshop, the Developer shall provide alternatives to improve TxDOT's current practices for securing ground box lids.

17.2.3 CCTV Cameras

Developer shall provide CCTV cameras for Incident verification and traffic management. The system of cameras shall accurately identify all vehicle(s) involved in an Incident or Emergency, the extent of vehicle(s) damage, and if applicable the likelihood of personal injury. Operation of the cameras shall result in no visual delay in response of the camera pan/tilt/zoom by a user.

17.2.3.1 Equipment

Developer shall provide all necessary CCTV equipment, including cameras, camera controls, cables, and connections. Developer shall provide all the equipment necessary for TxDOT control of all CCTV cameras. The method of control shall be in accordance with TxDOT standards and specifications.

Developer shall provide a digital video format and communications protocol at all connections with TxDOT systems. The format and protocol provided by Developer shall be compatible with systems in use by TxDOT, and if necessary convertible for use by TxDOT's in-place ITS network.

17.2.3.2 Placement

Developer 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, frontage roads, connecting facilities, and entrance and exit ramps, and messages displayed on any remotely-controlled dynamic message signs in the Project area. To provide a stable video image, Developer shall mount cameras on dedicated structures unless otherwise approved by TxDOT.

Distance between CCTV cameras shall not exceed 0.5 miles; however, the Developer is responsible for placing cameras to ensure 100% coverage. 100% coverage shall be defined as no blind spots for any reason, including but not limited to: trees, bridge structures, horizontal or vertical alignment, overhead or side mounted sign structures, or toll gantries. Additionally, each CCTV camera shall be able to view the CCTV camera immediately upstream and downstream from itself unless approved by TxDOT.

17.2.3.3 Video Requirements

Developer shall provide state-of-the-art CCTV cameras that meet the following requirements. Should any CCTV cameras fail to meet any of the following criteria, Developer shall replace such cameras within 48 hours of discovery of lack of compliance.

a) Solid-state design with digital signal processing (DSP) for digital zoom
- for auto/manual long-term integration (exposure) control, with built-in frame buffer
- for auto-focus; for built-in I.D. generator, with white letters and black outline

b) Conformance to a minimum of National Television System Committee (NTSC) video output and Electronic Industries Alliance (EIA)-170A standards
c) No less than 30 frames per second (fps) color
d) Able to produce clear, low-bloom, low-lag video pictures under all conditions, from bright sunlight to nighttime scene illumination of 0.02 foot-candles
e) Maintenance of color quality by a continuous, through-the-lens, automatic, white balance for color temperatures from 2850 degrees Kelvin to greater than 5100 degrees Kelvin, with less than 10 Institute of Radio Engineers (IRE) units unbalance
f) Aspect ratio of 4:3
g) Zero geometric distortion
h) Signal to noise distortion of 55 dB with AGC off
i) Built-in auto focus and auto iris
j) Overexposure protection to prevent permanent damage to cameras when pointed at strong light sources, including the sun, for brief periods of time

17.2.3.4 Operating Requirements

Developer shall provide cameras with built-in heaters, mounting structure, and related equipment capable of operating within the following weather conditions:

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

17.2.3.5 Control Requirements

The Developer shall supply CCTV equipment on this project which is fully compatible with the existing CCTV control systems operated from DalTrans and TransVision. In order to prove compatibility and operability of CCTV systems submitted for use on this project, deliver one complete set of CCTV equipment to TxDOT for testing by DalTrans and TransVision Information Technology Personnel as part of the equipment submittal and approval process. Allow a minimum of 30 days for testing by TxDOT IT personnel. Submit the CCTV equipment for testing no later than 60 days after completion of TxDOT submittal review. The equipment submitted for testing must be fully assembled and in a fully operational condition. Configure all equipment submitted for testing as is intended for use on the project. Prototype equipment will not be allowed. The equipment will be interconnected to the existing CCTV control system and must be fully operational using that system. No modifications to the existing CCTV control system will be made to accommodate the submitted CCTV equipment. To be considered fully operational, as a minimum, the equipment must correctly respond to the following commands:

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, test the communications link installed between the satellite building and the CCTV field equipment locations. Perform the test at all CCTV locations on the project.

Use a test signal generator and a video monitor to demonstrate the ability of the video signal link to transmit a NTSC 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 an NTSC 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 used to control the CCTV movement and control functions from the satellite building utilizing the data link. Demonstrate the ability to control all CCTV functions outlined in the specifications.

Supply all test equipment, cabling and connectors necessary for performing the tests by the Developer.

The equipment must be fully operational using the existing control system from DalTrans and TransVision. Equipment which in any manner is not fully operational with the control system will be considered as not passing the test. Equipment which does not pass the test will be allowed one chance to be retested. The retest must occur within 30 days after the initial test. All issues of non-compliance and all discrepancies must be resolved for the second test. Equipment which is not able to be retested within 30 days or which does not pass the second test will be rejected and cannot be used on the project. No additional time or compensation will be granted for the testing of the CCTV equipment. Successful testing of the CCTV equipment must be completed prior to any construction activities at the CCTV locations. No camera poles, cabinets or any other CCTV related equipment shall be installed until successful CCTV equipment testing has occurred.

17.2.4 Vehicle Detection

Developer shall provide permanent high definition (HD) microwave 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 0.5 miles in each highway lane in the Project, or, at a minimum, provide detection for all highway lanes at one location between interchanges, each entrance ramp lane, and each exit ramp lane. For sensors which are not placed in the pavement, the Developer shall locate the devices on the side of the Project nearest the largest managed lane shoulder so as to limit the potential interference of the concrete traffic barrier on detecting vehicles and collecting information.

Vehicle detection sensors shall determine vehicle speed for each vehicle passing the sensor. The sensors shall provide raw speed data (volume, speed, lane occupancy and vehicle classification counts) and direction of travel for the General Purpose Lanes and the Managed Lanes for each vehicle detection sensor. 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 twelve (12) lanes of traffic including shoulders or over distances greater than two hundred-fifty (250) feet, the Developer shall provide detectors on each side of the Project. TxDOT shall be able to adjust the frequency rates that the data files are provided by device.

Developer shall provide upon TxDOT request, the raw speed data (volume and speed) by traffic lane for the General Purpose Lanes and the Managed Lanes for each vehicle detection sensor. Developer shall coordinate, establish, and maintain a real time interface to the ETCS (provided by TxDOT's Integrator) that provides the speed and volume data for the General Purpose Lanes and the Managed Lanes for each vehicle detection sensor. Specific locations of the shared VDS devices shall be discussed during the pre-design workshop and confirmed during the preliminary design process. As the ITS and toll devices are on separate fiber backbones, the selected VDSs shall be configured to provide data feeds to two separate networks. For these shared VDS devices, the Developer shall be responsible for a full installation of the device for the general ITS purposes and for tolling purposes, installing conduits between the VDS device and the toll network equipment cabinet (installed by the Integrator) and running communication cable from the device into the toll network equipment cabinet.

Developer may attach detection units to existing structures with prior concurrence from TxDOT. Where an existing structure is not available, or in lieu of attaching the detection unit to an existing structure, Developer shall install a mounting pole solely for the vehicle detector. Any mounting poles placed specifically for ITS items shall conform to TxDOT specifications for CCTV mounting poles and must adhere to minimum vertical clearance requirements. Developer shall provide all necessary support structures, equipment, including, but not limited to, VDS devices, controls, cables, and connections.

17.2.5 Dynamic Message Signs

Developer shall provide a comprehensive network of electronic DMS, including Single-Line DMS (SDMS). The DMS shall operate as part of an overall regional system. The Developer shall provide TxDOT the ability to provide DMS messaging. TxDOT currently has a DMS messaging hierarchy. The Developer shall incorporate the messaging hierarchy into the DMS operations upon request from TxDOT.

Developer shall position each DMS to allow motorists to safely view the messages being displayed. Developer shall locate the DMS to comply with large guide sign spacing stated in the TMUTCD.

Developer shall place DMS, for traffic and incident management messaging, approximately 1-mile in advance of major interchanges using Good Industry Practice on each approach for the Project and outside the Project Limits with TxDOT approval. Major interchanges include the interchanges at IH-35E, SH-114, Loop 12 and President George Bush Turnpike / SH-161. The Developer shall coordinate with TxDOT on the location of the DMS during the ITS and toll design workshop.

DMS shall be used to inform motorist of the availability of alternate routes, and to advise travelers of adverse road conditions and congestion. SDMS may be embedded within static signs for disseminating toll rates to Users. DMS and SDMS shall be placed to provide a driver-friendly sign-viewing angle at each location.

Developer shall provide DMS which use light-emitting diode (LED) display technology and support full matrix graphics and color. DMS and SDMS used shall conform to the TxDOT special specification National Transportation Communication for ITS Protocol (NTCIP) for Dynamic Message Signs and shall demonstrate compliance before installation of DMS.

Developer shall provide all necessary support structures and equipment, including, but not limited to, DMS devices, controls, cables, and connections.

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

17.2.6 Lane Control Signals (LCS)

No LCS is required.

17.2.7 Single-Line DMS (SDMS)

If chosen for use during design the SDMS shall be utilized to notify users and potential users of the Managed Lanes of the toll rate in effect for the upcoming Toll Zone. These DMS panels will be mounted to the static signs for both advanced traveler information signs and toll rate signs.

Developer shall place SDMS over travel lanes on existing or proposed overhead sign structures on managed and mainline roadways. SDMS utilized as part of the advanced toll information signs, as described in Section 16.3.4, shall be spaced at minimum of one (1) mile, half (0.5) mile and immediate entrance distances from each access ramp. Toll rate signs shall be spaced between half (0.5) and one (1) mile from each access point and after each toll gantry, but before the exit after each toll gantry, on the Managed Lanes. The specific location of the toll rate signs shall be coordinated with the Integrator. All sign bridges shall be designed to accommodate SDMS brackets.

The SDMS shall support full matrix graphics and color, and be able to display at least 10 characters of 18” font.

For the advanced traveler information sign SDMS, the Developer shall provide and install all necessary support structures and equipment, including, but not limited to, SDMS devices, controls, cables, connections and network equipment. For the toll rate sign SDMS, the Developer shall provide and install the toll rate sign foundation, static portion of the sign with cutouts for the SDMS panels, conduits through the vertical column of the sign support to a ground box at the base of the sign support, ground box, and electrical power and communication backbone in proximity of each sign. The Developer shall coordinate the design of the toll rate sign with the Integrator to incorporate the requirements of the Integrator’s provided and installed SDMS.

Developer installed SDMS shall have the ability to be controlled using the latest TxDOT SDMS operating system being used at DalTrans and TransVision.

17.2.8 Communications Systems

Throughout the Project Limits, functional ITS communication components shall be provided, including the Regional ITS Backbone and all the ITS field devices. For each functional application (e.g. Field Devices, Regional ITS, Tolling), a separate physical conduit system shall be provided with appropriate interface connections.

a) Field Devices: Developer shall provide a communications system to all field devices such that operation is time and event driven. In addition to ITS field devices, the communication system shall accommodate all of the data needs for the ETCS. Sufficient conduit shall be provided to accommodate the current communication demands and a minimum 25% additional capacity.
b) Regional ITS Backbone System: Developer shall provide a fiber optic backbone communication system the entire length of the Project Limits for use exclusively by TxDOT. This fiber optic system shall be in addition to the ITS network of the Developer, with connection points occurring at either end of the Project Limits. The Developer's ITS will have connections at the same locations as the fiber optic cable communication system.

17.2.9 Satellite Buildings

The Developer shall install environmentally controlled Satellite Buildings (communication hubs) at each extent of the Project and at Loop 12. The Satellite Buildings shall be large enough to satisfy the Developer's needs and will provide a secured section for TxDOT use that will include a workspace and up to three racks of TxDOT equipment. If existing satellite buildings are available for Developer use, Developer shall coordinate with TxDOT the connection of all new ITS components to the existing ITS satellite buildings covering the Facility and connections to the DalTrans and TransVision TMCs. If existing satellite buildings are utilized, Developer shall be responsible for any necessary improvements / modifications.

The Developer shall provide a minimum of three satellite building design concepts for review and approval within the Aesthetics and Landscaping Plan. The satellite buildings or any other structure that requires the seal of a registered architect shall require the production of concepts.

Developer shall provide necessary paved vehicle ingress / egress pull-off areas as needed to facilitate maintenance vehicle access to the satellite buildings.

Developer shall maintain and protect the exiting satellite buildings within the Facility limits. As necessary, Developer may relocate or reconstruct the satellite buildings.

17.3 Construction Requirements

17.3.1 General

Developer shall notify TxDOT 30 days in advance of making connections to the existing TxDOT system.

Developer shall maintain 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 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.

Developer shall coordinate with Utility Owner(s) and ensure that power service is available for permanent ITS systems.

Subject to TxDOT approval, Developer may reuse existing ITS equipment that is in good working order. Any reuse of existing equipment shall not impact the maintenance of existing ITS communications functionality. Any reused equipment must meet all requirements defined within this technical provision.

17.3.2 Salvaging Existing Items

TxDOT reserves the right to require Developer, at any time to salvage and deliver to a location designated by TxDOT within the TxDOT District in which the Project is located, any TxDOT-owned equipment and materials in an undamaged condition. TxDOT reserves the right to require Developer to salvage and deliver to a reasonable location designated by TxDOT any ITS equipment and materials in an undamaged condition.

17.3.3 Existing ITS Relocation

Developer 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. Developer 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, Developer 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. No existing ITS components shall be utilized to satisfy the requirements herein absent explicit TxDOT approval. All Developer provided ITS components shall be new. Any reuse of existing TxDOT components or infrastructure shall require TxDOT approval. TxDOT will allow reuse of existing cameras, DMS, and communications infrastructure that is in good working order. Reuse of existing vehicle detection devices will not be allowed.

17.3.4 ITS Implementation Plan

Developer shall provide an ITS Implementation Plan for approval as part of the Final Design Documents to demonstrate system interoperability with other TMCs in the region as well as compatibility with the operational procedures for command and control of devices, sharing of data, and priority control that various parties will assume under different operating conditions of the corridor and surrounding roadway system. The ITS Implementation Plan shall include the following:

a) Functional design plan;
b) Communications analysis report;
c) Operational and requirements report; and
d) Acceptance Test Plan (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, Developer is required to hold scoping meetings with TxDOT such that requirements are defined to achieve interoperability with other TMCs and the ETCS and priority logic and information for command and 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. Developer 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, Developer 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. Developer shall conduct the procedure and provide certification that the ITS effectively meets the required functional requirements. Developer shall provide this certification prior to the use of the ITS for service.

Developer shall provide the CCTV secondary control equipment and design to TxDOT for approval a minimum of six months prior to Substantial Completion.

17.3.5 End-to-End Testing

Prior to Substantial Completion, Developer shall coordinate with TxDOT to allow for end-to-end testing of the Managed Lanes. Testing will occur during the twenty-one (21) calendar Day period prior to Substantial Completion and shall provide TxDOT, DalTrans staff, TransVision staff and Integrator with an opportunity to conduct full system tests, conduct daily operations to confirm operation plans and standard operating procedures, and to otherwise prepare for operational use of the Managed Lanes facility. End-to-end testing will also occur after hours and on weekends. The Developer, TxDOT, DalTrans, TransVision and Integrator shall have completed all their testing, training of DalTrans, TransVision and TxDOT staff, and acceptance requirements for Developer installed ITS devices, satellite buildings, communication and electrical networks, generators, and integration with regional traffic management systems, the Integrator and NTTA's back office toll collection system prior to the start of End-to-End Testing.

The Developer shall be responsible, at a minimum, for the coordinating the End-to-End Testing with TxDOT, DalTrans, TransVision and the Integrator to ensure that there will be no conflicts between TxDOT, DalTrans, TransVision the Integrator and their affiliated contractors and the Developer's staff; provide providing temporary advance signing (if needed to avoid confusion) stating that the Managed Lanes are closed and testing is occurring; providing maintenance of traffic / traffic control at all access locations for a maximum of five full days which could include evenings and weekends and may not be consecutive; providing a safe environment free of obstacles and unauthorized personnel on the Managed Lanes; providing access to the Managed Lanes for authorized TxDOT, DalTrans, TransVision and Integrator staff and contractors ; and repairing any issues found with the Developer's work efforts within one (1) Calendar Days unless otherwise approved by TxDOT.

The Developer shall not expect to have access to nor conduct work within the Managed Lanes during the end-to-end testing, with the exception of providing services as described above. TxDOT may, at its own discretion, provide Developer access to the Managed Lanes to conduct work outside the services described above.

17.3.6 Record Drawings and Documentation

The Record Drawings shall include the construction drawings as well as catalog sheets for all equipment and components. Developer shall maintain for the duration of the D&C Period, 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.

18 TRAFFIC CONTROL

18.1 General Requirements

Developer shall design, construct, operate and maintain the Project, in conformance with the requirements stated in this Section 18, to provide for the safe and efficient movement of people, goods, and services, through and around the Project, while minimizing negative impacts to Users, residents, and businesses. Developer shall coordinate with local Government Entities on the development of the Traffic Management Plan (TMP).

It shall be the responsibility of the Developer to gain approval from TxDOT and the appropriate Governmental Entity on each intersecting street closure and to coordinate with the property owner on driveway closures.

During all phases, temporary or existing Intelligent Transportation System (ITS) equipment, illumination, and traffic signals shall remain in operation such that the new and existing equipment operate as a coherent system.

18.2 Administrative Requirements

18.2.1 Traffic Management Plan

Developer shall prepare and implement a Traffic Management Plan (TMP) that includes the following:

a) Descriptions of the qualifications and duties of the traffic engineering manager, traffic control coordinator, and other personnel with traffic control responsibilities.
b) Procedures to identify and incorporate the needs of transit operators, Utility Owners, Governmental Entities, local governmental agencies, Emergency Service providers, school districts, business owners, and other related Users, Customer Groups or entities in the Project corridor and surrounding affected areas.
c) Procedures for obtaining acceptance of detours, road and lane closures and other traffic pattern modifications from applicable Governmental Entities, and implementing and maintaining those modifications.
d) Procedures for signing transitions during construction from one stage to the next and from interim to permanent signing.
e) Procedures for maintenance and replacement of traffic control devices, including pavement markings and traffic barriers, if used, and transitions from one stage to the next and from interim to permanent placement.
f) Procedures to regularly evaluate and modify, if necessary in coordination with local maintaining Governmental Entities, traffic signal timings, and the procedures for the development, TxDOT approval, implementation, testing, and maintenance of all affected signals.
g) Procedures to coordinate with the appropriate Governmental Entities operating signal networks along the Project or Project detour routes to ensure temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, and coordinate traffic signal timing with local signal networks.
h) Procedures and processes for the safe ingress and egress of construction vehicles in the work zone.

i) Provisions to provide continuous access to established truck routes and Hazardous Material (HazMat) routes, and to provide suitable detour routes, including obtaining any approvals required by the appropriate Governmental Entities for these uses.
j) Procedures to modify plans as needed to adapt to current Project circumstances including a contingency plan to alleviate unreasonable construction-related back-ups that can be implemented immediately upon notification from TxDOT.
k) Procedures to communicate TMP information to Developer's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Section 3.
l) Descriptions of contact methods, personnel available, and response times for any deficiencies or Emergency conditions requiring attention during off-peak hours.
m) Procedures for night work (30 minutes after sunset to 30 minutes before sunrise) to include a work zone light system design in accordance with NCHRP Report 498 – *Illumination Guidelines for Nighttime Highway Work*.
n)
o) Contingency plans to address construction-related traffic back-ups and a traffic incident response plan.
p) Procedure for compliance with reporting height and width restrictions per Section 18.4.5.

The Developer shall participate in coordination meetings scheduled by others. These meetings shall include Traffic Management Committee meetings convened by Texas Transportation Institute (TTI) and consisting of local representatives and stakeholders impacted by the Project.

The TMP must be approved by TxDOT prior to the start of construction activities. Developer shall provide TxDOT 14 days for review of and comment on, the TMP. TxDOT retains the right to require the Developer to provide revisions and re-submittal of the TMP within a reasonable amount of time.

If at any time, TxDOT, in its sole discretion, determines that construction-related back-ups become unreasonable, modifications to alleviate the congestion shall be taken immediately. The development and implementation of these contingency plans shall be at the Developer's expense.

18.3 Design Requirements

18.3.1 Traffic Control Plans

Developer shall use the procedures in the TMP and the standards of the TMUTCD to develop detailed traffic control plans which provide for all construction stages and phasing, as well as all required switching procedures. Traffic control plans are required for the Work during the Term of the Agreement including D&C and O&M Periods.

Developer shall designate a full-time Maintenance of Traffic Manager for the Work. In the event the Maintenance of Traffic Manager, in consultation with the Developer's Project Manager and TxDOT, is unable to reach satisfactory resolution of traffic control issues, the Maintenance of Traffic Manager shall provide written notification to the Developer and TxDOT outlining the concerns, actions taken in attempt to correct the concerns, and provide a recommendation as to the suggested course of action. Maintenance

of Traffic Manager shall be a registered Professional Engineer (P.E.) in the State of Texas, with a minimum of 10 years' experience.

The Maintenance of Traffic Manager shall monitor, document, and report the current status of traffic control operations for the Work to TxDOT on a monthly basis. The Maintenance of Traffic Manager shall report immediately to TxDOT and the Developer any violation or non-compliance and shall include with any such report, the appropriate recommendations for corrective action including stoppage of Work.

The Maintenance of Traffic Manager shall coordinate with TxDOT, the Developer, and appropriate Governmental Entities. The Maintenance of Traffic Manager shall submit all necessary traffic control documentation and monitoring reports to the appropriate Governmental Entities and when applicable, through TxDOT, to the extent necessary to maintain compliance with the Technical Provisions.

Developer shall not have the ability to relieve the Maintenance of Traffic Manager of his or her duty without the written consent of TxDOT. Should Developer desire to replace Maintenance of Traffic Manager, Developer shall submit to TxDOT the resume of a replacement candidate. The replacement candidate shall be available full-time within 30 Days (if the role is vacated due to death, retirement, injury or no longer being employed by the Developer-Related Entity, except where such employee is moved to an affiliated company), or 15 Days (if the role is vacated for any other reason) after delivery of TxDOT's written acceptance.

Developer shall produce a traffic control plan for each and every phase of Work that impacts traffic and involves traffic control details and shall coordinate with appropriate Governmental Entities on the development of the plan. Developer is responsible for obtaining all necessary permits from such local entities to implement the plans. Traffic control plans shall be designed, stamped, signed and dated by a Registered Professional Engineer in the State of Texas. All traffic control plans shall be subject to review by the Maintenance of Traffic Manager.

Each traffic control plan, including the contingency plan as described in Section 18.3.1.2, shall be submitted to TxDOT for review and approval a minimum of ten (10) Days prior to implementation. The traffic control plan shall include details for all detours, traffic control devices, striping, and signage applicable to each phase of construction. Information included in the traffic control plans shall be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections, alignment, striping layout, drop off conditions, and temporary drainage. The traffic control plans shall clearly designate all temporary reductions in speed limits. Changes to posted speed limits will not be allowed unless specific prior approval is granted to TxDOT by the Texas Transportation Commission. Maintenance of Traffic Manager shall be responsible for overseeing the implementation of all traffic control plans.

Opposing traffic on highways shall be barrier separated in accordance with Good Industry Practice and TMUTCD based on the roadway design speed**.** Approved traffic control devices can be found in the *Compliant Work Zone Traffic Control Device List* (CWZTCD list). Any traffic control that involves the physical separation of contiguous lanes of the same roadway component (i.e. managed lanes, general purpose, or frontage road lanes) traveling in the same direction will not be allowed.

Developer shall maintain signing continuity on all active roadways within or intersecting the Project at all times.

Throughout the duration of the Project, Developer shall ensure all streets and intersections remain open to traffic in accordance with the lane configuration established in Table 18-3. Developer shall maintain access to all adjacent streets and shall provide for ingress and egress to public and private properties at all times during the Project.

Developer shall prepare public information notices, in coordination with Section 3, in advance of the implementation of any lane closures or traffic switches. These notices shall be referred to as Traffic Advisories. The Developer shall also notify the traveling public by placing changeable message signs a minimum of seven (7) Days in advance of actual roadway closure or major traffic modifications. Where available and when possible, the Developer shall coordinate and utilize Dynamic Message Signs on the regional ITS system. Developer shall utilize uniformed police officers to effect main lane closures.

18.3.1.1 Design Parameters for Traffic Control

Design Vehicle: Turning movements on all local streets and driveways shall, at a minimum, provide equal characteristics as their existing conditions and use.

Design Speed: On Interstate and State Highways, the design speed shall be the existing posted speed limit or greater, except for major alignment transitions where the design speed may be reduced if requested by the Developer, and approved by TxDOT and Governmental Entity having jurisdiction over the transition area.

Number of Lanes: The minimum number of lanes to be maintained and open to traffic during construction in each direction on each roadway component of the Project shall be in accordance with Tables 18-1A, 18-1B and 18-2. Lane closures on other roadways may be considered, and approved by TxDOT, within reason, so long as all traffic patterns and accesses are maintained.

Lane Widths: During construction, the minimum lane width is 11 feet. For frontage roads and crossing streets, TxDOT may, in its sole discretion, allow 10-foot lanes in limited circumstances during construction for short distances after reviewing the Developer's traffic control plan.

Shoulders: A minimum one foot offset from the edge of travel way to the edge of pavement or traffic barrier is required.

18.3.1.2 Permitted Lane and Roadway Closures

Lane closures will only be permitted when the Developer can demonstrate that the closure will provide clear benefit to the progress of the Work. Closures must be coordinated with adjacent projects and priority shall be given to the closure request submitted first. Developer shall use the public information and communication methods available to inform the appropriate Customer Groups of any lane closures. Lane closure procedures, with the exception of HOV lane closures, shall conform to the requirements shown in consistent Tables 18-1A, 18-1B, and 18-2.

Developer shall provide a contingency plan showing how lane closure modifications will be implemented and identify the specific actions to alleviate congestion. If, at any time, permitted lane closure backups

become unreasonable, such that motorist delay is greater than 20 minutes, modifications to alleviate this congestion shall be taken immediately. If the Developer does not immediately implement the approved contingency plan, the congestion would be considered a lane closure and is subject to Lane Rental Fees or Liquidated Damages for Lane Closures.

Cross streets may be temporarily closed for 24 hours with approval of TxDOT and Governmental Entity to allow for the construction of cross structures. Eastbound and westbound SH 183 and SH 114 shall be considered general purpose lanes. Northbound and Southbound Loop 12 shall be considered general purpose lanes.

Lane Closures — Service periods for lane closures are defined as follows and are applicable to general purpose lanes:

Table 18-1A: Lane Closure Periods for Three/Four Lane Sections

	Eastbound SH 183/SH 114 & Northbound Loop 12				Westbound SH 183/SH 114 & Southbound Loop 12			
	Sunday	Monday-Thursday	Friday	Saturday	Sunday	Monday-Thursday	Friday	Saturday
0:00	D	D	D	D	D	D	D	D
1:00	D	D	D	D	D	D	D	D
2:00	D	D	D	D	D	D	D	D
3:00	D	D	D	D	D	D	D	D
4:00	D	D	D	D	D	D	D	D
5:00	D	D	D	D	D	D	D	D
6:00	D	A	A	D	D	A	A	D
7:00	D	A	A	C	D	A	A	D
8:00	D	A	A	C	D	A	A	D
9:00	D	A	A	C	D	A	A	C
10:00	C	A	A	B	D	A	A	C
11:00	B	A	A	B	B	A	A	B
12:00	B	A	A	B	B	A	A	B
13:00	B	A	A	B	B	A	A	B
14:00	B	A	A	B	B	A	A	B
15:00	B	A	A	B	B	A	A	B
16:00	B	A	A	B	B	A	A	B
17:00	B	A	A	B	B	A	A	B
18:00	B	A	A	B	B	A	A	B
19:00	B	A	A	B	B	A	A	B
20:00	C	A	A	B	C	A	A	B
21:00	C	C	C	B	D	C	C	C
22:00	D	D	C	C	D	C	C	D
23:00	D	D	D	D	D	D	D	D

A	Weekday peak	C	Off-peak
B	Weekend peak	D	Night

Table 18-1B: Lane Closure Periods for Two-Lane Sections

	Eastbound SH 183/ SH 114				Westbound SH 183/ SH 114			
	Sunday	Monday-Thursday	Friday	Saturday	Sunday	Monday-Thursday	Friday	Saturday
0:00	C	C	C	C	C	C	C	C
1:00	C	C	C	C	C	C	C	C
2:00	C	C	C	C	C	C	C	C
3:00	C	C	C	C	C	C	C	C
4:00	C	C	C	C	C	C	C	C
5:00	C	C	C	C	C	C	C	C
6:00	C	A	A	C	C	A	A	C
7:00	C	A	A	C	C	A	A	C
8:00	C	A	A	C	C	A	A	C
9:00	C	A	A	C	C	A	A	C
10:00	C	A	A	B	C	A	A	B
11:00	B	A	A	B	B	A	A	B
12:00	B	A	A	B	B	A	A	B
13:00	B	A	A	B	B	A	A	B
14:00	B	A	A	B	B	A	A	B
15:00	B	A	A	B	B	A	A	B
16:00	B	A	A	B	B	A	A	B
17:00	B	A	A	B	B	A	A	B
18:00	B	A	A	B	B	A	A	B
19:00	B	A	A	B	B	A	A	B
20:00	C	A	A	B	B	A	A	B
21:00	C	C	C	B	C	C	C	C
22:00	C	C	C	C	C	C	C	C
23:00	C	C	C	C	C	C	C	C

A	Weekday peak
B	Weekend peak
C	Off-peak/night

Table 18-2: Permitted Lane Closures

Category of Work	Permitted Lane Closures						
Description	Three-lane/Four-lane General Purpose Section Periods				Two-lane General Purpose Section Periods		
	A	B	C	D	A	B	C
Any work necessary up to NTP2.	0	0	1	2	0	0	1
Work after NTP2: Placement of CTB, placement of pavement markings, full depth roadway repair, placement of bridge beams, bridge demolition or similar operations Adjacent construction, lanes for construction traffic or similar operations	0	0	1	2	0	0	1
O&M Renewal Work during O&M Period:	0	0	1	2	0	0	1
All other O&M Work during O&M Period: Repair of CTB, pavement markings, full depth roadway or any type of repair operations	0	0	1	1	0	0	1

Notes:

1. See Table 18-1A and Table 18-1B for definition of lane closure periods A through D.

a) Ramps

- All ramp closures including direct connectors require TxDOT approval. Developer shall provide 14 days advance notice of any ramp closures and shall also provide a staging analysis to TxDOT and the Governmental Entity having jurisdiction within and adjacent to the Project. When ramp movements are diverted or detoured along existing roads, Developer shall be responsible for any and all costs that may be assessed for the use of these existing roads. This may include an operational analysis, temporary traffic control devices, road user costs, and any other costs associated with impacts to local facilities to the satisfaction of the Governmental Entity having jurisdiction.
- The Developer will not be allowed to close two consecutive entrance ramps or two consecutive exit ramps unless approved by TxDOT.
- In the event that an entrance and/or exit access ramp listed below must be closed, Developer shall construct a temporary ramp to maintain access and movements.

SH 183 GPL EB:
- Entrance from Industrial Blvd
- Exit to Main Street
- All ramps between Main Street and Belt Line Rd
- Entrance from Belt Line Road
- Exit to Story Rd
- Entrance from Story Rd
- Exit to MacArthur Blvd
- Entrance from N MacArthur Blvd
- Exit to Carl Rd
- Exit to LP 12
- Entrance from Carl Rd
- Exit to Regency Dr
- Entrance from LP 12
- Entrance from Grauwyler Rd
- Exit to Regal Row
- All ramps from Regal Row to IH-35E

SH 183 GPL WB:
- Entrance from N Story Road
- Entrance from Main Street
- Exit to Main Street
- All ramps between Main Street and Belt Line Rd
- Exit to Belt Line Rd
- Entrance from Story Rd
- Exit to Story Rd
- Entrance from MacArthur Blvd
- Exit to N MacArthur Blvd
- Exit to O'Connor Rd
- Entrance from Carl Rd
- Exit to Carl Rd
- Exit to Tom Braniff Dr
- Exit to LP 12
- Entrance from Spur Rd
- Exit to Spur Rd
- Entrance from Regency Dr
- Exit to Regency Dr
- Entrance from Regal Row
- All ramps from Regal Row to IH-35E

LP 12 GPL:
- All NB and SB ramps between SH 183 and IH-35E

SH 114 GPL:
- All EB and WB ramps between International Pkwy and SH 183

b) Frontage Roads

- For continuous Frontage Road sections:
  - Ramp closures are allowed, with TxDOT approval, provided that an alternative ramp that maintains the same access is located within one mile of the cross street served by the closed ramp.

- For non-continuous Frontage Road sections:
    - Ramp closures are allowed, with TxDOT approval, provided that adequate detour routes approved by TxDOT and the Governmental Entity are provided.
- Developer shall seek TxDOT approval if a reduction in the current number of frontage road or arterial street lanes are required. A minimum of one-lane on frontage roads shall be maintained at all times, unless otherwise approved by TxDOT.

c) Direct Connectors

- If Limited Access Highway to Limited Access Highway connectors are proposed for closure, a connector closure request shall be prepared and submitted to TxDOT for approval prior to closure of the connector. If SH 183 to SH 161/PGBT connectors are proposed for closure, a connector closure request shall be prepared and submitted to NTTA and TxDOT for approval prior to closure of the connector. The connector closure request shall demonstrate the need for the closure relative to construction staging and provide supporting traffic analysis indicating detour routing, capacity analysis and proposed improvements along the detour route(s) and other impacted roads to accommodate the additional traffic.

d) Additional Constraints during construction:

- Developer shall maintain continuous construction Work adjacent to closed traffic lanes.
- Developer shall reopen closed traffic lanes during planned or actual periods of inactive construction Work greater than or equal to 14 days.
- Developer shall begin construction Work adjacent to a traffic shift or traffic detour within 3-days of shifting or detouring traffic.

e) Roads crossing over/under SH 183, SH 114 and Loop 12

- Developer to maintain the minimum number of lanes open as in Table 18-3. Reduction in capacity for successive cross streets will not be allowed simultaneously without TxDOT and the appropriate Governmental Entity approval.
- Developer shall maintain the same number of approach through lanes as shown in Table 18-3 through the intersection.

Table 18-3: Minimum Approach Lanes for Roads Crossing Over/Under Project

					Existing				During Construction			
Segment	**Cross Street**	**Type**	**Existing U-Turn**	**Proposed U-Turn**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**
SH 183	FM 157 (Industrial Blvd)@WBFR	Under	W to E	W to E	L-T-T	T-T-T-R	NA	UTL-T-R	L-T-T	T-T-R	NA	TL-T-R
	FM 157 (Industrial Blvd)@EBFR		E to W	E to W	T-T-T-R	L-T-T	UL-TL-R	NA	T-T-R	L-T-T	L-TL-R	NA
SH 183	Ector Dr @ WBFR	Under	W to E	W to E	LT-T	T-R	NA	U-TL-TR	LT-T	T-R	NA	TL-TR
	Ector Dr @ EBFR		E to W	E to W	T-TR	LT	U-TL-T-R	NA	T-TR	LT	TL-T-R	NA
SH 183	Main St @ WBFR	Over	NA	W to E	LT-T	T-T-R	NA	TL-R	Existing to Remain			
	Main St @ EBFR			E to W	T-TR	LT-T	L-TL-R	NA				
SH 183	SH 10 @ WBFR	Over	NA	NA	NA	T-T	NA	NA	Existing to Remain			
	SH 10 @ EBFR				NA	T-T	NA	NA				
SH 183	Bear Creek Pkwy @ WBFR	Over	NA	NA	T-T	T-T	Modified Clover leaf	Modified Clover leaf	Existing to Remain			
	Bear Creek Pkwy @ EBFR				T-T	T-T						
SH 183	SH 360 @ EBFR	Over	NA	NA	T-T-T-T	T-T-T-T	Modified Clover leaf	Modified Clover leaf	Existing to Remain			
	SH 360 @ WBFR				T-T-T-T	T-T-T-T						
SH 183	Amon Carter Blvd @ WBFR	Over	NA	NA	L-L	NA	NA	L-LT	Existing to Remain			
	Amon Carter Blvd @ EBFR				T-T-R	L-T-T	LT-T-R	NA				
SH 183	SB International Pkwy @ EBFR	Over	NA	NA	NA	NA	NA	NA	Existing to Remain			
	SB International Pkwy @ WBFR				NA	NA	NA	NA				
SH 183	NB International Pkwy @ WBFR	Over	NA	NA	NA	NA	NA	NA	Existing to Remain			
	NB International Pkwy @ EBFR				NA	NA	NA	NA				
SH 183	County Line Rd @ EBFR	Over	NA	NA	T	T	Modified Clover leaf	Modified Clover leaf	Existing to Remain			
	County Line Rd @ WBFR				T	T						

					Existing				During Construction			
Segment	**Cross Street**	**Type**	**Existing U-Turn**	**Proposed U-Turn**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**
SH 183	Valley View Ln @ WBFR	Over	NA	NA	L-L-T-T	T-T-T-R	NA	L-TL-T-R	Existing to Remain			
	Valley View Ln @ EBFR				T-TR	L-L-T-T	TL-TR	NA				
SH 183	PGBT US 161 @ WBFR	Over	NA	NA	NA	NA	NA	NA	Existing to Remain			
	PGBT US 161 @ EBFR				NA	NA	NA	NA				
SH 183	Esters Rd @ WBFR	Over	NA	W to E	L-L-T-T	T-T-T-R	NA	L-TL-T-R	L-LT-T	T-T-R	NA	L-TL-R
	Esters Rd @ EBFR			E to W	T-T-T-R	L-L-T-T	TL-TR	NA	T-T-R	L-LT-T	TL-TR	NA
SH 183	N Belt Line Rd @ WBFR	Under	NA	NA	T-T-T	T-T-T	Clover Leaf	Clover Leaf	Existing to Remain			
	N Belt Line Rd @ EBFR				T-T-T	T-T-T						
SH 183	N Story Rd @ WBFR	Under	W to E	W to E	L-T-T	T-T-T-R	NA	UL-TL-T-R	LT-T	T-T-R	NA	TL-TR
	N Story Rd @ EBFR		E to W	E to W	T-T-T-R	L-LT-T	UL-TL-T-R	NA	T-T-R	LT-T	TL-TR	NA
SH 183	MacArthur Blvd @ WBFR	Under	W to E	W to E	L-LT-T	T-T-T-R	NA	UL-TL-TR	LT-T	T-T-R	NA	TL-TR
	MacArthur Blvd @ EBFR		E to W	E to W	T-T-T-R	L-LT-T	UL-TL-T-R	NA	T-T-R	LT-T	L-TL-TR	NA
SH 183	O'Connor Blvd @ WBFR	Under	W to E	W to E	L-LT-T	T-T-TR	NA	UL-TL-TR	LT-T	T-TR	NA	L-TL-TR
	O'Connor Blvd @ EBFR		E to W	E to W	T-T-T-R	L-LT-T	UL-TL-TR	NA	T-T-R	LT-T	TL-TR	NA
SH 183	BNSF & DART Railroad U-turn @WBFR	Under	E to W (2 lanes)	E to W (1 lane)	NA	NA	NA	NA	NA	NA	NA	NA
	BNSF & DART Railroad U-turn @EBFR				NA	NA	NA	NA	NA	NA	NA	NA
SH 183	Carl Rd @ WBFR	Under	NBSB	NBSB	L-LT-T	T-T-TR	NA	UL-TL-TR	LT-T	T-TR	NA	TL-TR
	Carl Rd @ EBFR		SBNB	SBNB	T-T-TR	L-LT-T	UL-TL-TR	NA	T-TR	LT-T	TL-TR	NA
SH 183	Loop 12 @ WBFR	Under	NA	NA	T-T-T-T	T-T-T-T	Modified Clover leaf	Modified Clover leaf	Existing to Remain			
	Loop 12 @ EBFR				T-T-T-T	T-T-T-T						
SH 183	Maryland Dr/Spur 482 @ WBFR	Over	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Maryland Dr/Spur 482 @ EBFR				T-T				T			

					Existing				During Construction			
Segment	**Cross Street**	**Type**	**Existing U-Turn**	**Proposed U-Turn**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**
SH 183	Century Center Blvd U-turn @WBFR	Under	W to E	W to E	NA	NA	NA	NA	NA	NA	NA	NA
	Century Center Blvd U-turn @EBFR		E to W	E to W	NA	NA	NA	NA	NA	NA	NA	NA
SH 183	Regal Row @ WBFR	Under	W to E	W to E	LT-T-T	T-T-TR	NA	U-L-TL-TR	LT-T	T-TR	NA	L-TL-TR
	Regal Row @ EBFR		NA	NA	T-T-TR	LT-T-T	L-TL-TR	NA	T-TR	LT-T	L-TL-TR	NA
Loop 12	SH 114 @ SBFR	Under	NA	NA	NA	NA	T-T-T	T-T-T	Existing to Remain			
	SH 114 @ NBFR				NA	NA	T-T-T	T-T-T				
Loop 12	SH 348 Northwest Hwy @ SBFR	Under	N to S	N to S	NA	U-L-T-T-R	T-T-T-TR	L-T-T-T	Existing to Remain			
	SH 348 Northwest Hwy @ NBFR		S to N	S to N	U-L-TL-T-R	NA	L-T-T-T	T-T-T-TR				
SH 114	Freeport Pkwy @ WBFR	Under	NA	NA	L-T-T	T-T-R	NA	L-LT-TR	Existing to Remain			
	Freeport Pkwy @ EBFR				T-TR	L-T-T	L-LTR	NA				
SH 114	Esters Blvd @ WBFR	Over	NA	NA	L-T-T	T-T-R	NA	LT-TR	Existing to Remain			
	Esters Blvd @ EBFR				T-TR	L-T-T	LT-TR	NA				
SH 114	BeltLine Rd @ EBFR	Over	NA	NA	L-T-T-T	T-T-T-TR	NA	L-TR-R	Existing to Remain			
	BeltLine Rd @ WBFR				T-T-T-TR	L-T-T-T	L-LTR-R	NA				
SH 114	NB & SB PGBT SH 161 @ WBFR	Over	W to E	W to E	L-LT-T-T	NA	NA	U-T-T-TR	Existing to Remain			
	NB & SB PGBT SH 161 @ EBFR		E to W	E to W	NA	L-LT-T-T	U-T-T-TR	NA				
SH 114	MacArthur Blvd @ WBFR	Over	NA	NA	L-T-T-T	T-T-T-R	NA	L-LTR-R	Existing to Remain			
	MacArthur Blvd @ EBFR				T-T-T-R	L-T-T-T	LTR-R	NA				
SH 114	Love Dr/ Walnut Hill Rd @ WBFR	Over	NA	NA	L-L-T-T	T-T-TR	NA	L-LT	Existing to Remain			
	Love Dr/ Walnut Hill Rd @ EBFR				NA	NA	NA	NA				

					Existing				During Construction			
Segment	**Cross Street**	**Type**	**Existing U-Turn**	**Proposed U-Turn**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**	**NB[1]**	**SB[1]**	**EB[1]**	**WB[1]**
SH 114	Hidden Ridge @ WBFR	Over	NA	NA	L-T-T	NA	NA	L-L-TR	Existing to Remain			
	Hidden Ridge @ EBFR				T-T-T-R	L-T-T-T	L-LT-TR	NA				
SH 114	O'Connor Blvd @ WBFR	Over	NA	NA	L-T-T	T-T-T-R	NA	L-LT-T-R	Existing to Remain			
	O'Connor Blvd @ EBFR				T-T-T-R	L-T-T-T	L-LT-TR	NA				
SH 114	Wingreen Rd @ WBFR	Over	NA	NA	L-LT	T-T-R	NA	L-T-TR	Existing to Remain			
	Wingreen Rd @ EBFR				T-TR	LT	LT-TR	NA				
SH 114	Rochelle Blvd/Riverside Dr @ WBFR	Over	NA	NA	LT-T-T	T-T-T-T-R	NA	LT-TR	Existing to Remain			
	Rochelle Blvd/Riverside Dr @ EBFR				T-T-T-R	L-LT-T-T	L-LT-R	NA				

(1) Notes:

1. T = thru lane, R = right turn lane, L = left turn lane, TR = combination lanes thru and right, TL = combination lanes thru and left, U = U- turn lane, UL = combination lanes U-turn and left; S = south, N = north, E = east, W = west, NA = none
2. SH 183 and SH 114 is considered west and east. Loop 12 is considered north and south.
3. This table represents the lane configurations for both cross streets and frontage roads. Lane configurations for these cross streets represent the main movements provided by the cross street.
4. For cross streets not listed in this table, the minimum number of lanes to be open at all times will be the existing number of lanes.
5. Pedestrian access to be maintained at all times.
6. Full or staged closure of cross streets may be necessary for certain bridge construction activities. Developer shall submit a request for approval to TxDOT and the local Governmental Entity, thirty (30) days in advance of any closure and submit a traffic control plan and contingency plan in accordance with Section 18.3.1. Closures will only be permitted for critical bridge placement activities, including but not limited to demolition, setting beams, or setting deck. Developer shall limit the duration and schedule this work to off-peak or nighttime hours as shown in Table 18-1A and 1B, or as otherwise specified by TxDOT and the local Governmental Entity.
7. Lane configurations on both cross streets and frontage roads shall provide 300 feet minimum or match existing conditions storage area capacity for through or shared movements.

Developer shall issue a Lane Closure Notice (LCN) to TxDOT and affected Governmental Entities fourteen (14) Days prior to the publication of any notices or placement of any traffic control devices associated with lane closures and/or traffic switches planned to be in effect longer than 24 hours, or all full highway closures in effect during any portion of the period from 6 a.m. to 8 p.m., regardless of duration, and a minimum of 48 hours advance notice for lane closures other than full closures that are planned to be in effect less than 24 hours. Developer shall issue a Lane Closure Notice (LCN) to NTTA and TxDOT fourteen (14) Days prior to the publication of any notices or placement of any traffic control devices associated with lane closures, detour routing or other change in traffic control of SH 183 to SH 161/PGBT Direct Connectors. The LCN shall contain the estimated date, time, duration, and location of the proposed Work requiring the lane closure and/or traffic switches.

If an Emergency condition should occur, Developer shall provide a LCN to TxDOT within one Day after the onset of the event. For non-TxDOT controlled facilities, Developer shall immediately notify the controlling Governmental Entity. Developer shall keep TxDOT and affected Governmental Entities informed of any and all changes or cancellations of proposed lane closures prior to the date of their implementation.

If a bridge cannot be demolished and/or constructed safely within these requirements, roads may need to be closed and traffic detoured during the lowest-volume times. Developer shall obtain TxDOT's approval for such traffic closures. If exceptional circumstances exist, TxDOT may approve, in its sole discretion, a variation of the permitted lane closures during Periods C and D provided in Tables 18-1A and 18-1B prior to implementing such variance and upon payment of a fee equivalent to the Lane Rental Fee or Liquidated Damages identified in Exhibit 17 of the Agreement that the Developer would incur absent such variation and approval. This fee equivalent is not considered a Lane Rental Fee or Liquidated Damage, and therefore shall not be included in the amount shown in Exhibit 17 Section 1.2(g) of the Agreement. Periods C and D may be started earlier or extended later with TxDOT approval.

Developer shall obtain prior written approval from TxDOT for any variance from Tables 18-1A, 18-1B, 18-2, and 18-3 prior to implementing any such variance.

Detour routes are required for full closures. Any detour utilizing a local street network shall require the written approval by local Governmental Entity and TxDOT, 14 days in advance of implementing the detour.

TxDOT will have the right to lengthen, shorten, or otherwise modify the foregoing restrictions as actual traffic conditions may warrant.

Driveway Closures

Developer shall maintain a minimum of one all-weather driveway per property owner at all times. For properties with multiple driveways, when driveway closure is necessary to progress Work, no driveway may be closed for more than 30 consecutive days or more than 45 days in a 90-day period without written approval of the property owner. Developer shall work diligently and expeditiously to complete the Work in the area where the driveway has been closed.

18.3.1.3 Detour Usage

Developer shall use State routes for detour routes, wherever applicable. If State routes are unavailable, Developer shall use local arterials, provided that Developer has conducted the necessary coordination and obtained the necessary approvals from the Governmental Entity having jurisdiction including but not limited to Emergency Medical Services, fire services, police, school, and post office. Developer shall not use local surface streets for detour routes without the prior written approval by TxDOT. In situations where this occurs, Developer shall perform and submit a video survey and existing conditions report prior to the use of the detour. Developer shall return the detour route back to pre-construction condition.

Developer shall provide motorists with guidance on diverting around the construction, detouring around specific construction sites, and traveling through the construction areas. This shall include the installation and maintenance of temporary regional signs to divert traffic around the Project. Motorist guidance to and along detour routes shall be provided, together with regional guidance.

18.3.2 Restricted Hours

A. Holiday Restrictions

Developer shall maintain existing general-purpose-lane capacity, from 12:00 p.m. (noon) on the day before, to 10:00 pm on the day after, the following dates. No additional lane or ramp closure that restricts or interferes with traffic shall be allowed. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant.

a) New Year's Eve and New Year's Day (December 31 through January 1)
b) Easter Holiday Weekend (Friday through Sunday)
c) Memorial Day Weekend (Friday through Monday)
d) Independence Day (July 3 through noon on July 5)
e) Labor Day Weekend (Friday through Monday)
f) Thanksgiving Holiday (Wednesday through Sunday)
g) Christmas Holiday (December 23 through December 26)

B. Event Restrictions

Developer shall maintain existing general-purpose-lane capacity for the regional events set forth below. No additional lane or ramp closure that restricts or interferes with traffic shall be allowed during the regional events set forth below. TxDOT has the right to lengthen, shorten, or otherwise modify these restrictions as actual traffic conditions may warrant. TxDOT also has the right to modify the list of major events as they are added, rescheduled or warranted.

a) Any events held within a three (3) mile radius of any point along the length of the corridor with an expected attendance greater than 20,000 (restricted from three (3) hours before the start of the event to three (3) hours after the end of the event).
b) Within one (1) mile radius of major retail traffic generators (i.e. malls) (Thanksgiving Day through January 2).

c) Byron Nelson Classic at the Four Seasons Resort and Club Las Colinas, Irving in early May (restricted from 3:00 p.m. of the night preceding the first event until Monday 5:00 a.m. following the event).

The following regional events apply to SH 114 general purpose lanes only:

d) NASCAR Nationwide and Sprint Cup Racing Series (3 races total) at Texas Motor Speedway usually held in late March/early April (restricted from 3:00 p.m. of the night preceding the first event until Monday 5:00 a.m. following the event).
e) NASCAR Nationwide and Sprint Cup Racing Series (3 races total) at Texas Motor Speedway usually held in late October/early November (restricted from 3:00 p.m. of the night preceding the first event until Monday 5:00 a.m. following the event).
f) Indy Series Racing and NASCAR Truck Series Racing (2 races) at Texas Motor Speedway usually held in June (restricted from 3:00 p.m. of the night preceding the first event until Monday 5:00 a.m. following the event).

18.4 Construction Requirements

Construction shall be in accordance with Developer's TMP, the manufacturer's directions or recommendations where applicable, and the applicable provisions of the TMUTCD.

18.4.1 Developer Responsibility

If at any time TxDOT determines Developer's traffic control operations do not meet the intent of the TMP or any specific traffic control plan, Developer shall immediately revise or discontinue such operations to correct the deficient conditions.

Developer shall provide TxDOT the names of the traffic control coordinator and support personnel, and the phone number(s) where they can be reached 24 hours per day, seven days per week.

18.4.2 Access

Existing bicycle and pedestrian access and mobility shall be maintained parallel with the frontage roads and across all cross streets. Access to existing transit stop locations shall be maintained during construction or reasonable alternative access shall be coordinated with and approved by transit operators.

18.4.3 Detours

Developer shall maintain all detours in a safe and traversable condition. A pavement transition, suitable for the posted speed of the section shall be provided at all detour interfaces.

18.4.4 Local Approvals

It shall be the responsibility of the Developer to gain approval from the appropriate Governmental Entity for all traffic control measures on each intersecting street.

18.4.5 Changes to Roadway Height and Width Restrictions

Developer shall report any changes in the height or width of roadway restrictions during the Term. The reporting shall be made via email to the Texas Department of Motor Vehicles at mcd_permit-restriction-@txdmv.gov with a copy to TxDOT Permit Coordinators at FTW_CashPermit@txdot.gov and DAL_CashPermit@txdot.gov using the TxDMV Permit Restriction Application form shown in

Attachment 18-1. Increase to the restriction requires a minimum of seven (7) days advance notice while decrease or removal of the restriction must be reported no later than the next day following the change.

The height and width should be reported in feet and inches and the distances in miles to the nearest quarter mile. Developer shall provide advance signing including clearance height of three (3) inches less than normal clearance along traveled roadway or as dictated by the requirements of the current TxDOT policy.

18.4.6 Pavement Markings

Developer shall be required to remove existing pavement markings that conflict with temporary or permanent pavement markings. These pavement markings shall be removed by any method that does not materially damage the surface or texture of the pavement. Pavement marking removal by over-painting is prohibited.

18.4.7 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, if applicable, maintained to a riding surface equal to or better than the existing surface.

18.4.8 Hauling Equipment

Developer 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.

Where Developer moves any equipment not licensed for operation on public highways on or across any pavement, Developer shall protect the pavement from all damage caused by such movement. Any damage caused by the operation of Developer shall be repaired at the expense of Developer.

All haul routes utilizing any street of an adjacent Governmental Entity shall be coordinated with the appropriate Governmental Entity

18.4.9 Final Clean Up

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

18.4.10 Stockpiles

Barricades and warning signs are to be placed at stockpiles to adequately warn motorists of a hazard in accordance with TxDOT's Traffic Engineering Standard sheets and the TMUTCD. No material stockpiles shall be located within the clear zone of any traveled lane, unless positive protection is provided.

19 MAINTENANCE

Developer shall maintain the Project in accordance with this Section 19 upon issuance of NTP2 through the Operations and Maintenance (O&M) Term.

19.1 General Requirements

Developer shall maintain the Project in a manner that provides a safe and reliable transportation system for improved mobility. The Maintenance Services shall include all activities to be performed by Developer for routine and renewal work to satisfy the Performance Requirements and the Handback Requirements with respect to the Maintained Elements, together with other duties described in this Section19.

19.2 General Maintenance Obligations

Developer shall take all necessary actions to achieve the following:

a) Maintain the Project and Related Transportation Facilities in a manner appropriate for a facility of the character of the Project.
b) Minimize delay and inconvenience to Users and, to the extent Developer is able to control, users of Related Transportation Facilities.
c) Identify and correct all Defects and damages from Incidents.
d) Monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to heavy rains, snow, ice, or other severe weather events.
e) Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from within the O&M Limits.
f) Minimize the risk of damage, disturbance, or destruction of third-party property during the performance of maintenance activities.
g) Coordinate with and enable TxDOT and others with statutory duties or functions in relation to the Project or Related Transportation Facilities to perform such duties and functions.
h) Perform systematic Project inspections, periodic maintenance, and routine maintenance in accordance with the provisions of Developer's Maintenance Management Plan and Developer's Safety and Health Plan.

Developer is responsible for providing all resources necessary for the performance of all activities in the Maintenance Management Plan.

For purposes of this Section 19, each cure period shall be deemed to start (i) for purposes of assessing Noncompliance Points for Noncompliance Events identified in Exhibit 24 to the Agreement, in the manner set forth in Section 13.2.3(b) of the Agreement and (ii) for purposes of assessing Construction Liquidated Damages, in the manner set forth in Section 3.1(b) of Exhibit 17 to the Agreement.

19.3 O&M Limits

For purposes of operations and maintenance, the O&M Limits are areas defined and shown in RID Exhibit 19-1 O&M Limits.

19.3.1 Elm Fork of the Trinity River

Other than Work associated with bridges and structures, Developer shall not be responsible for the O&M Work of the levees and the areas in between in the levees of the Elm Fork of the Trinity River.

19.3.2 Minimum Base Scope and Additional Scope Components 1 and 2

Developer shall be responsible for all maintenance activities during the Construction and O&M Periods of every Element Category as detailed in Tables 19-3, 19-4 and 19-5 from right-of-way line to right-of-way line within the limits as detailed below and as detailed in the O&M Limits:

- For SH 183 from east of Main Street to east of Belt Line Road, except rehabilitated pavement stated in Sections 1.2 and 8.2.2 and rehabilitated bridges listed in Section 13.2.11, perform routine operations and maintenance work within ROW during O&M Period with no handback.
- For all other Project elements, perform routine operations and maintenance and renewal work during O&M Period and meet handback requirements at completion of O&M Period in accordance with Section 19.12 of the Technical Provisions.

19.3.3 Additional Scope Components 3 and 4

Routine operations and maintenance is not required during the O&M Period and no handback is required for Scope Component 3 and/or 4. Developer shall be responsible for all maintenance activities during the Construction Period for every Element Category as detailed in Tables 19-3 and 19-4 from right-of-way line to right-of-way line.

19.4 Noncompliance Point System Relationship

Developer shall maintain the Elements within the O&M Limits as detailed in Section 19.3 above to the minimum requirements specified in the Contract Documents. A failure to do so constitutes a Noncompliance and as such can trigger Noncompliance Points under the system set forth in Section 13 of the Development Agreement. This Noncompliance Event shall be subject to Liquidated Damages in accordance with Section 17 of the Development Agreement. The minimum requirements identified in Tables 19-3, 19-5 shall be assigned Noncompliance Points as set forth in the Agreement.

19.4.1 Defect Hazard Mitigation Classifications

Hazard mitigation classifications result in the failure to respond to an Element Category as detailed in Table 19-3 with the necessary resources and equipment to provide a temporary mitigation to the Defect. Hazards Mitigation Classifications shall be subject to only Liquidated Damages during the D&C Period and shall be subject to Noncompliance Points and Liquidated Damages during the O&M Period as detailed in Section 17 of the Development Agreement.

19.4.2 Construction O&M Violations Classifications

Construction O&M violations classifications result from the failure to meet the minimum requirements set forth in Table 19-4 within the applicable cure period (if any) for the O&M Limits during the Construction Period. Construction O&M Violations detailed in Table 19-4 are the minimum requirements the Developer shall meet within the Construction Period.

19.4.3 O&M Violation Classifications

O&M violation classifications result from the failure to meet the minimum requirements set forth in Table 19-5 within the applicable cure period (if any) for the O&M Limits during the O&M Period.

19.5 TxDOT's Obligation to Remedy and Repair

In the period between the Proposal due date and NTP2, TxDOT will reasonably perform maintenance activities of each Element Category which is normally included as an annually recurring cost in the TxDOT highway maintenance and repair budgets including repairs required to restore asset condition following accidents and Incidents. TxDOT is not obligated to extend the Residual Life of any Element through reconstruction, rehabilitation, restoration, renewal, or replacement.

19.6 Transmission of Maintenance

Developer shall coordinate with TxDOT to achieve a smooth transition of maintenance activities from TxDOT. Developer shall assume full responsibility for all maintenance activities as described in Section 5.3 of the Agreement.

19.7 Performance Requirements from NTP2 to Substantial Completion

Developer is responsible for operations and maintenance of all Elements Categories as described in Tables 19-3 and 19-4 within the O&M Limits, including the existing Elements. The term "existing" means Elements Categories in place and operating prior to commencement of construction of the Work.

Developer shall perform an inspection and evaluation of all the assets detailed in Table 19-4 and evaluate the asset's conditions to determine if the asset meets that minimum performance requirements.

Developer shall prepare and submit to TxDOT for review, within 90 days of NTP2, a Work plan that demonstrates how the Performance Requirements for each Element having an asset condition not meeting the Performance Requirements specified in Table 19-4 will be fully met and maintained by the Substantial Completion date.

Additionally, Developer is responsible to respond to any Event detailed in Table 19-3 with the necessary resources and personnel to provide a temporary mitigation to a Defect Hazard within the period outlined in Table 19-3.

19.7.1 Performance Requirements of Temporary Ramps and Diversions

Temporary Work for the maintenance of traffic during Construction Work and/or Renewal Work are to be maintained in a safe and functional condition meeting the requirements of the Technical Provisions.

19.8 Performance Requirements after Substantial Completion

After an Element has been constructed, re-constructed, or renewed or after the Substantial Completion, Developer is to maintain the Elements in accordance with Table 19-5. In meeting the requirements of this Section 19, where a Defect Hazard Category is identified, Developer shall take immediate steps to respond with the necessary personnel and equipment to temporarily mitigate, by use of traffic control devices to secure the hazard and provide a safe area for any emergency vehicles or maintenance vehicles. Developer shall also coordinate with TxDOT to alert Users to the hazard. Developer shall categorize, correct, make safe and provide a temporary mitigation to the Defect in accordance with Table 19-3.

For a Defect Hazard Category as detailed in Table 19-3, Developer shall take necessary action such that the hazard to Users is mitigated within the period given in the column entitled "Hazard Mitigation Classification" in Table 19-3 and after the Defect Hazard Category has been properly mitigated, Developer shall take the necessary actions to provide a permanent repair to the Defect within the period given in the column entitled "Cure Period" in Table 19-5. The Developer's failure to correct the O&M Noncompliance Event within the cure period specified in Table 19-5 will be considered a separate O&M Noncompliance Event and will be assessed Noncompliance Points for its failure to correct the Defect within the applicable interval of recurrence. The interval of recurrence is the period given in the column entitled "Interval of Recurrence" specified in Tables 19-3 and 19-5 applied after the initial cure period has lapsed, within which the Developer must correct the Defect before additional Noncompliance Points are assessed. Noncompliance Points will be assessed with each lapsed interval of recurrence until a permanent cure to the Defect has been provided.

Developer's obligation is to remedy and repair the Project as a preventative measure, including Renewal Work not scheduled in Developer's annually recurring highway maintenance and repair program. Developer shall use the results of the inspections described in its Maintenance Management Plan and other relevant information to determine, on an annual basis, the Residual Life of each Element of the Project. From this, Developer shall update the scope of the O&M Work Schedule. Renewal Work shall be performed at the point in time necessary to establish a Useful Life for each Element that will avoid deterioration of any Element to the extent that such deterioration would cause noncompliance with a Performance Requirement.

19.9 Maintenance Management Plan

Developer shall prepare a Maintenance Management Plan (MMP) that meets the general maintenance obligations described in Section 19.1 and defines the process and procedures for the maintenance of the Project for the Term of the Agreement. The MMP shall include performance requirements, measurement procedures, threshold values at which maintenance is required, inspection procedures and frequencies, and subsequent maintenance to address noted deficiencies, for each physical Element of the Project in accordance with Tables 19-3, 19-4 and 19-5 including impacts to Related Transportation Facilities. The MMP shall identify response times to mitigate hazards, permanently repair Defects as well as tracking all Noncompliance Events, hazard mitigation classification, construction violation classification and O&M noncompliance classifications with the associated timeframes for response and repair. Developer shall update this plan as required, or at least annually.

The MMP shall also include a detailed process by which events are handled and processed including:

a) Notification: This includes event identification, notification triggers (periodic or inspection based), responsible individuals, and entities or individuals to be notified.
b) Classification: This includes how events are classified (i.e. Element component or its function, safety impacts, Governmental Entities/Public concern, etc.).
c) Action Plan: This includes developing a detailed plan based on event classification type listing all actions necessary to handle and close out the event.

d) Action: By event classification type, this includes a description of how the actions are carried out stating the responsible individuals and the duration it will take to complete such actions in accordance with the requirements of Section 19.
e) Closure: This includes how the event is closed out stating necessary notification and the individuals to be notified for such event closure.
f) Documentation: This includes how events are entered, updated and closed into the MMIS and other applicable data and communication systems.

Developer shall submit the MMP to TxDOT for review and approval at least 60 Days prior to the issuance of NTP2. Approval by TxDOT of the MMP shall be a condition of NTP2. Developer shall update the MMP and submit it along with the initial O&M Work Schedule to TxDOT for review and approval no later than 90 days before Substantial Completion.

The MMP shall include procedures for managing records of inspection and maintenance activities, including appropriate measures for providing protected duplication of the records. Inspection and maintenance records shall be kept for the Term of the Agreement and shall be provided to TxDOT at the time the Project is delivered to TxDOT, at either the expiration of the Term or earlier termination of the Agreement.

The MMP shall include Developer's plan for performing Routine Maintenance for the term of the Agreement as further described in Section 19.9.1.

The documents listed below are documents the Department currently uses and are strictly for "information purposes only" in the development of the MMP. The Department does not warrant or guarantee, in any way, the outcomes achieved by the Developer in using any of these documents.

a) Maintenance Operations Manual
b) Roadside Vegetation Management Manual
c) Herbicide Operations Manual
d) Herbicide Recordkeeping Book
e) Traffic Operations Manual
f) Sign Crew Field Book
g) Highway Condition Report (HCR) Manual
h) Use of Right of Way by Others Manual
i) Material Producer List
j) Public Assistance Guide FEMA 322
k) Emergency Relief Manual FHWA
l) Department's Function Code Chart 12

The MMP shall also include a schematic showing the overall limits of maintenance and detailing the areas of existing pavement to remain, rehabilitated pavement, and new pavement.

19.9.1 Routine Maintenance

Routine Maintenance activities are identified activities which involve the repair or preservation of any element in order to prevent the deterioration of that asset to an unsafe or irreparable state. The MMP shall

include Developer's plan for performing routine maintenance of all the assets detailed in Table 19-5 for the term of the Agreement. The MMP shall include the timing, frequencies, scope and nature of the routine maintenance activities on an annual basis to meet the performance requirements as set forth in Table 19-5.

19.9.2 Additional Requirements

The MMP shall address, but shall not necessarily be limited to, the following:

a) Maintenance and service manual
b) Spare parts
c) Inventory control
d) Maintenance Management Information System (MMIS) functionality
e) Software maintenance
f) Special tools and equipment
g) Defect tracking and corrective action
h) Reliability and maintainability analysis
i) Vendors for equipment and maintenance services
j) Retaining wall monitoring
k) Incident Response

The Developer shall include in the MMP how the following specific obligations are implemented:

a) Preventative Maintenance
The minimum standards shall be as determined by the equipment manufacturer's recommended maintenance schedule and operating procedures.

b) Maintenance and Service Manual
The Developer shall prepare and update a Maintenance and Service Manual in both printed and electronic file format (searchable PDF). This manual shall be comprehensive and shall include, but not be limited to, detailed technical maintenance and servicing descriptions for all major and safety critical components as well as equipment that is specialized to meet the needs of this Project. The manual shall include preventive maintenance schedules, testing and troubleshooting techniques, corrective measures, both temporary and permanent, the location and availability of support services, point to point component wiring schematics and logic signal flows, assembly and disassembly drawings, including exploded view drawings.
Standard service manuals for unmodified commercial products are acceptable for inclusion in the MMP provided that they contain details and accurate information in order to properly service the specific equipment supplied under this Agreement. Large size diagrams and mechanical assembly diagrams need not be reduced or incorporated into the manual if these drawings are delivered with the manuals.

c) Spare Parts and Inventory Levels
The Developer shall maintain a comprehensive, accurate, and auditable parts and spares inventory adequate to address the maintenance obligations. This information contained in the inventory shall be compatible with the Maintenance Management Information System (MMIS) as described in Section 19.14.3.

d) Maintenance Records

The Developer shall prepare quarterly Work Plans together with one year and five year Work Plans. The five year Work Plan is to be updated each year and include all renewal activities. The one year Work Plans shall be updated every quarter and shall include a rolling 12-month Work Plan.

With respect to this requirement a Work Plan means a detailed plan that identifies all maintenance activities that will be undertaken during a specified period, including a schedule of the associated road closures expected.

e) Maintenance Management Information System
The Developer shall prepare and implement a computer based Maintenance Management Information System (MMIS), in accordance with TxDOT MMIS User Manual as described in Section 19.14.3.

f) Incident Management Plan
As per Section 22.

19.9.3 Standard of Remedy or Repair

The remedy or repair of any Element shall meet or exceed the TxDOT standards, industry design standards, manufacturer's specifications and shall function as intended.

19.9.4 Highway Conditions Report (HCR) System

The Developer shall report highway and weather conditions to TxDOT every morning by 8:15 a.m. and update the information as needed to TxDOT and include this information on the Developer's Web page.

The following types of information are to be reported:

a) Highway conditions which close travel in one direction for more than four hours or create hazardous travel including construction or maintenance sites, roadway or right of way damage, major accidents or hazardous spills; and
b) Weather-related events which may cause unsafe driving conditions such as ice, sleet, snow, floods, or high winds.

19.9.5 Bridge/Structures

Attachment 19-1, Bridge Maintenance Categories, detail bridges and their respective maintenance categories. The following requirements will be needed for the bridges listed in Attachment 19-1:

New Bridges: Developer shall maintain these bridges to a rating of 7 for the O&M Period and shall include, at a minimum, renewal work as identified in Section 19.10.1.2 and routine maintenance as detailed in Section 19.9.5.2

Rehabilitated Bridges: Developer shall maintain these bridges for 10 years after Substantial Completion and shall include, at a minimum, renewal work as identified in Section 19.10.1.2. Routine maintenance for these bridges shall be provided for the O&M Period as detailed in Section 19.9.5.2.

Routine Maintenance Bridges: These bridges will require the Developer to only provide routine maintenance as detailed in Section 19.9.5.2 for the O&M Period.

19.9.5.1 Bridges/Structures Inspection Requirements

Developer shall be responsible for conducting bridge inspections during the D&C and O&M Periods on all the bridges within the O&M Limits and shall request TxDOT approval for all Bridge Inspection Team Leaders, Bridge Inspection Supervisors, and the approving Professional Engineer a minimum of 60 days before initiating the bridge inspections.

Developer shall inspect all bridges within the Project according to the frequencies and criteria required by the Code of Federal Regulations. Developer shall create inspection reports in accordance with TxDOT's procedures and shall furnish TxDOT an original signed and sealed bridge inspection report and a color copy within 60 days after completion of each inspection.

Developer shall maintain all bridge records at all times in preparation for audit reviews. Developer shall ensure that bridge inspectors attend appropriate bridge inspection training courses and are certified to conduct bridge inspections. TxDOT will perform quality assurance reviews by inspecting bridges that have been previously inspected by Developer and by reviewing the inspection records for conformity with TxDOT's findings.

19.9.5.2 Bridges/Structures Routine Maintenance Requirements

Developer shall perform Routine bridge maintenance, defined as follows:

Routine maintenance: The preservation and upkeep of a structure, including all its appurtenances, including any activity intended to maintain an existing condition or to prevent deterioration. Examples include: cleaning, lubrication, spot painting, dirt and debris removal, and application of protective systems. Additional routine maintenance activities include the restoration of certain elements, including all its appurtenances, to its original condition (or as subsequently improved) insofar as practical, any activity intended to correct the effects of minor material deterioration by restoring the element. Routine Maintenance repairs are generally defined as repairs to bridge elements that are structurally sound (i.e., no loss of strength), but may have minor section loss, cracking, spalling, or scour. These conditions will have "fair", "satisfactory", or "good" condition ratings. Minor repairs include localized material restoration of:

- deck expansion joints and joint systems,
- deck surfaces,
- sidewalks,
- drainage systems,
- bridge railing systems,
- superstructure members and bearing devices,
- substructure members,
- waterway channels,
- approach slabs,
- anchorages, and structural crack injection and matrix loss restoration.

19.9.6 Change of Use

During the Term, Elements may require a change of use from the original intentions, e.g. an office space may become a computer server room, or a parking lot may need to be modified to accommodate larger vehicles through re-striping and curb line alterations. For any such change of use or modification of use,

the Developer shall document the reason for the change, how the original use will be accommodated or the reason why the original use is no longer required and provide the total cost of ownership implications of the change.

19.9.7 Mitigation for Severe Weather Events

In addition to the obligations of Section 19.1.1 to monitor and observe weather and weather forecasts and to proactively deploy resources accordingly for weather events, the Developer's MMP shall establish the means by which all the Project's traveled roadway types are to be managed to minimize delays and safety hazards in the event of any severe weather event.

19.10 Renewal Work Plan

Developer shall perform Renewal Work as and when necessary to maintain compliance with such Performance Requirements and restore the Useful Life of each Element detailed in Table 19-5 at the end of its Residual Life. Developer shall perform Renewal Work according to the other applicable terms of the Technical Provisions, including, when applicable, the Handback Requirements. Developer shall use the O&M Work Schedule, as updated from time to time, as the principal guide for scheduling and performing Renewal Work.

Not later than 90 days after the end of each calendar year, Developer shall deliver to TxDOT a written report of the Renewal Work performed in the immediately preceding calendar year. The report shall describe, by location, each Element as listed in the O&M Work Schedule and other component, the type of work performed, the dates of commencement and completion and the cost, as well as the total cost of all Renewal Work performed during the calendar year.

19.10.1 O&M Work Schedule

Not later than 90 days before Substantial Completion Date, Developer shall prepare and submit to TxDOT for review and comment a O&M Work Schedule. Developer shall include in the O&M Work Schedule, by Element, the following items:

a. the estimated Useful Life,
b. the estimated Residual Life,
c. a brief description of the type of Renewal Work anticipated to be performed at the end of the Element's Residual Life,
d. a brief description of any Renewal Work anticipated to be performed before the end of the Element's Residual Life, including reasons why this work should be performed at the proposed time,
e. the estimated cost in current dollars of such Renewal Work and
f. the total estimated cost in current dollars of Renewal Work in each of the years Renewal Work is anticipated to be performed under the O&M Work Schedule.

Not later than 90 days before the beginning of the second full calendar year after the Substantial Completion Date and each calendar year thereafter, Developer shall prepare and submit to TxDOT for review and comment either (a) a revised O&M Work Schedule or (b) the then-existing O&M Work Schedule accompanied by a statement that Developer intends to continue in effect the then-existing O&M Work Schedule without revision (in either case, referred to as the "**Updated O&M Work Schedule**").

Developer shall make revisions as reasonably indicated by experience and then-existing conditions respecting the O&M Limits, the factors described in Section 5.6.2, changes in estimated costs of Renewal Work, changes in technology, changes in Developer's planned means and methods of performing Renewal Work, and other relevant factors. The updated O&M Work Schedule shall show the revisions, if any, to the prior O&M Work Schedule and include an explanation of reasons for revisions. If no revisions are proposed, Developer shall include an explanation of the reasons no revisions are necessary. The O&M Work Schedule shall include a detailed description of the Renewal Work activities, if any, planned for the current year and for the next five-year period.

Lane Closures required for any Renewal Work shall be reviewed and approved by TxDOT a minimum of 60 days prior to the start of the work. Lane Closures for the Renewal Work shall be planned in accordance with Exhibit 17 of the Development Agreement.

The Renewal Work shall detail the following elements:

19.10.1.1 Pavement

Pavement-related work to strengthen the pavement structure for the current and projected future traffic usage shall be conducted when the minimum performance requirements as detailed in Table 19-5 can no longer be achieved. Work may include, but not be limited to recondition and stabilize base and subgrade, add base, level up, overlays and seal coats.

As part of the Renewal Work the Developer shall submit a description of the major pavement renewal work planned to be performed, a schedule of when the major pavement renewal is planned to be performed, the area of pavement to be renewed in square yards (SY), and a lump sum amount for performing the major pavement renewal work. Major pavement renewal is defined as renewal of pavement greater than 90% of pavement area subject to the performance standards in Table 19-5. The developer shall specify the year in which the major pavement renewal work is planned to be performed subject to the following:

- The first major pavement renewal work shall not be planned any earlier than eight (8) years after substantial completion;
- There shall be no more than three (3) major renewal(s) over the 25 year O&M term.

The Developer shall be paid for major pavement renewal based on progress of actual major pavement renewal area performed against the planned major pavement renewal area as a percent of the lump sum amount. The developer shall provide documentation of the major pavement renewal areas performed. To provide flexibility in performing the major pavement renewal work, the Developer may perform portions of the major pavement and renewal work during a period of two years before and three years after the year planned major pavement renewal. In no case shall the developer submit the same renewed area ["double count"] over this time period for progress. Payment for major renewal shall be made during or after the planned year of major pavement renewal based on progress. The payment requirements shall not relieve the Developer of the performance standards in Table 19-5 or the associated noncompliance for pavement failure to perform.

19.10.1.2 Structures

As part of the Renewal Work the Developer shall submit a description of the bridge renewal work planned to be performed, a schedule of when the bridge rehabilitation is planned to be performed, the bridges to be renewed, and a lump sum amount for performing the bridge renewal work. Bridge renewal work is defined as the work to be performed such that all elements of the bridge achieve a bridge rating of seven (7) or greater, ten (10) years after Substantial Completion. The Developer shall be paid a lump sum for each bridge that has had renewal work performed and all elements of the bridge achieve a bridge rating of seven (7) ten (10) years after Substantial Completion supported by a bridge inspection and documented in a BRINSAP Report ten (10) years after Substantial Completion. For new bridges, Developer shall maintain all elements of the bridge to a minimum bridge rating of seven (7) for the O&M Period.

a) Renewal Work: The restoration of a structure, including all its appurtenances, to its original condition (or as subsequently improved) insofar as practical. Renewal Work includes any activity intended to correct deteriorated members. Conditions requiring Renewal Work include loss of section, deterioration, spalling, or scour that affect the strength of the member. Renewal Work needs are to be identified by Developer's bridge inspectors and will require that Developer accomplish the necessary remedial work. Examples include localized or full material renewal of:

- deck expansion joints and joint systems,
- deck surfaces, sidewalks,
- drainage systems,
- bridge railing systems,
- superstructure members and bearing devices,
- substructure members,
- waterway channels,
- approach slabs, anchorages,
- concrete restoration requiring reinforcement splicing,
- structural crack injection and matrix loss restoration, or
- metal fabrication to restore the integrity of or to replace structural elements.

19.10.1.3 Renewal of All Other Elements

All other Elements are to be renewed when any of the following conditions are evident:

a) The Asset Condition Score of an Element is below 3 as described in Table 19-2,
b) The "reliability" is less than 99.9% for any safety critical Element. Such an Element is one that, should it fail, the safe operation of the Project would be in jeopardy or an immediate or imminent safety hazard would result.
c) The "reliability" is less than 90% for an Element other than a safety critical Element.
d) The Element ceases to function, or dies (as in the case of certain landscaping).
e) The frequency of repair is higher than that recommended in the manufacturer's preventive maintenance schedule.

"Reliability" is calculated as the in-service time over a prescribed time period. For example, if an Element is out of service for 20 days of 365 days, its "reliability" is 94.5% (i.e. (365 – 20)/365 x 100%). The reliability measurement is made over a moving 365 days.

All renewed Elements shall meet all applicable code requirements and industry design standards at the time of Renewal Work.

19.11 Inspections

Condition Assessment. The Department will perform a baseline condition assessment using the criteria in Table 19-2a – Assessment Scoring System. This baseline condition assessment will be performed within 30 days of NTP 2. The Developer will be notified at least 3 (three) days prior to the date of the baseline condition assessment and is encouraged to accompany the Department during the assessment. This baseline condition will be used as the minimum condition of maintenance through the D&C period.

The Department will perform another baseline condition assessment at Substantial Completion for all areas the Developer is responsible for maintenance for new and rehabilitated Elements during the O&M Period. This baseline condition will be used to develop the minimum acceptable level of maintenance during the 10 years after Substantial Completion.

The Department will perform another baseline condition assessment 10 years after Substantial Completion for all areas the Developer is responsible for maintenance for new Elements. This baseline condition will be used to develop the minimum acceptable level of maintenance for the remainder of the O&M Period.

Developer shall cause trained and competent personnel to plan and implement a program of inspections of the Project which:

a) Verifies the continuing safety of the Project for Users.
b) Prioritizes Defects requiring immediate and urgent attention because they are likely to create a danger or serious inconvenience to Users (Defects Hazard Category).
c) Identifies Construction Violation Events to be included for repair either within Developer's annually recurring highway maintenance and repair program or as Renewal Work.
d) Is responsive to reports or complaints received from Customer Groups.
e) Takes account of Incidents and Emergencies affecting the Project.
f) Monitors the effects of extreme weather conditions.
g) Collates data to monitor performance of the Project and to establish priorities for future maintenance operations and Renewal Work.

Developer shall ensure that personnel performing inspections of road pavements and structures are qualified and/or certified as inspectors and/or raters.

19.11.1 Inspection Frequency

Developer shall establish an annual schedule for inspections which will be appropriately spaced throughout the year. After periods of inclement weather or other events which may cause accelerated deterioration of the asset, safety hazards or other detrimental impacts to the Project, Developer shall conduct comprehensive visual surveys which will identify all such areas of concern.

The Developer will perform a condition assessment per Section 19.11.5 using the criteria in Table 19-2a – Assessment Scoring System four times per year spaced at 3 (three) month intervals. These assessments may be performed at any given time during each quarter but there must not be more than four months apart between any two consecutive assessments.

Developer shall establish inspection procedures and carry out inspections so that:

a) All Defect Hazard Category are identified and remedied such that the hazard to Users is mitigated within the period given in the column entitled "Defect Hazard Mitigation Classification" in Table 19-3.
b) All Category 1 Defects are identified and permanently repaired within the cure period given in the Table 19-4.
c) All O&M Noncompliance Events are identified and permanently repaired within the cure period given in Table 19-5.

The periods stated in the Table 19-3, 19-4 and 19-5 under each of the above headings shall be deemed to start upon the time and date Developer first obtained knowledge of, or first reasonably should have known of, the Defect. Developer shall investigate reports and complaints on the condition of the Project received from all sources. Developer shall record these as O&M Records together with details of all relevant inspections and actions taken with respect to Defects, including temporary protective measures and repairs.

19.11.2 Inspection Standards

In performing inspections, Developer shall, for any Element defined Table 19-4 and 19-5, conform at a minimum to the inspection standards set forth in these Tables and in accordance with applicable TxDOT standards.

19.11.3 General Inspections

Developer shall perform General Inspections in accordance with the MMP so that the repairs of all Defects are included in planned programs of work.

O&M Records with respect to General Inspections shall include details of the manner of inspection (e.g. center lane closure or shoulder), the weather conditions and any other unusual features of the inspection.

General Inspections shall be performed such that Element Categories in Tables 19-4 and 19-5 are identified and repaired within the cure period shown in Table 19-4 and Table 19-5.

19.11.4 Specialist Inspections

Developer shall undertake Specialist Inspections for Elements listed below and shall include the inspection results as O&M Records.

Table 19-1: Specialist Inspections

Maintained Element	Specialist Inspection
All Maintained Elements in Element Category 'Roadway' in	Annual survey of pavement condition for the entire Project, including managed lanes, general use lanes, ramps, and

Maintained Element	Specialist Inspection
Table 19-5	frontage roads, undertaken using automated condition survey equipment to measure all necessary criteria including: ruts, skid resistance and ride quality according to the inspection and measurement methods set forth in Table 19-5
All Maintained Elements in Element Category 'Structures' in Table 19-5	Inspections and load rating calculations at the required frequency. In addition, NBIS inspections as per FHWA regulations and at the frequency specified in FHWA regulations.
Pavement Markings for all lane lines, edge lines, centerline/no passing barrier-line	Annual Mobile Retroreflectivity Data Collection (MRDC) 60 days before the first anniversary of the date of authorization to begin work and each year thereafter in accordance with Special Specification 8094 Mobile Retroreflectivity Data Collection for Pavement Markings.

19.11.5 Developer Audit Inspections

Developer shall undertake detailed inspections of randomly selected Auditable Sections for audit purposes (the "Developer's Audit Inspections") at least once quarterly. On each occasion that a Developer's Audit Inspection is undertaken, the inspection shall include at least five (5) percent of the total available Auditable Sections. Developer shall assess the condition of each Element of the Project, as detailed in Tables 19-2a, 19-4 and 19-5 using the inspection and measurement method set forth in these Tables and in accordance with applicable TxDOT standards. Developer's Audit Inspections shall include physical inspection of those Elements that are safely accessible without traffic control. Where the measurement method would require specialist equipment or would require traffic lane closures to implement, Developer shall assess the condition of the relevant Element by reference to the current O&M Records held in Developer's database.

Developer shall create a new O&M Record for each Element physically inspected in accordance with the Table 19-4 or Table 19-5. Developer's Audit Inspections shall be undertaken on a schedule agreed to with TxDOT on Auditable Sections randomly selected by TxDOT, or its representative. TxDOT shall be given the opportunity with seven (7) day notice, to accompany Developer when it undertakes the physical inspections associated with the Audit Inspection.

19.12 Asset Conditions Score by Developer

Within ten (10) Days of the quarterly Developer's Audit Inspections, Developer shall assess its achievement of the Performance Requirements by self-scoring against the Minimum Performance Requirement set forth in Tables 19-2a, 19-4 and 19-5.

Developer shall report quarterly to TxDOT an Asset Condition Score to include, for each Element Category, all of the Auditable Sections inspected in the most recent Developer's Audit Inspection. Developer shall assess the Asset Condition Score according to the measurement criteria set forth in Table 19-2a below.

Table 19-2a: Asset Condition Score Criteria for Element Categories
(Reported Quarterly for each Element Category for all Inspected Auditable Sections)

Component:	Perfect	Above Average	Average	Below Average	Poor
Asphalt Pavement	**5**	**4**	**3**	**2**	**1**
Rutting (Do not count associated with FAILURES)	No rutting.	Minor < ¼" Flushing, Rock wearing	Moderate (¼" to ½") May be able to feel when crossing in vehicle	Major (> ½" to 1")	Severe (> 1")
Cracking (Do not count cracking associated with FAILURES)	No cracking	Minor cracking (tight cracking that a seal would cover). All cracks sealed and no sealed areas wider than 3"	Moderate cracking (cracking wide enough to be crack sealed). Minor cracking thru out the section. All cracks sealed and sealed areas are wider than 3".	Major cracking (cracks wider than ½"). Moderate cracking throughout the section. May have some pumping or may have some squeegee seal areas.	Severe cracking (cracks wide than 1"). Major cracking throughout section. Substantial pumping and substantial squeegee seal areas.
Failures	No repairs of any type.	All patched and repaired areas are smooth and level. Small depressed areas, (gopher runs, settled areas, ant towns or etc.)	Moderate failures (small areas that have minor pavement movement and/or tight cracking, that will need to be dug up in near future). Several small depressed areas. Un-level repairs. Small open potholes.	Major failures (areas in need of repair, that have cracking and may have some pavement movement, needs repairs now). Has several moderate failures. Large open potholes.	Severe failure (areas that have loose pavement or missing pavement). Several major failures.
Ride (Settlement)	Very smooth with no humps, lumps or depressions	Smooth with few minor humps, Bumps or humps, bumps or depressions. All patches are smooth and level.	Adequate with several minor humps, bumps or depressions. Some repairs are not smooth and level. May have 3 moderate humps, bumps or depressions (will feel sharpness in vehicle).	Rough with many moderate humps, bumps or depressions. Most repairs are not smooth and level. May have 2 locations that you feel the vehicle bottom out.	Unacceptable, causing a reduction in speed (Example: Open failure).

Component:	Perfect	Above Average	Average	Below Average	Poor
Edges Raveling/ broken area first 1foot of pavement and drop-off area foot off pavement.	No repairs made. May have complete edge seal.	Minor drop-offs (short lengths < 50' and < 2" deep) and/or minor broken edge (areas < 100' and up to 3" wide. All repaired.	Moderate drop-offs (short areas of < 50' and 2" to 4" deep. Long areas of minor drop-offs. moderate broken edge (areas under 100' and up to 6" wide). Long areas of minor broken edge. Not all repaired	Major drop-offs (over 4" to 6"). Long areas of moderate drop-offs. Major broken edge (areas over 6" wide). Long areas of moderate broken edge.	Severe drop-offs (over 6"). Long areas of major drop-offs. Long areas of major broken edge.
Shoulders Must be wider than 2'. Rating based on cracking, crack seal, patching and failures.	Very good condition no repairs made.	Pavement in good condition (few repairs) or very few repairs needed.	Pavement in fair condition (several repairs). Some minor repairs needed.	Pavement in poor condition major repairs needed.	Pavement is coming apart.
Concrete Pavement	**5**	**4**	**3**	**2**	**1**
Rutting	Concrete Pavement will not be rated				
Cracking/CRCP Do not rate cracking associated with large pop outs.	Has typical tight transverse cracking on 3'- 6' spacing	Minor Cracking, (typical transverse cracking on 3' -6' spacing with very minor spalls along cracks). May have a very few tight transverse cracks.	Moderate cracking (most transverse cracking closer than the typical 3' - 6' spacing). May have a very few minor longitudinal cracks	Major cracking (several areas of tight transverse and longitudinal cracking, some may have very minor spalls along cracks.)	Severe cracking (wide transverse and longitudinal cracking, some may have minor pop outs.)

Component:	Perfect	Above Average	Average	Below Average	Poor
Cracking/JCP Do not count cracking associated with pop outs.	No cracking	Minor cracking (a few tight transverse or longitudinal cracks). All cracks sealed, none wider than 3”.	Moderate cracking (transverse or longitudinal cracks that are wide enough to be sealed). A large amount of minor cracking. Some sealed and some unsealed. All cracks sealed, some wider than 3”	Major cracking (transverse or longitudinal cracks that are wide enough to be sealed with some minor spalling.) A large amount of moderate cracking. More unsealed than sealed.	Severe cracking (wide transverse or longitudinal cracks > ¾”. A large amount of major cracking.
Failures	No pop outs or punch outs. No repairs.	All repairs are smooth and level. No asphalt patches. No more than 3 very small pop outs (small pieces missing pavement, may be by joints)	Some rough repairs. May have some small pop outs patched with asphalt. More than 3 very small pop outs. No more than 3 small low severity punch outs (longitudinal and transverse cracks are tight and will have minor spalling)	More than 3 small low severity punch outs. No more than 3 moderate severity punch outs (longitudinal and transverse cracks are wide and will have spalling, needs repair in near future)	More than 3 moderate severity punch outs. Any high severity punch out (longitudinal and transverse cracks are wide and concrete will move under traffic or is missing)
Ride	Ride smooth with no humps, bumps or rough joints	Smooth with few minor humps, bumps or rough joints. All repairs are smooth and level.	Adequate with several minor humps, bumps or rough joints (will feel sharpness in vehicle)	Rough with many moderate humps, bumps or rough joints. Most repairs are not smooth and level. May have 2 locations that you feel the vehicle bottom out.	Unacceptable causing a reduction in speed (Example: open punch outs)
Edges	No repairs made	Minor drop-offs (short lengths less than 50’ and less than 2” deep) and/or all repaired.	Moderate drop-offs (short areas of less than 50’ and 2” to 4” deep) Long areas of minor drop-offs. Not all repaired	Unacceptable drop-offs > 50 feet in length and 2” to < 4”	Unacceptable drop-offs > 4”
Shoulders	Very good condition, no repairs made	Pavement in good condition (few repairs) or very few repairs needed	Pavement in fair condition (several repairs). Some minor repairs needed.	Pavement in poor condition, major repairs needed.	Pavement is coming apart.

Component:	Perfect	Above Average	Average	Below Average	Poor
Traffic Operations	**5**	**4**	**3**	**2**	**1**
Raised Pavement Markers	Markers like new with none missing. Placed on standard placement.	Most in place, may have a few missing or obviously non-reflective cracked or pressed into adhesive.	Most in place, maximum of 10% missing or obviously non-reflective, cracked or pressed into adhesive or adhesive over reflective face.	Many missing, maximum of <25% missing or obviously non-reflective, cracked or pressed into adhesive or adhesive over reflective face	Most >25% missing or non-reflective or no markers installed
Large Signs (Installed on I or H beams or sign bridge)	Signs like new, with all back ground, lettering, borders and shields clean and reflective. No damage.	Signs generally good; background, lettering, borders and shields may be slightly faded. May have very minor damage.	Signs borderline acceptable; background, lettering, borders and shields may be slightly faded or mildewed. May have some damage.	Signs unacceptable with dirt or mildew. May be faded or have substantial damage. May have one or two high or low bases.	Signs totally unacceptable with severe dirt, mildew or fading. May be damaged or totally knocked down. Several bases are high or low.
Small Signs (Chevron are signs)	Signs like new, on standard posts, no repairs needed. All straight	All on standard supports. Very minor repairs needed. All required signs are in place. No high or low bases. Most are straight	All on standard supports, < 50% leaning or with dirty, damaged or bad sign faces. No high or low bases	All on standard supports, most leaning or dirty, damaged or bad sign faces. One non-regulatory maybe missing. Some may have high or low bases.	Signs not on standard supports or any regulatory sign missing or more than one other sign missing. MOST ALL are leaning and bad or damaged sign faces.
Striping Graphics	New or like new. All required graphics are in place and like new	Stripes in very good shape with no obvious loss of reflectivity. All required graphics are in good condition	Stripes in acceptable shape with some cracking or minor loss of reflectivity. May have crack seal slightly obscuring some stripe. Required graphics are present.	Stripes unacceptable with cracking, fading, or severely worn. May be substantially covered with crack seal material. Needs to be replaced. Graphics are missing.	Stripes totally unacceptable with severe cracking, fading or severely worn. Major loss of reflectivity. ANY road without a stripe.
Attenuator	New or like new to current standards with no damage.	Attenuator not damaged; may not be latest standard.	Attenuator functional but with very minor damage. May need painting.	Attenuator with moderate damage, but will still function as designed.	Attenuator that will not function as designed

Component:	Perfect	Above Average	Average	Below Average	Poor
Delineators (OM3 or delineators)	Delineators, new or like new, straight, installed in accordance with standards. No repairs needed.	Delineators posts <50% slightly leaning or with some damaged and non-reflective delineators	Delineators <50% slightly leaning and <50% delineators damaged or non-reflective, or most post slightly leaning, or most delineators non reflective.	Most post slightly leaning and delineators non reflective or one or two post bent, broken, down or missing.	Several bent, broken damaged or missing. Not installed in accordance with standards
Shoulder Texturing Required on rural 4 lane divided (does not include inside the city limits)	Texturing in place like new.	May have in countered sealcoat not as effective as new. Profile Striping flattened down.	Seal over or patched over with level up, mill and inlay taking away effectiveness.	Most of texturing mill or patched over non-effective.	Missing on 4 lane divided
Roadside	**5**	**4**	**3**	**2**	**1**
Vegetation Management	Vegetation recently mowed or of uniform height. No noxious weeds. No grass in pavement. May contain "non-mow" areas.	Vegetation generally good, of uniform height and with very little noxious weeds, May have obvious signs of herbicide application. May contain "non-mow" areas.	Vegetation acceptable. May have some small stands of Johnson grass or other noxious weeds. Or have short areas of grass in pavement. No sight distance problems. May contain "non-mow" areas.	Vegetation needs mowing with large stands of Johnson grass or other noxious weeds or have grass along edge of pavement or in some cracks. May have minor sight distance problems.	Vegetation unacceptable Large stands of Johnson grass or other noxious weeds. May have severe sight distance problems. Grass is over one foot into edge of pavement.
Litter	ROW clean with no or very minor litter. Litter not visible at posted speed limit.	ROW generally clean with only a few pieces of litter or debris visible at posted speeds.	ROW acceptable with one or two objectionable spots of litter or debris. Several single pieces of litter, or debris.	ROW unacceptable, with much litter or debris.	ROW totally unacceptable with large quantities of litter or debris.

Component:	Perfect	Above Average	Average	Below Average	Poor
Sweeping (Rate as needed)	Clean, no dirt debris or ice rock along curbs, turn lanes, or barriers.	Very minor dirt, ice rock, or debris along curbs, turn lanes, or barriers	Some debris, dirt or minor ice rock along curbs, turn lanes or barriers.	Substantial quantities of dirt, debris and/or ice rock built up along barriers, turn lanes, or curbs. May cause minor drainage problem.	Debris built up along curbs, or turn lanes that would cause a hazard or drainage problem.
Trees and Brush	Trees trimmed to allow mowing beneath. No sight restrictions or sign obstructions. ROW neat. No trees in clear zone	Trees generally trimmed. No sight restrictions or sign obstructions. May have some minor brush or trees in need of trimming.	Trees and brush may have substantial growth. No sight restrictions or sign obstructions. May have a few trees within clear zone.	Trees and brush un-kept. Tree limbs encroaching onto pavement or large trees > 5" within clear zone. May have sight restrictions or sign obstructions.	Trees and brush un-kept. Tree limbs encroaching onto travel lanes or large trees > 5" within clear zone. Has sight restrictions and/or sign obstructions.
Drainage	Ditches and channels like originally constructed, clear of silt or erosion. Vegetation as appropriates in ditches. No high shoulders	Ditches and channels like originally constructed may have minor silt or erosion. Vegetation as appropriates in ditches. Minor spots of high shoulders	Ditches and channels like originally constructed, may have some silt or erosion (pipes 50% full). Vegetation as appropriates in ditches. Several areas of high shoulders	Substantial erosion or siltation in ditches or channels. Does not function as designed. Potential exists for additional erosion. High shoulders may trap water on pavement. Washouts around culverts, bridges and etc.	Extreme erosion or siltation in ditches or channels. Does not function as designed. Potential exists for additional erosion. Erosion has created a safety hazard. High shoulders may trap water in travel lanes.
Encroachments Access Control	No illegal signs, buildings, vehicles, etc. encroaching on highway ROW. No apparent or frequent access control violations.	May have a few illegal signs, buildings, or vehicles slightly encroaching onto ROW. Does not cause a safety problem. May have very minor or infrequent access control violations.	May have illegal signs, buildings or vehicles encroaching onto ROW. They should not cause a safety problem, however it is apparent they have been there for a long period of time. May have one minor access control violation.	Has illegal signs, buildings or vehicles encroaching onto ROW. They are causing a safety problem and should be removed. May have one obvious access control violation.	Has illegal signs, buildings or vehicles encroaching onto ROW. They are causing a safety problem and should be removed. Has more than one obvious access control violation.

Component:	Perfect	Above Average	Average	Below Average	Poor
Guardrail (Rate as needed)	Guardrail like new, appropriately placed, installed to the latest standards.	Guardrail all functional. May have one minor dent or may not be the latest standard.	Guardrail all functional with several minor dents or out of alignment.	Guardrail has been hit and is not functional. Guardrail has standup ends instead of turn down or turn down instead of GET. Guardrail is low.	Guardrail has major damage and should be repaired as soon as possible. Guardrail is required and not installed at bridge ends
GET's Does not include Turndowns	GET's like new, in correct alignment and installed properly.	GET's still aligned properly may have minor damage to O.M.	GET' has minor damage but still functional.	GET' damaged not functional needs repairs.	GET's has major damage needs replaced.
Mailboxes	Mailboxes straight, all on standard supports and hardware, with standard delineation.	Mailboxes all on standard supports and hardware, with standard delineation. Some leaning.	Mailboxes all on standard supports and hardware. Many leaning, some may not have standard delineation.	One or two mailboxes on nonstandard supports. Most other boxes are too standard. Missing or incorrect delineation.	Several mailboxes on non-standard supports, some are safety problems, most other not to standard.
Bridges Including approach slabs	**5**	**4**	**3**	**2**	**1**
Joints	Joints are clean and seals have no damage.	Joints or seals have 10% damage or debris.	Joints or seals have 20% damage or debris.	Joints are 30% dirty and seals are 20% damaged.	Joints are 50%, or more, dirty and/or seals are 30%, or more, damaged.
Curbs, sidewalks, railing	Like new, no damage or vegetative encroachment.	All functional. May have minor damage, but not considered structural.	Minor damage, but still functional with minor vegetation encroachment.	Damaged and not functional needs repairs. Vegetation encroachment indicating lack of maintenance.	Major damage needs replacing/repair. Excessive vegetation encroachment.
Drains	Clean and functioning properly.	Minor visible debris and functioning properly.	Visible minor debris at inlet and functioning properly.	Visible debris at inlet with limitations on proper function.	Clogging present and not functioning.

Component:	Perfect	Above Average	Average	Below Average	Poor
Debris	No debris or ice rock on deck, caps, or around columns	Very minor debris or ice rock on deck, caps, and/or around columns	Some debris, dirt or minor ice rock on deck, caps and/or around columns	Substantial quantities of dirt, debris and/or ice rock on deck, caps, or around columns.	Debris built up causing a hazard or drainage problem.
Channel	Streambed & embankment are clean & free of obstructions. No presence of scour.	No erosion or obstructions. Channel protection system(s) functioning properly. Trees not encroaching. No vegetation in riprap.	Minor erosion and obstructions visible. Trees and vegetation present, but not obstructing drainage, encroaching or catching debris. No scour.	Erosion, scour and obstructions need correcting. Trees and vegetation present and obstructing drainage, encroaching or catching debris.	Undermining of footings/channel protection system and/or obstruction of channel.

Table 19-2b: Sample Asset Condition Score Criteria for Element Categories

		Condition Assessment Inspections															
Roadway Component[1]	Element	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	Average	Element Score[2]	Weighted Factor[5]	Element Composite Score[3]
Pavement	Rutting	5	4	4	4	5	4	5	4	4	5	4	4	4.33	86.7%	9	7.80
	Cracking	4	5	5	4	5	5	4	3	4	5	4	4	4.33	86.7%	10	8.67
	Failures	4	4	5	4	5	4	5	5	5	4	5	3	4.42	88.3%	11	9.72
	Ride	4	4	4	5	4	5	4	5	4	5	4	4	5.00	100.0%	6	6.00
	Edges	5	4	5	4	4	4	5	4	5	4	5	4	4.42	88.3%	7	6.18
	Shoulders	4	4	4	4	5	3	5	3	4	4	4	4	4.00	80.0%	7	5.60
Component Score[4]																	87.9%
Traffic Operations	Raised Pavement Markers	4	4	4	3	4	4	4	3	4	4	4	4	3.83	76.7%	3	2.30
	Signs - Large		4	4	4		5	4	5	4	4	4		4.22	84.4%	3	2.53
	Signs - Small			3	4	3	4	4	4	4	4	3	4	3.70	74.0%	3	2.22
	Striping, Pavement Graphics	5	4	4	5	4	4	4	5	4	4	5	4	4.33	86.7%	5	4.33
	Attenuators	4	4	3		5		5	4	4	3	4	5	4.10	82.0%	3	2.46

		Condition Assessment Inspections															
Roadway Component[1]	Element	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	Average	Element Score[2]	Weighted Factor[5]	Element Composite Score[3]
	Delineators	4	4	4	3	4	5	5	4	5	5	5	5	4.42	88.3%	2	1.77
	Shoulder Texturing	3	3	4	4	3	4	5	5	4	4	4	4	3.92	78.3%	1	0.78
Component Score[4]																	82.0%
Roadside	Vegetation Management	3	3	2	2	2	2	2	2	3	3	3	3	2.50	50.0%	2	1.00
	Litter	3	3	3	3	3	4	3	3	3	3	3	3	3.08	61.7%	1	0.62
	Sweeping	3	3	3	3	4	4	4	4	4	4	4	4	3.67	73.3%	1	0.73
	Trees and Brush	4	4	4	5	5	4	5	4	5	4	5	4	4.42	88.3%	1	0.88
	Drainage	3	4	4	4	4	4	4	4	4	4	3	4	3.83	76.7%	3	2.30
	Encroachments	5	5	5	5	5	5	5	5	5	5	5	5	5.00	100.0%	1	1.00
	Guardrails	4	4			3	3	4	4	4	4	4	3	3.70	74.0%	3	2.22
	Guardrail End Treatments	4	4			4	3	4	4	5	4	4	4	4.00	80.0%	2	1.60
	Mailboxes	4												4.00	80.0%	1	0.80
Component Score[4]																	74.4%
Bridges	Joints	5	4	5	4	5	4	5	5	5	4	5	5	4.67	93.3%	5	4.67
	Curbs, sidewalks, railing	5	5	4	4	4	4	5	5	5	5	5	5	4.67	93.3%	3	2.80
	Drains	4	4	4	4	4	4	4	4	4	4	4	4	4.00	80.0%	2	1.60
	Debris	4	4	4	4	4	4	4	4	4	4	4	4	4.00	80.0%	2	1.60
	Channel	4				4	4			4			4	4.00	80.0%	3	2.40
Component Score[4]																	87.1%
Overall Score[6]																	84.6%

Notes:

1. Weight of Components - Pavement (50%), Traffic Operations (20%), Roadside (15%), Bridges (15%)
2. Element Score - Average of Element Inspections/Maximum achievable score of Element (5)
3. Element Composite Score - Element Score X Weighted Factor
4. Component Score = Sum of Element Composite Scores/Sum of Weighted Factor
5. If there are no ratings for an element then the multiplier will not be included in the component calculation
6. Overall Score = Summary of Component Score X Component Weight

19.12.1 Existing Infrastructure and Existing Improvements

Developer shall be responsible for the maintenance of all existing infrastructure for the Element Category detailed in Table 19-4.

19.12.2 Temporary Ramps and Diversions

Developer shall be responsible for the maintenance of any Element Category for all temporary ramps and diversions per Table 19-4.

19.12.3 Pavement Sections

Developer shall prepare separate pavement designs as detailed in Section 8 and shall be subject to the maintenance criteria detailed in Table 19-5 for new pavement, rehabilitated pavement and existing pavement.

19.13 Handback Requirements

Developer shall prepare a Handback Plan that contains the methodologies and activities to be undertaken or employed to meet the Handback Requirements at the end of the Term of the Agreement. Developer shall submit the Handback Plan, including a Useful Life Methodology plan, to TxDOT for review and approval at least 60 months before the anticipated Termination Date.

Table 19-6, Residual Life Requirements, defines the number of years of required final Residual Life certain Elements must have at Handback. Table 19-6, Residual Life Requirements shall be populated throughout the contract term to define the final Residual Life of all applicable Elements if it is deemed certain Elements are not included. At Handback any Element of the Project for which a "Required Final Residual Life" is not specified in Table 19-6, the required final Residual Life for the Element shall equal the documented serviceable life of the Element or five (5) years, whichever is less.

Developer shall perform an initial, an intermediate, and a final Residual Life Inspection that covers all physical Elements within the Project as noted below. Within thirty (30) Days following performance of each Residual Life Inspection, Developer shall submit to TxDOT the findings of the inspection, Residual Life test results and Residual Life calculations, as more particularly described in Section 5.10.2 of the Agreement.

The Residual Life Methodology plan shall contain the evaluation and calculation criteria to be adopted for the calculation of the Residual Life at Handback for all Elements of the Project. The scope of any Residual Life testing shall be included, together with a list of all independent Residual Life testing organizations, proposed by Developer. These organizations shall be on TxDOT's approved list at the time the testing is performed, as well as during the writing the Handback Plan, have third party quality certification, and be financially independent of Developer and not be an Affiliate of Developer.

TxDOT's approval of the Residual Life Methodology, including the scope and schedule of inspections, shall be required before commencement of Residual Life Inspections.

Developer shall perform all work necessary to meet or exceed the Residual Life requirements contained in Table 19-6 by the time of Handback of the Project to TxDOT.

At the point of Handback, Developer shall certify in writing to TxDOT that all physical Elements of the Project meet or exceed their respective Residual Life requirements defined in the Agreement.

19.13.1 Residual Life Inspections

Developer shall perform Residual Life Inspections and testing with appropriate coverage such that the results are representative of the whole Project as described in Table 19-6. TxDOT shall be given the opportunity to witness any of the inspections and/or tests. Developer shall deliver to TxDOT, within ten days after it is created, the output data arising from any testing and any interpretation thereof made by the testers.

19.13.1.1 Initial Residual Life Inspection

Between sixty-three (63) and sixty (60) months prior to the end of the Term, Developer shall perform an initial Residual Life Inspection (the Initial Inspection), including all Elements set forth in the Useful Life Requirements.

19.13.1.2 Intermediate Residual Life Inspection

Between twenty-one (21) and eighteen (18) months before the end of the Term, Developer shall perform an intermediate Residual Life Inspection (the Intermediate Inspection) including all Elements within the Project, regardless of whether Developer has undertaken Renewal Work for a particular Element in the period since the Initial Inspection.

19.13.1.3 Final Residual Life Inspection

Between ninety (90) and thirty (30) days before the end of the Term, Developer shall perform a final Residual Life Inspection (the Final Inspection) including all Elements within the Project, regardless of whether Developer has undertaken Renewal Work for a particular Element in the period since the Initial Inspection.

19.13.1.4 Specialist Inspections for Handback

For Specialist Inspections, Developer shall provide, at the submittal of the Handback Plan, all individuals who will be performing the inspections for Handback, and shall demonstrate to TxDOT that these individuals have the skill, experience and certifications to perform the necessary inspections related to Handback.

19.13.2 O&M Work Schedule for Handback Requirements

The O&M Work Schedule for five years before Handback shall include, in addition to any other requirements specified in Contract Documents:

- Developer's calculation of Residual Life for each Element calculated in accordance with the Residual Life Methodology and taking into account the results of the inspections set forth above.
- The estimated cost of the Renewal Work for each Element at the end of its Residual Life.

For any Element in Table 19-6:

- Where a Residual Life at Handback is specified, the Residual Life at Handback shall be equal to or greater than the period set forth.

Where a Useful Life is specified in place of a Residual Life at Handback, the Useful Life created at the time of its last replacement, renewal, reconstruction, restoration or rehabilitation before the end of the Term shall be equal to or greater than the period set forth in the column entitled "Residual Life", and the O&M Work Schedule shall estimate the cost of the next Renewal Work (after the end of the Term) on the assumption that such Renewal Work will be performed in order to create a new Useful Life of the same duration.

19.14 Highway Location and Data Requirements

19.14.1 Texas Reference Marker System (TRMS)

Developer shall implement the *Texas Reference Marker System.*

19.14.2 Establishment of Auditable Sections

The entire Project and all Work shall be subject to Auditable Sections. Developer shall establish Auditable Sections referenced to the *Texas Reference Marker System*. Developer shall establish and prepare plans identifying the Auditable Sections. The plans shall identify the boundaries of each Auditable Section and shall cross reference to an inventory describing each Element of the Project contained within each Auditable Section. Developer shall submit these plans no later than thirty (30) days prior to commencement of initial inspections.

19.14.3 Maintenance Management Information System (MMIS)

Developer shall implement a computer based MMIS to record inventory, failures, repairs, maintenance activities and inspections performed. Developer shall enter all of the physical Elements into the MMIS with Element identifications (IDs) consistent with those descriptions and units of measure used by TxDOT. All information shall be recorded in a consistent manner and shall be searchable by individual attribute.

Developer shall include relevant physical Element information in the MMIS including but not limited to, location, equipment nomenclature, serial number, name, date of installation, technician ID, type of failure, date-time of failure, date-time of response to the site and date-time time returned to service, preventive maintenance work, scheduled work, work repair code, failure and repair history, and statistical data on mean time between failure and mean time to repair. The MMIS shall be configured to report work by TxDOT function code, physical Element, reference marker, crew and unit of measurement. The MMIS data shall be developed and maintained in a format that is directly transferable into TxDOT systems.

In the MMIS, the information for bridges shall include National Bridge Inventory (NBI) sheets. The MMIS shall be fully populated and operational prior to NTP2 and kept updated and operational for the duration of the Agreement. Updates to reflect baseline condition assessments described in Section 19.11 shall be made no later than 30 days after the baseline condition assessments are completed.

The MMIS shall be capable of reporting system performance on a geographical basis to demonstrate compliance with operational and maintenance requirements. The MMIS shall incorporate a Geographical Information System (GIS), which shall use the same database engine as the MMIS and shall use the MMIS for display of physical Element information. All physical Elements shall be recorded on the MMIS. The physical Element locations are to be accurate to within one foot in 100 feet. The information

displayed geographically shall include pavement condition measurements, maintenance limits, average daily traffic and truck counts, Work performed by roadway segment, type of work, crew/contractor, etc., and any other information relevant to the construction, operation, maintenance and renewal of the Facility. When a physical Element is constructed, installed, maintained, inspected, modified, replaced or removed, the MMIS shall be updated within three (3) days of completion of such Work. Defects shall be recorded on the MMIS within three (3) days of them coming to the attention of Developer. All other recording requirements shall be recorded on the MMIS within fifteen (15) days of completion or occurrence of the relevant activity.

Developer shall provide equipment, facilities and training necessary to permit remote, real-time, dedicated high-speed access to the MMIS, via one terminal each, for TxDOT and its representative. Developer shall handover the fully populated MMIS and everything required for its operation to TxDOT, or other entity as directed by TxDOT, upon expiration or earlier termination of the Agreement.

Table 19-3: Defect Hazard Category

Element No.	Event	Minimum Performance Requirements	Hazard Mitigation Classification [1]		Cure Period	Interval of Recurrence
			Managed Lanes*	All Other Lanes**		
19-3.01	**Lane Closures**	Developer shall not conduct any lane closures that have not been planned and submitted to TxDOT or keep lanes closed past previously approved time periods.	1E	1D	0	Hourly
19-3.02	**Incident Response**	Respond to and initiate traffic control to secure sites of incidents, emergencies, accidents, and other events that result in a condition that is unsafe and/or may present a life threatening condition, such as at a minimum, fuel spills, debris, pavement failure (e.g. pot holes, etc.), flooding, guardrail failures, attenuator faults, and other Events as detailed in this Table	1D	1C	30 minutes	30 Min
		Provide all necessary equipment, staff and resources to clean up and open the travel lanes at the sites of incidents, emergencies, accidents and other Events such as, at a minimum, accidents, fuel spills, debris, pavement failure (e.g. pot holes, etc.), flooding, guardrail failures, attenuator faults, and other Events as listed in this matrix after release by the emergency services (Police, Fire,, etc.) in order to correct the Event and provide a safe passage for the traveling public.	1D	1C	120 min	Hourly
19-3.03	**Roadway Operations (Broken down or stranded vehicles)**	Notify law enforcement of broken down or stranded vehicles in travel lanes and initiate traffic control to secure the site until travel lanes are cleared. Assist in the removal of vehicles from the travel lanes.	1C	1B	30 min	Hourly
19-3.04	**Roadway Surface Debris**	Remove and dispose of debris from travel lanes that would potentially cause a safety hazard to the traveling public, including at a minimum, large objects, dead animals and tires.	1D	1C	30 Min	30 min
		Debris too large to be removed within the above timeframe will require that the roadway be closed. This closure shall comply with TxDOT Standards.	1D	1C	2 hours	Hourly
19-3.05	**Flexible pavement pot holes or rigid pavement spalls**	Manage the Project's Pavement and respond with the necessary equipment and personnel to provide a temporary mitigation to any potholes or spalls that would potentially cause a safety hazard to the traveling public.	1D	1C	60 Min	Hourly
19-3.06	**Flooding of a Lane**	No portion of a lane can have standing water that exceed the criteria listed in Section 12 that would potentially cause a safety hazard to the traveling public and affecting any given lane of the facility.	1D	1C	30 Min	Hourly

Table 19-3: Defect Hazard Category

Element No.	Event	Minimum Performance Requirements	Hazard Mitigation Classification [1]		Cure Period	Interval of Recurrence
			Managed Lanes*	All Other Lanes**		
19-3.07	**Guardrail**	Maintain the Project's guardrail sections and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged guardrail that would potentially cause a safety hazard to the traveling public.	1C	1B	60 Min	Hourly
19-3.08	**Attenuators**	Maintain the Project's attenuator systems and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged attenuator that would potentially cause a safety hazard to the traveling public.	1C	1B	60 Min	Hourly
19-3.09	**Signs (single or multi-post)**	Maintain the Project's single and multi-post signs systems and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged or down signs that would potentially cause a safety hazard to the traveling public.	1C	1B	30 Min	Hourly
19-3.10	**Traffic Signals**	Maintain the Project's traffic signal system and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged or down traffic signal that would potentially cause a safety hazard to the traveling public.	1C	1B	30 Min	Hourly
19-3.11	**Highway Light Poles**	Maintain the Project's highway lighting system and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged or down light poles that would potentially cause a safety hazard to the traveling public.	1C	1B	60 Min	Hourly
19-3.12	**Barrier Wall**	Maintain the Project's barrier wall sections and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged barrier wall section that would potentially cause a safety hazard to the traveling public.	1C	1B	60 Min	Hourly
19-3.13	**Bridge/ Structure Impact**	Maintain the Project's bridges/structures and respond with the necessary equipment and personnel to provide a temporary mitigation to any damaged bridge/structure that would potentially cause a safety hazard to the traveling public.	1E	1D	60 Min	Hourly

[1] See Exhibits 17 and 24 of the Development Agreement for classifications.

*-Applies to the O&M Period

**-Applies to all lanes during the Construction Period and all lanes (except Managed Lanes) during the O&M Period

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – ROADWAY						
19-4.01	**Pavement (All)**	Inspection of the Pavement after major damage such as fire, fuel spill or other incident/event.	Conduct a visual inspection of the affected area.	2A	24 Hours	24 Hours
			Provide written recommendation for remedial work to the TxDOT after the inspection of the affected area.	2A	10 Days	24 Hours
			Complete repairs set forth in the written recommendation for the remedial work.	2C	30 Days	7 Days
		Maintain all pavement sections within the Project.	Maintain all roadway surfaces including those in construction areas, including detours and temporary facilities, free of dust, pot holes, and rutting. Manholes/crosswalks/joint cannot exceed one (1) inch above the riding surface in accordance with TxDOT Design Standards.	2C	2 Days	24 Hours
ELEMENT CATEGORY – MAINTENANCE OF TRAFFIC						
19-4.02	**Maintenance of Traffic**	Install and maintain traffic control and safety devices.	Maintain the Project free of conflicting pavement markings and ensure all work zone pavement markings, including, at minimum, centerlines, raised pavement markers, lane lines, edge lines, stop bars and turn arrows are installed in accordance with TMUTCD, TCP Standards, and BC Standards.	2B	24 Hours	24 Hours
			Provide and maintain continuous access for residents and business along frontage roads and within intersections including driveway maintenance as necessary for a safe, stable and reasonable access.	2B	4 Hours	4 Hours
			Maintain all detours in accordance with Developer's Design Plans including all signs, arrow boards, variable message signs for the safe passage of traffic and pedestrian movements.	2C	2 Hours	6 Hours
			Timely removal or covering of temporary detours signs and devices that are no longer needed.	2A	24 Hours	24 Hours
			Provide Traffic Control Officers in accordance with Developer's Design Plans and in accordance with TMUTCD, TCP Standards, and BC Standards.	2A	2 Hours	2 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
			Maintain temporary traffic control devices including signs, barricades, lights and cones as detailed in the Developer's Design Plans and in accordance with TMUTCD, TCP Standards, and BC Standards and keep these devices in the correct position, properly directed, clearly visible, upright and clean.	2B	2 Hours	2 Hours
			Provide and maintain work zone signs in accordance with Developer's Design Plans and in accordance with TMUTCD, TCP Standards, and BC Standards with appropriate hardware, supports and are installed in accordance with TxDOT Design Standards.	2B	24 Hours	24 Hours
			Provide and properly maintain Drop Off Conditions in work zones in accordance with TMUTCD, TCP Standards, and BC Standards.	2C	6 Hours	6 Hours
			Maintain high intensity flashing lights, warning/channelizing devices including cones, temporary barrier wall, arrow boards, Portable Changeable Message Signs (PCMS), Portable Regulatory Signs in accordance with Developer's Design Plans and in accordance with TMUTCD, TCP Standards, and BC Standards operational and functional at all times.	2B	12 Hours	6 Hours
			Within an active lane closure, maintain warning/channelizing devices including cones, arrow boards, Portable Changeable Message Signs (PCMS), Portable Regulatory Signs in accordance with TMUTCD, TCP Standards, and BC Standards and in accordance with TxDOT Design Standards operational and functional at all times.	2B	2 Hours	2 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – DRAINAGE						
19-4.03	**Pipes and channels**	Maintain each Element of the drainage system.	Pipes and channels shall be maintained to ensure they are functioning as intended by cleaning, clearing and/or emptying as appropriate from the point at which water drains from the travel way to the outfall or drainage way. Pipes and channels shall not have more than 20% of cross section area obstructed.	2B	30 Days	7 Days
19-4.04	**Drainage treatment devices**	Maintain all drainage treatment and balancing systems, flow and spillage control devices.	Drainage Treatment Devices maintained to ensure they are functioning correctly and their location and means of operation is recorded adequately to permit their correct operation in an Emergency. Ensure they are functioning correctly with means of operation displayed.	2B	10 Days	5 Days
19-4.05	**Discharge systems**	Maintain Surface water discharge systems.	Discharge systems shall be maintained to ensure they are functioning as intended and their discharge to groundwater and waterways complies with the relevant legislation and permits.	2B	30 Days	7 Days
ELEMENT CATEGORY – PAVEMENT MARKINGS, OBJECT MARKERS, BARRIER MARKERS AND DELINEATORS						
19-4.06	**Delineators and Markers**	Maintain object markers, mail box markers and delineators.	Delineators and markers cannot be defective or missing and they are clean and visible, of the correct color and type, legible and reflective and straight and vertical.	2A	30 days	15 Days
ELEMENT CATEGORY – GUARDRAILS, SAFETY BARRIERS AND IMPACT ATTENUATORS						
19-4.07	**Guardrail/Safety Barriers, Concrete Barriers (temporary or permanent)**	Maintain the Project's guardrail, safety barriers, and concrete barriers sections and repair any damaged guardrail safety barriers, concrete barriers that would potentially cause a safety hazard to the traveling public.	All guardrails, safety barriers, concrete barriers (temporary or permanent) are to be maintained free of Defects. They are appropriately placed and correctly installed at the correct height and distance from roadway or obstacles. Installation and repairs shall be carried out in accordance with the requirements of NCHRP 350 standards.	2B	7 Days	24 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
19-4.08	**Attenuators**	Maintain the Project's attenuators.	All impact attenuators are appropriately placed and correctly installed in accordance with Manufactures specifications and TxDOT standards	2B	3 Days	24 Hours
ELEMENT CATEGORY – TRAFFIC SIGNS						
19-4.09	**Traffic Signs**	Maintain signs at acceptable level of safety for the traveling public.	Meet the performance requirements for the following: a) Retroreflectivity coefficient cannot be below the requirements of TxDOT's TMUTCD. b) Face damage cannot exceed 5% of surface area. c) Placement of signs to be in accordance with TxDOT's Sign Crew Field Book and shall not be twisted or leaning. d) Sign Information is of the correct size, location, type and wording to meet its intended purpose. e) "Stop," "Yield," "Do Not Enter," "One Way" and "Wrong Way" signs are clean legible and undamaged.	2B	28 Days	5 Days
		Perform a bi-annual inspection of all signs on the Project and submit inspection reports to TxDOT.	Complete an inspection of all the signs on the Project on a bi-annual basis.	2A	0	24 Hours
			Complete repairs identified in the inspection report.	2B	60 Days	5 Days
ELEMENT CATEGORY – HIGHWAY LIGHTING (TEMPORARY OR PERMANENT)						
19-4.10	**Highway Lighting**	Maintain the highway lighting system.	Replace any damaged light poles damaged by traffic accidents/ incidents.	2A	14 Days	24 Hours

Table 19-4: Construction Violation Events						
Element No.	**Element**	**Required Task**	**Minimum Performance Requirements**	**Construction Violation Classification[1]**	**Cure Period**	**Interval of Recurrence**
		Perform a monthly inspection in order to monitor and maintain highway lighting.	All roadway lighting to meet the minimum performance as follows: a) Roadway lights - Maintain the highway lighting system with a minimum of ninety percent (90%) of the lights operational and have no instances of more than two consecutive lights out. b) Sign lighting cannot have any instances of more than one bulb per sign not working. c) Complete repairs identified in the monthly inspection	2A	10 Days	24 Hours
		Maintain the Electricity supply, feeder pillars, cabinets, switches and fittings.	Electricity supply, feeder pillars, cabinets, switches and fittings are electrically, mechanically and structurally sound and functioning	2A	14 Days	24 Hours
19-4.11	**Highway Lighting – High Mast Lighting**	Maintain the High Mast Lighting	All high mast lighting shall be functional and operational and shall meet the minimum performance as follows: a) All high mast luminaries functioning on each pole b) All obstruction lights are present and working (if required) c) Compartment door is secure with all bolts in place d) All winch and safety equipment is correctly functioning and maintained without rusting or corrosion	2A	10 Days	24 Hours
ELEMENT CATEGORY – FENCE, WALLS, AND SOUND ABETEMENT						
19-4.12	**Fence, Walls and Sound Abatement**	Maintain fence, walls and sound abatement at an acceptable level of safety for the traveling public.	All fence, walls and sound abatement to act as designed and serve the purpose for which they were intended.	2C	30 Days	7 Days
19-4.13	**Access Gates**	Maintain all access gates locked during periods of no work activity.	All construction access gates shall be locked at the end of each construction work day. No gates shall remain unlocked.	2B	24 Hours	24 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – ROADSIDE MAINTENANCE						
19-4.14	**Mowing**	Maintain roadside mowing at an acceptable level of maintenance.	Mowing shall be maintained such that: a) All grassing in the urban areas require that 95% of height of grass shall be maintained between 5 in. and 18 in. b) Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance. c) Grass or vegetation does not encroach into or on paved shoulders, travel lanes, sidewalks, islands, riprap, traffic barrier or curbs. d) A full width mowing cycle is completed after the first frost. e) Wildflowers are preserved utilizing the guidelines in the mowing specifications and TxDOT Roadside Vegetation Manual.	2A	24 Hours	7 Days
19-4.15	**Herbicide Program**	Maintain the Project at an acceptable level of service	A herbicide program is undertaken in accordance with the TxDOT Herbicide Manual to control noxious weeds and to eliminate grass in pavement or concrete.	2A	14 Days	7 Days
19-4.16	**Environmental Compliance**	Monitor wetland and other Permits obtained during construction.	Comply with permit requirements, monitoring and reporting for all Permits obtained during construction.	2B	7 Days	3 Days
		Manage the Erosion Control and Storm Water Pollution Prevention Plan	Provide and maintain all erosion control features in accordance with the Developer's Design Plans and TxDOT Design Standards.	2B	7 Days	3 Days
19-4.17	**Protected species**	Manage the Project to ensure that Named species and habitats are protected.	Compliance with the Required Task	2B	30 Days	30 Days
ELEMENT CATEGORY – SWEEPING AND CLEANING						
19-4.18	**Litter Removal**	Pick-up, remove, and properly dispose of litter found within the limits of the maintained area.	No more than 20 pieces of litter per roadside mile shall be visible when traveling at highway speed	2A	5 Days	3 Days

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
19-4.19	**Road & Bridge Sweeping**	Maintain the roadway and shoulders in order to prevent the buildup of dirt, ice rock, debris, etc. on roadways and bridges.	Conduct routine sweeping and maintenance operation in order to: a) Prevent buildup of dirt, ice rock, debris, etc. on roadways and bridges not to accumulate greater than 24" wide or 1/2" deep. b) Keep all channels, hard shoulders, gore areas, ramps, intersections, islands and frontage roads swept clean. c) Clear and remove debris from traffic lanes, hard shoulders, verges and central reservations, footways and cycle ways. d) Remove all sweepings without stockpiling in the right of way and dispose of at approved tip sites.	2B	5 Days	3 Days
ELEMENT CATEGORY – PEDESTRIAN FEATURES						
19-4.20	**Concrete sidewalk and Pedestrian curb ramps**	Maintain sidewalk, pedestrian curb ramps at an acceptable level of safety for the traveling public.	All pedestrian elements to act as designed and serve the purpose for which they were intended and shall meet the performance requirements set forth in the TxDOT Design Standards and ADA requirements.	2A	30 Days	24 Hours
ELEMENT CATEGORY – TRAFFIC SIGNAL						
19-4.21	**Traffic Signal**	Maintain all traffic signals at acceptable level of safety for the traveling public.	Traffic Signals and their associated equipment are clean and visible, correctly aligned and operational, free from damage caused by accident or vandalism, correctly aligned and operational and Signal timing and operation is correct.	2B	5 Days	24 Hours
			Contingency plans are in place to rectify Hazard Defects not immediately repairable to assure alternative traffic control is provided during a period of failure.	2C	2 Days	24 Hours
			Traffic signals are structurally and electrically sound.	2A	30 Days	10 Days
19-4.22	**Identification marking**	Maintain identification markings.	Signals have identification markers and the telephone number for reporting faults are correctly located, clearly visible, clean and legible.	2A	30 Days	5 Days
19-4.23	**Pedestrian Elements and vehicle detectors**	Maintain all pedestrian and vehicle detectors.	All pedestrian Elements and vehicle detectors are correctly positioned and fully functional at all times.	2A	5 Days	24 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – ITS and ETCS EQUIPMENT						
19-4.24	**ETCS Equipment - Maintenance**	Manage the Project and maintain all ITS and ETCS equipment fully functional and free of defects.	All ITS and ETCS equipment shall be functional and operational and shall meet the minimum performance as follows: a) All equipment and cabinet identification numbers are visible, sites are well drained and access is clear. b) Steps, handrails and accesses are kept in good condition. c) Access to all communication hubs, ground boxes, cabinets and sites is clear, d) All drainage is operational and all external fixtures and fittings are in satisfactory condition. e) All communications cable markers, cable joint markers and duct markers are visible and missing markers are replaced. f) Backup power supply system is available at all times.	2A	14 Days	24 Hours
19-4.25	**VES equipment - Maintenance**	Maintain VES equipment	All VES equipment is kept clean, the identification numbers are visible.	2A	14 Days	24 Hours
19-4.26	**Dynamic message sign equipment**	Maintain all Dynamic message sign equipment	Dynamic message signs are free from faults such as: a) No sign shall be displaying a message which is deemed to be a safety hazard. b) Failure of system to clear sign settings when appropriate. c) 2 or more contiguous sign failures that prevent control office from setting strategic diversions d) No sign shall display an incorrect message.	2B	2 Hours	24 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
19-4.27	**CCTV equipment – Emergency Response Repairs**	Maintain all CCTV equipment and respond with the necessary personnel and equipment necessary to conduct any emergency repairs.	Emergency Response to System Failures - Respond to any system failure of the CCTV Systems that limit the availability of the operators to monitor the area network, such as: a) Failure of CCTV Systems to provide control offices with access and control of CCTV images. b) Failure of a CCTV camera or its video transmission system. c) Failure of a pan / tilt unit or its control system. d) Moisture ingress onto CCTV camera lens. e) Faults that result in significant degradation of CCTV images.	2B	2 Hours	2 Hours
19-4.28	**CCTV equipment – Temporary Repairs**	Maintain all CCTV equipment and complete any temporary repairs.	Provide temporary repairs to any CCTV System that has been responded to in Element Category 19-4.27.	2B	24 Hours	24 Hours
19-4.29	**CCTV equipment – Permanent Repairs**	Maintain all CCTV equipment and complete permanent repairs.	Provide permanent repairs to any CCTV System that has been responded to in Element Category 19-4.28.	2B	14 Days	5 Days
19-4.30	**Vehicle detection equipment**	Maintain all vehicle detection equipment.	All vehicle detection equipment shall be free of defects and operational problems such as; a) Loops maintain a Loop circuit's inductance to be > 50 and < 1,000 micro henries and Insulation resistance to be > 50 meg ohms. b) Malfunctioning camera controllers.	2B	14 Days	24 Hours
ELEMENT CATEGORY – AMENITY						
19-4.31	**Graffiti**	Maintain assets free of graffiti.	Graffiti to be removed, covered or painted over to match the color and the painted finish of adjacent area.	2A	7 Days	3 Days
			Any obscene, gang related or highly visible graffiti to be covered or painted over to match the color and painted finish of adjacent area.	2A	24 Hours	24 Hours
19-4.32	**Animals**	Remove animals.	All dead or injured animals are removed from the Pavement ROW	2C	2 Hours	1 Hour
			All dead or injured animals are removed from the ROW	2C	24 Hours	24 Hours

Table 19-4: Construction Violation Events

Element No.	Element	Required Task	Minimum Performance Requirements	Construction Violation Classification[1]	Cure Period	Interval of Recurrence
19-4.33	**Abandoned vehicles and/or equipment**	Notify Law Enforcement for the removal of vehicles and/or equipment from within the Project Limits	Notify Law Enforcement of any abandoned vehicles and/or equipment for the removal from the ROW.	2C	24 Hours	24 Hours
ELEMENT CATEGORY – SNOW AND ICE						
19-4.34	**Snow and Ice**	Maintain the Project's travel ways free from snow and ice that would potentially cause a safety hazard to the traveling public.	Response time to complete manning and loading of spreading vehicles.	2C	1 Hour	30 Min
			Departure from loading point to complete treatment and return to loading point.	2C	2 Hours	30 Min
			Response time for snow and ice clearance vehicles to depart from base.	2C	1 Hour	30 Min
19-4.35	**Weather Forecasting**	Maintain weather forecast information and obtain, assess and develop appropriate precautionary treatments.	Comply with Maintenance Management Plan (MMP) to prevent ice forming on the travel way.	2C	1 Hour	30 Min
19-4.36	**Operational Plans**	Comply with Maintenance Management Plans (MMP) related to snow and ice clearance plans.	Comply with Maintenance Management Plan (MMP) for snow and ice clearance plans to maintain traffic flows during and after snowfall and restore the travel way to a clear condition as soon as possible.	2A	1 Hour	1 Hour
ELEMENT CATEGORY – INCIDENT RESPONSE						
19-4.37	**Incident Response**	Monitor the Project and respond to Incidents in accordance with the Maintenance Management Plan (MMP).	Comply with the Maintenance Management Plan (MMP) for the following: a) Response times met for 98% of Incidents measured on a 1 year rolling basis. b) No unresolved complaints from Emergency Services.	2E	0	0
19-4.38	**Incidents involving Hazardous Materials.**	Monitor the Project and respond to Incidents involving Hazardous Materials.	Comply with the Maintenance Management Plan (MMP) and comply with the requirements of the MMP.	2D	1 Hour	1 Hour

[1] See Exhibit 17 of the Development Agreement for classifications.

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – ASSET CONDITION SCORE						
19-5.01	**Asset Condition Score**	Maintain the Project to the established overall Baseline Condition Score in any quarterly audit as described in Tables 19-2a and 19-2b, Section 19 of the Technical Provisions.	0.1% to 2.0% below the established Overall Baseline Condition Score..	3B	60 Days	30 Days
			2.1% to 4% below the established Overall Baseline Condition Score.	3C	60 Days	15 Days
			4.1% or greater below the established Overall Baseline Condition Score.	3D	30 Days	7 Days
		Maintain the Project to the established Baseline Condition Score for any component groupings: concrete pavement, asphalt pavement, traffic operations, roadside, and bridges in any quarterly audit as described in Tables 19-2a and 19-2b, Section 19 of the Technical Provisions.	0.1% to 2% below the component grouping Baseline Condition Score.	3B	60 Days	30 Days
			2.1% to 4.0% below the component grouping Baseline Condition Score.	3C	30 Days	7 Days
		Maintain the Project to the established Baseline Condition Score for any individual Element in any quarterly audit as described in Tables 19-2a and 19-2b, Section 19 of the Technical Provisions.	0.1% to 2% below any Individual Element Baseline Condition Score.	3B	60 Days	30 Days
			2.1% to 4% below any Individual Element Baseline Condition Score.	3C	30 Days	7 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element		Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – ROADWAY							
19-5.02	**Pavement - Damaged**		Inspection of the Pavement after major damage such as fire, fuel spill or other incident/event.	Conduct a visual inspection of the affected area.	3A	24 Hours	24 Hours
				Provide written recommendation for remedial work to the TxDOT within 10 days after the inspection of the affected area.	3A	10 Days	24 Hours
				Complete repairs set forth in the written recommendation for the remedial work.	3C	30 Days	7 Days
19-5.03	**NEW/REHABILITATED**	**Pavement – Condition Score**	All roadways to have a smooth surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	Pavement Condition Score for 80% of Auditable Sections cannot fall below: a) Mainlanes and ramps – 90 b) Frontage roads – 80	3C	30 Days	7 Days
				Pavement Condition Score for each Auditable Section cannot fall below: a) Mainlanes and ramps – 80 b) Frontage roads – 70	3C	30 Days	7 Days
19-5.04	**NEW/REHABILITATED**	**Pavement - Ruts**	All pavement sections to be measured using an automated device in compliance with TxDOT standards.	Ruts – Mainlanes, shoulders & ramps. Depth as measured cannot exceed: a) Mainlanes, shoulders and ramps – 3% of wheel path length with ruts greater than ¼" in depth in each Auditable Section b) Frontage roads – 10% of wheel path length with ruts greater than ¼" in depth in each Auditable Section c) 0.5" for the Depth of rut at any location using the 10ft straight edge used to measure rut depth for localized areas.	3C	30 Days	7 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element		Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.05	NEW/REHABILITATED	Pavement Ride Quality	All pavement sections to be measured using the International Roughness Index (IRI) according to TxDOT standard Tex-1001-S, Operating Inertial Profilers and Evaluating Pavement Profiles. ** To allow for measurement bias, an adjustment of -10 (minus ten) is made to IRI measurements for concrete pavements before assessing threshold compliance.	Ride Quality - For 80% of all Auditable Sections measured, IRI throughout 98% of each Auditable Section is less than or equal to: a) Mainlanes, ramps – 95" per mile** b) Frontage roads – 120" per mile**	3C	30 Days	7 Days
				Ride Quality - For each Auditable Sections measured, IRI measured throughout 98% of Auditable Section of less than or equal to: a) Mainlanes, ramps 120" per mile** b) Frontage roads – 150" per mile**	3C	30 Days	7 Days
				Ride Quality - For each Auditable Sections measured, IRI measured throughout 98% of each lane containing a a) bridge deck in any Auditable Section, 0.1 mile average – 200" per mile**	3C	30 Days	7 Days
19-5.06	Pavement – Failures		Maintain the pavement sections and correct any instances of failures.	Pavement shall be maintained to ensure it is functioning as intended and in the case of a pavement failure, perform repairs/mitigation which exceed the failure criteria set forth in the TxDOT PMIS Rater's Manual, including potholes, base failures, punchouts and jointed concrete pavement failures.	3D	10 Days	24 Hours
19-5.07	Pavement – Edge drop-offs		Maintain the pavement section for Edge drop-offs	Physical measurement of edge drop-off level compared to adjacent surface cannot exceed an edge drop-off greater than 2".	3D	10 Days	24 Hours

Table 19-5: O&M Noncompliance Events

Element No.	Element		Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.08	NEW/REHABILITATED	Pavement Skid Resistance	All pavement sections to be measured using ASTM E274/E274M-11 Standard Test Method for Skid Resistance Testing of Paved Surfaces at 50 MPH using a full scale smooth tire meeting the requirements of ASTM E524-08.	Mainlanes, shoulders and ramps – All 0.5 mile sections are to meet a minimum average Skid Number of 30.	3D	7 Days	24 Hours
				Frontage roads – All 0.5 mile sections are to meet a minimum average Skid Number of 30.	3C	7 Days	24 Hours
				Comply with the requirements of the Wet Surface Crash Reduction Program Guidelines.	3D	7 Days	24 Hours
				Instances where road Users warned of potential skidding hazard where remedial action is identified.	3D	7 Days	24 Hours
19-5.09	Crossovers and other paved areas		Maintain all Crossovers and other paved areas free of Defects	a) No Potholes of low severity or higher b) Base failures of low severity or higher	3C	7 Days	24 Hours
19-5.10	Joints in concrete		Maintain all joints in concrete paving so they are sealed and watertight.	All unsealed joints greater than ¼" shall be resealed.	3C	30 Days	7 Days
			Longitudinal joint separation.	Measurement of joint width and level difference of two sides of joints cannot exceed more than 1" or faulting more than ¼".	3C	30 Days	7 Days
19-5.11	Curbs		Maintain all curbs free of defects.	Curbs shall not have any Length out of alignment greater than 1".	3C	30 Days	7 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – DRAINAGE						
19-5.12	**Pipes and channels**	Maintain each Element of the drainage system.	Pipes and channels shall be maintained to ensure they are functioning as intended by cleaning, clearing and/or emptying as appropriate from the point at which water drains from the travel way to the outfall or drainage way. Pipes and channels shall not have more than 20% of cross section area obstructed.	3B	30 Days	7 Days
19-5.13	**Drainage treatment devices**	Maintain all drainage treatment and balancing systems, flow and spillage control devices.	Drainage Treatment Devices maintained to ensure they are functioning correctly and their location and means of operation is recorded adequately to permit their correct operation in Emergency. Ensure they are functioning correctly with means of operation displayed.	3B	10 Days	5 Days
19-5.14	**Discharge systems**	Maintain Surface water discharge systems.	Discharge systems shall be maintained to ensure they are functioning as intended and their discharge to groundwater and waterways complies with the relevant legislation and permits.	3B	30 Days	7 Days
ELEMENT CATEGORY – STRUCTURES						
19-5.15	**Structures - having an opening measured along the center of the roadway of more than 20 feet**	Maintain all structures and perform Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the TxDOT Bridge inspection Manual, and the Federal Administration's Bridge	Maintain and update all Records as required in the TxDOT Bridge Inspection Manual	3B	10 Days	5 Days
			Occurrences of condition rating below seven for any deck, superstructure or substructure	3D	30 Days	10 Days
19-5.16	**Other Structural Components**		All Expansion joints are free of dirt debris and vegetation, defects in drainage systems, loose nuts and bolts, defects in gaskets	3B	30 Days	10 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
	All non-structural items	Inspector's Reference Manual.	Parapets are free of loose nuts or bolts, blockages of hollow section drain holes, impact damage.	3B	30 Days	10 Days
			Bearings and bearing shelves are clean.	3B	30 Days	10 Days
			Sliding and roller surfaces are clean and greased to ensure satisfactory performance. Additional advice contained in bearing manufacturers' instructions in the Structure Maintenance Manual is followed. Special finishes are clean and perform to the appropriate standards.	3B	60 Days	10 Days
			All non-structural items such as hoists and electrical fixings, operate correctly, are clean and lubricated as appropriate, in accordance with the manufacturer's recommendations and certification of lifting devices are maintained.	3B	60 Days	10 Days
19-5.17	**Non-bridge class culverts**	Maintain all Non-bridge-class culverts.	No vegetation and debris or more than 20% silt	3B	30 Days	10 Days
			No defects in sealant to movement joints	3C	15 Days	10 Days
			No scour damage	3D	30 Days	10 Days
19-5.18	**Gantries and high masts**	Maintain Sign signal gantries, high masts	Sign signal gantries, high masts are structurally sound and free of: a) loose nuts and bolts b) defects in surface protection systems	3C	30 Days	10 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.19	**Load ratings**	Perform Load rating calculations in accordance with the Manual for Bridge Evaluation and the TxDOT Bridge Inspection Manual. Load restriction requirements as per the TxDOT Bridge Inspection Manual.	All structures maintain the design load capacity.	3C	30 Days	10 Days
19-5.20	**Access points**	Maintain all structures access points	All hatches and points of access have fully operational and lockable entryways and no hatch shall be left open.	3B	30 Days	10 Days
19-5.21	**Mechanically Stabilized Earth and Retaining Walls**	Perform Inspection and assessment using Good Industry Practices of all Mechanically Stabilized Earth and Retaining Walls	Mechanically Stabilized Earth and Retaining Walls 95% free of blocked weep holes, undesirable vegetation, defects in joint sealants, defects in pedestrian protection, scour damage, corrosion of reinforcing bars, paint system failure, concrete spalling and impact damage	3B	30 Days	10 Days
			Parapets free of loose nuts and bolts, blockage of drain holes, undesirable vegetation, impact damage and concrete spalling	3B	30 Days	10 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – PAVEMENT MARKINGS, OBJECT MARKERS, BARRIER MARKERS AND DELINEATORS						
19-5.22	**Pavement Markings**	Maintain pavement markings.	Pavement markings shall be clean and visible during the day and at night, whole and complete and of the correct color, type, width and length and are placed to meet the TMUTCD and TxDOT's Pavement Marking Standard Sheets. Lengths shall: a) Meet the minimum retroreflectivity 175 mcd/sqm/lx for white b) Meet the minimum retroreflectivity 125 mcd/sqm/lx for yellow c) Not account more than 5% loss of area of material at any point d) Not account for spread more than 10% of specified dimensions. e) Perform its intended function and compliant with relevant regulations	3B	60 Days	30 Days
19-5.23	**Raised Pavement Markers**	Maintain raised reflective pavement markers, object markers and delineators.	Pavement Markers shall be clean and clearly visible, of the correct color and type, reflective or retroreflective as TxDOT standard, correctly located, aligned and at the correct level, are firmly fixed and are in a condition that will ensure that they remain at the correct level. Additionally, they need to perform to the following minimum performance requirement: a) No more than 10 ineffective consecutive markers are ineffective (Ineffective includes missing, damaged, settled or sunk). b) A minimum of four markers should be visible at 80' spacing when viewed under low beam headlights.	3B	30 days	15 Days
19-5.24	**Delineators and Markers**	Maintain object markers, mail box markers and delineators.	95% of the delineators and markers cannot be defective or missing and are clean and visible, of the correct color and type, legible and reflective and straight and vertical.	3A	30 days	15 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – GUARDRAILS, SAFETY BARRIERS AND IMPACT ATTENUATORS						
19-5.25	**Guardrail/Safety Barriers, Concrete Barriers (temporary or permanent)**	Maintain the Project's guardrail, safety barriers, and concrete barriers sections and repair any damaged guardrail safety barriers, concrete barriers that would potentially cause a safety hazard to the traveling public.	All guardrails, safety barriers, concrete barriers (temporary or permanent) are to be maintained free of Defects. They are appropriately placed and correctly installed at the correct height and distance from roadway or obstacles. Installation and repairs shall be carried out in accordance with the requirements of NCHRP 350 standards.	3B	7 Days	24 Hours
19-5.26	**Attenuators**	Maintain the Project's attenuators.	All impact attenuators are appropriately placed, correctly installed and any repairs made in accordance with Manufactures specifications and TxDOT standards.	3B	3 Days	24 Hours
ELEMENT CATEGORY – TRAFFIC SIGNS						
19-5.27	**Traffic Signs**	Maintain signs at acceptable level of safety for the traveling public.	Meet the performance requirements for the following: a) Retroreflectivity coefficient cannot be below the requirements of TxDOT's TMUTCD. b) Face damage cannot exceed 5% of surface area. c) Placement of signs to be in accordance with TxDOT's Sign Crew Field Book and shall not be twisted or leaning. d) Sign Information is of the correct size, location, type and wording to meet its intended purpose. e) "Stop," "Yield," "Do Not Enter," "One Way" and "Wrong Way" signs are clean legible and undamaged.	3B	30 Days	5 Days
		Perform a bi-annual inspection of all signs on the Project and submit inspection reports to TxDOT.	Complete a daytime and nighttime inspection of all the signs on the Project on a bi-annual basis.	3A	0	7 Days
			Complete repairs identified in the inspection report.	3B	30 Days	5 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – HIGHWAY LIGHTING						
19-5.28	**Highway Lighting**	Maintain the highway lighting system.	Replace any damaged or knocked down light poles damaged by traffic accidents/ incidents.	3A	14 Days	24 Hours
		Perform a monthly inspection to monitor and maintain highway lighting.	All roadway lighting to meet the minimum performance as follows: a) Roadway lights - Maintain the highway lighting system with a minimum of ninety percent (90%) of the lights operational and have no instances of more than two consecutive lights out. b) Sign lighting cannot have any Instances of more than one bulb per sign not working. c) Complete repairs identified in the monthly inspection	3A	10 Days	24 Hours
		Maintain the Electricity supply, feeder pillars, cabinets, switches and fittings.	Electricity supply, feeder pillars, cabinets, switches and fittings are electrically, mechanically and structurally sound and functioning.	3A	10 Days	24 Hours
19-5.29	**Highway Lighting – High Mast Lighting**	Maintain the High Mast Lighting	All high mast lighting shall be functional and operational and shall meet the minimum performance as follows: a) All high mast luminaries functioning on each pole b) All obstruction lights are present and working (if required) c) Compartment door is secure with all bolts in place All winch and safety equipment is correctly functioning and maintained without rusting or corrosion	3A	10 Days	24 Hours
ELEMENT CATEGORY – FENCE, WALLS, AND SOUND ABETEMENT						
19-5.30	**Fence, Walls and Sound Abatement**	Maintain fence, walls and sound abatement at an acceptable level of safety for the traveling public.	All fence, walls and sound abatement to act as designed and serve the purpose for which they were intended.	3C	30 Days	15 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.31	**Access Gates**	Maintain all access gates locked during periods of no work activity.	All construction access gates shall be locked at the end of each construction work day. No gates shall remain unlocked.	3B	24 Hours	24 Hours
ELEMENT CATEGORY – ROADSIDE MAINTENANCE						
19-5.32	**Mowing**	Maintain roadside mowing at an acceptable level of maintenance.	Mowing shall be maintain such that: a) All grassing in the urban areas require that 95% of height of grass shall be maintained between 5 in. and 18 in. b) Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance. c) Grass or vegetation does not encroach into or on paved shoulders, travel lanes, sidewalks, islands, riprap, traffic barrier or curbs. d) A full width mowing cycle is completed after the first frost. e) Wildflowers are preserved utilizing the guidelines in the mowing specifications and TXDOT Roadside Vegetation Manual.	3A	24 Hours	24 Hours
19-5.33	**Herbicide Program**	Maintain the Project at an acceptable level of service	A herbicide program is undertaken in accordance with the TxDOT Herbicide Manual to control noxious weeds and to eliminate grass in pavement or concrete	3A	14 Days	7 Days
19-5.34	**Environmental Compliance**	Monitor wetland and other Permits obtained during construction.	Comply with permit requirements, monitoring and reporting for all Permits obtained during construction.	3B	7 Days	3 Days
		Monitor the Erosion Control and Storm Water Pollution Prevention Plan	Provide and maintain all erosion control features in accordance with the Developer's Design Plans and TxDOT Design Standards.	3B	7 Days	3 Days
19-5.35	**Protected species**	Monitor the Project to ensure that Named species and habitats are protected.	Compliance with the Required Task	3B	30 Days	30 Days

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
ELEMENT CATEGORY – SWEEPING AND CLEANING						
19-5.36	**Litter Removal**	Pick-up, remove, and properly dispose of litter found within the limits of the maintained area.	No more than 20 pieces of litter per roadside mile shall be visible when traveling at highway speed	3A	5 Days	3 Days
19-5.37	**Road & Bridge Sweeping**	Maintain the roadway to prevent the buildup of dirt, ice rock, debris, etc. on roadways and bridges.	Conduct routine sweeping and maintenance operation in order to: a) Prevent buildup of dirt, ice rock, debris, etc. on roadways and bridges not to accumulate greater than 24" wide or 1/2" deep. b) Keep all channels, hard shoulders, gore areas, ramps, intersections, islands and frontage roads swept clean. c) Clear and remove debris from traffic lanes, hard shoulders, verges and central reservations, footways and cycle ways. d) Remove all sweepings without stockpiling in the right of way and dispose of at approved tip.	3B	5 Days	3 Days
ELEMENT CATEGORY – PEDESTRIAN FEATURES						
19-5.38	**Concrete sidewalk and Pedestrian curb ramps**	Maintain sidewalk, pedestrian curb ramps at acceptable level of safety for the traveling public.	All pedestrian elements to act as designed and serve the purpose for which they were intended and shall meet the performance requirements set forth in the TxDOT Design Standards and ADA requirements.	3A	30 Days	24 Hours
ELEMENT CATEGORY – AMENITY						
19-5.39	**Graffiti**	Maintain assets free of graffiti.	Graffiti to be removed, covered or painted over to match the color and the painted finish of adjacent area.	3A	7 Days	3 Days
			Any obscene, gang related or highly visible graffiti to be covered or painted over to match the color and painted finish of adjacent area.	3A	24 Hours	24 Hours

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.40	**Animals**	Monitor the Project for animals.	All dead or injured animals are removed from the pavement	3C	2 Hours	1Hour
			All dead or injured animals are removed from the ROW	3C	24 Hours	24 Hours
19-5.41	**Abandoned vehicles and/or equipment**	Notify law enforcement for the removal of vehicles and/or equipment for within the Project	Notify Law Enforcement of any abandoned vehicles and/or equipment for the removal from the ROW.	3B	24 Hours	24 Hours
ELEMENT CATEGORY – SNOW AND ICE						
19-5.42	**Snow and Ice**	Maintain the Project's travel ways free from snow and ice that would potentially cause a safety hazard to the traveling public.	Response time to complete manning and loading of spreading vehicles.	3C	1 Hour	30 Min
			Departure from loading point to complete treatment and return to loading point.	3C	2 Hours	30 Min
			Response time for snow and ice clearance vehicles to depart from base.	3C	1 Hour	30 Min
19-5.43	**Weather Forecasting**	Monitor weather forecast information and obtain, assess and develop appropriate precautionary treatments.	Comply with Maintenance Management Plan (MMP) to prevent ice forming on the travel way.	3C	1 Hour	30 Min
19-5.44	**Operational Plans**	Comply with Maintenance Management Plans (MMP) related to snow and ice clearance plans.	Comply with Maintenance Management Plan (MMP) for snow and ice clearance plans to maintain traffic flows during and after snowfall and restore the travel way to a clear condition as soon as possible.	3A	1 Hour	1 Hour
ELEMENT CATEGORY – INCIDENT RESPONSE						
19-5.45	**Incident Response**	Monitor the Project and respond to Incidents in accordance with the Maintenance Management Plan (MMP).	Comply with the Maintenance Management Plan (MMP) for the following: a) Response times met for 98% of Incidents measured on a 1 year rolling basis. b) No unresolved complaints from Emergency Services.	3E	0	0

Table 19-5: O&M Noncompliance Events

Element No.	Element	Required Task	Minimum Performance Requirements	O&M Noncompliance Classification[1]	Cure Period	Interval of Recurrence
19-5.46	**Incidents involving Hazardous Materials.**	Monitor the Project and respond to Incidents involving Hazardous Materials.	Comply with the Maintenance Management Plan (MMP) and comply with the requirements of the MMP.	3D	1 Hour	1 Hour

[1] See Exhibit 24 of the Development Agreement for classifications.

Table 19-6: Useful Life Requirements

Element Category	Required Final Residual Life (yrs.)
Structures	
Bridges (New) (Structural Elements)	50
Bridge (Rehabilitated)	N/A
Reinforced Concrete	40
Pre-Stress Concrete	40
Structural Steelwork	40
Weathering Steel	40
Corrugated Steel	40
Corrosion Protection for Structural Steel	10
Deck surfacing	10
Deck Joints	10
Bearings	30
Railing	40
Sign/Signal Gantries	25
Retaining Walls	25
Noise Walls	25
Traffic Signal Poles	5

Element Category	Required Final Residual Life (yrs.)
High Mast Lighting	5
Road Pavement	
Main Lines	5
Ramps/Direct Connectors	5
Frontage	5
Local Roads	5
Drainage	
Underground Storm Sewer System (New)	25
Underground Storm Sewer System (Existing)	N/A
Culverts	25
Ditches	10
Inlets	25
Ancillary	
Earthwork Slopes	25
Metal Beam Guardrail	10
Concrete Barrier	10
Impact Attenuators	10
Lighting columns	5
Overhead signs	5
Traffic signal Housings and Mountings	5
Fence	10
Manhole covers, Gratings, Frames and Boxes	25
Curbs and Gutters	10
Lanterns (Lamps/Luminaires)	5
Pavement Markings	3
Delineators	5

20 BICYCLE AND PEDESTRIAN FACILITIES

20.1 General Requirements

This Section 20 includes requirements with which Developer shall design and construct all bicycle and pedestrian facilities for the Project. Developer shall ensure the bicycle and pedestrian facilities of this Project support TxDOT's commitment to integrate bicycle and pedestrian travel into Project development. Developer shall coordinate the Elements of this Project with the existing and planned trails and other facilities of local and county administrations for pedestrians and cyclists.

20.2 Administrative Requirements

Developer shall maintain and keep operational all bicycle and pedestrian facilities during construction and throughout the Term of the Agreement.

20.3 Design Requirements

20.3.1 Bicycle Facilities

Developer's facilities shall be consistent with the region's bicycle and pedestrian plan, and accommodate existing bicycle paths and crossings, and on-street bicycle facilities. Developer shall coordinate with Governmental Entities to ensure consistency with existing and proposed bicycle facilities.

Developer's facilities shall meet the requirements of the AASHTO Guide for the Development of Bicycle Facilities and shall incorporate the following elements relating to bicycle facilities into the Design:

a) Alignment, profile, cross-section, and materials
b) Points of connection to existing and proposed bicycle facilities
c) Signing, signalization, and pavement markings
d) Separation between bicycle facilities and the nearest vehicular travel lane, except where the outside lane accommodates bicycles
e) Methods of illumination, where applicable
f) Requirements of the Aesthetics and Landscaping Plan

In areas where new frontage roads are constructed as a part of the Work, the outside lane shall have a width of 16 feet, measured from back of curb or edge of pavement in areas without curb, to accommodate bicycles and vehicles. In areas where crossing streets are constructed or reconstructed as a part of the Work, the outside lane shall have a width of 14 feet (excluding curb and gutter) to accommodate bicycles and vehicles.

The Developer shall provide an 8-foot wide shared use path for bicycles and pedestrians along SH 183 along the southern right-of-way line from Britain Road, continuing eastward and along the one-way access road, crossing under SH 183, and continuing westward along the north right-of-way line to Wingren Road.

20.3.2 Pedestrian Facilities

Developer shall design, construct, and maintain sidewalks along the frontage roads and side streets where sidewalks currently exist and where required by State or federal regulations. In addition, the Developer shall design, construct and maintain new sidewalks in areas where new frontage roads are constructed as part of the Work. Sidewalks and pedestrian facilities shall comply with the *American with Disabilities Act (ADA)* and *Texas Accessibility Standards*. Developer shall install pedestrian signals and curb ramps at all existing and proposed signalized intersections. All pedestrian facilities shall be designed to incorporate ambulatory, visibility, and auditory needs of all users and shall include the following elements relating to pedestrian facilities:

a) Alignment, profile, cross-section, and materials
b) Points of connection to existing and proposed pedestrian facilities
c) Signing, signalization, and pavement markings
d) Separation between pedestrian facilities and the nearest vehicular travel lane
e) Methods of illumination, where applicable
f) Requirements of the Aesthetics and Landscaping Plan(s)

Prior to construction, Developer shall inventory the Project for areas where no existing sidewalks exist yet a visible path has been created by pedestrians. For those areas, Developer shall construct new sidewalks with logical termini to provide connectivity to existing facilities. All sidewalks shall be 5-foot minimum width unless otherwise specified herein. Where sidewalks are constructed adjacent to curbed roadways, a minimum 6-foot width shall be used. Developer shall coordinate with Governmental Entities to ensure consistency with the existing and proposed pedestrian facilities. Crossing streets requiring pedestrian user accommodation are shown in Attachment 11-1, Table 2.

The Developer shall provide sidewalk connecting the westbound and eastbound frontage road sidewalks under SH 183 east of the BNSF Railroad extending to Nursery Road.

The Developer shall provide sidewalks along the SH 183 westbound and eastbound frontage roads crossing over the BNSF Railroad connecting to existing and/or new sidewalks and shared use facilities.

Sidewalks on bridges shall meet the minimum width and safety requirements of the Technical Provisions.

Developer is responsible for obtaining Texas Department of Licensing and Regulation (TDLR) reviews and approvals of pedestrian facility design and construction including applicable waivers and/or variances.

21 TOLLING

21.1 General Requirements

TxDOT will enter into a separate contract with tolling integrator (hereinafter the "Integrator") to provide the Electronic Toll Collection System ("ETCS") for the Project. Developer shall support the installation of the ETCS as described herein. Developer shall coordinate with TxDOT and the Integrator during the design phase to finalize the design of all ETCS-related civil Elements. Developer shall provide access to the Project and coordinate construction activities for the Integrator to construct Integrator's infrastructure, as defined in Section 21.4, for the Toll zones concurrent with Developer's Work.

21.2 Administrative Requirements

Not applicable.

21.3 Design Requirements

Developer shall coordinate design work in the Toll Zones with TxDOT to determine design requirements specific to the Toll Zones.

Developer shall be responsible for designing general roadway work through each tolling zone including pavement design, traffic barrier, end treatments, general grading, earthwork, embankment, retaining walls, drainage, SW3P, and other typical roadway items included in Developer's Work, to support TxDOT's design of the Integrator's gantry structures, conduit, maintenance areas, and concrete pads for the roadside equipment cabinets and generators. Developer shall design a special jointed concrete pavement section with glass fiber reinforced polymer bars and shall include conduit stub-ups in the pavement, meeting the Integrator's specification, for a length of approximately 110 feet through each Toll Zone. Developer shall utilize Attachment 21-3, Typical Toll Zone Layout and Attachment 21-2, Jointed Concrete Pavement Design Using Glass Reinforced Polymer Bars Standard, as a basis for design.

Developer shall design conduit and ground boxes with single mode communication fiber, meeting the Integrator's specification, to each Toll Zone, and shall provide electric service connections at each Toll Zone. All fiber, conduit and ground boxes designed by the Developer for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems.

Developer shall be responsible for designing power and communication lines to a designated ground box adjacent to the Integrator's roadside equipment cabinet pad at each Toll Zone, in accordance with Integrator's specifications. Fifty feet of fiber optic cable and fifty feet of conductor shall be coiled in the ground box.

TxDOT will be responsible for civil design of the toll infrastructure related to the Integrator's work. TxDOT shall design and provide Integrator's typical plaza layouts to Developer during design and work closely with Developer to coordinate design. TxDOT shall provide design for the Integrator's toll gantries, including foundations, lightning protection, columns, and trusses, maintenance areas, concrete pads for roadside equipment cabinets and generators, and conduit.

For toll rate sign SDMSs, the Developer shall design the toll rate sign foundation, static portion of the sign with cutouts for the SDMS panels, conduits through the vertical column of the sign support to a ground box at the base of the sign support, ground box, and electrical power and communication backbone in proximity of each sign. The Developer shall coordinate the design of the toll rate sign SDMS with TxDOT to incorporate the requirements of the SDMS panels provided and installed by the Integrator.

A complete listing of Developer/TxDOT/Integrator design responsibilities is provided in Attachment 21-1, Toll Systems Responsibilities Matrix.

21.3.1 ETCS Infrastructure Requirements

21.3.1.1 Mainlane Tolling

Mainlane tolling shall consist of managed lanes with ETCS at the tolling locations indicated in the Reference Information Documents.

21.3.1.2 Ramp Tolling

Ramp Tolling will consist of ETCS at the tolling locations indicated in the Reference Information Documents.

21.3.1.3 Utility Personnel Access-way

Developer shall furnish and install power drops, sized per TxDOT design criteria with voltage and load information provided by the Integrator, at each toll gantry location.

21.4 Construction Requirements

Developer shall coordinate construction work in the Toll Zones with TxDOT and Integrator to determine construction requirements specific to the Toll Zones. Developer shall provide access and coordination to Integrator during construction to allow for Integrator's civil construction work to occur concurrently with Developer's work.

Developer shall be responsible for constructing general roadway work through each tolling zone including pavement section, barrier, end treatments, grading, earthwork, embankment, retaining walls, concrete traffic barrier, drainage, SW3P and other typical items included in Developer's Work, to support the construction of the Integrator's gantry structures, conduit, maintenance areas and concrete pads for the roadside equipment cabinets and generators. Developer shall construct modified concrete traffic barrier and end treatments and paved maintenance areas in accordance with TxDOT design to facilitate maintenance vehicle access to the toll systems.

Developer shall construct a special jointed concrete pavement section with glass fiber reinforced polymer bars and shall include conduit stub-ups in the pavement, meeting the Integrator's specification, for a length of approximately 110 feet and as shown in Attachment 21-3, Typical Toll Zone Layout, through each Toll Zone. Developer shall provide exclusive unobstructed access to Integrator at each Toll Zone during Integrator's pavement sensor installation and toll systems testing. To allow for Integrator's testing of the toll systems, the area designated for unobstructed access shall be a minimum of 500 feet at each end of the special Toll Zone pavement section. These 500 foot sections are not required to be constructed using the special jointed concrete pavement section with glass fiber reinforced polymer bars.

Developer shall construct conduit and ground boxes with single mode communication fiber, meeting the Integrator's specification, to each Toll Zone, and shall provide electric service connections at each Toll Zone.

Developer shall be responsible for installing power and communication lines to a designated ground box adjacent to the Integrator's roadside equipment cabinet pad at each Toll Zone, in accordance with Integrator's specifications. Fifty feet of fiber optic cable and fifty feet of conductor shall be coiled in the ground box. All fiber, conduit and ground boxes for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems.

Developer shall coordinate construction schedules with TxDOT and the Integrator for work taking place within the Toll Zones with specific regard for conduit and grounding under structures and in-pavement loops. Developer shall provide access and coordination for the Integrator to perform construction of toll gantries, foundations, columns, and trusses.

For the toll rate sign SDMS, the Developer shall construct the toll rate sign foundation, static portion of the sign with cutouts for the SDMS panels, conduits through the vertical column of the sign support to a ground box at the base of the sign support, ground box, and electrical power and communication backbone in proximity of each sign. The Developer shall coordinate the construction of the toll rate SDMS sign with TxDOT to incorporate the requirements of the SDMS panels provided and installed by the Integrator.

Developer shall be responsible for coordinating with the electrical Utility Owners to purchase and install the service on behalf of TxDOT.

Developer shall furnish and install power drops, sized per TxDOT design criteria with voltage and load information provided by the Integrator at each toll gantry location. Developer shall be responsible for installing power and communication lines to each Toll Zone. Conduit for electrical service to each Toll Zone shall be three (3) inches in diameter.

Developer shall provide, install, terminate, and test (pre-installation and post-installation) single mode fiber for the toll systems communications. Fiber shall be placed in a dedicated conduit along the corridor and shall consist of a minimum of four (4) dedicated strands for each Toll Zone with no daisy chaining permitted. All fiber, conduit and ground boxes for the toll systems shall be separate from those used for ITS and shall be exclusive to the toll systems.

No exposed conduit sections will be permitted. All sections shall have a minimum of 48" of cover over all conduit except where boring is required to cross under intersections or to reach locations within the Managed Lanes or on the opposite side of the Managed Lanes, or in the case of large bridge crossings, built into the bridge structure, unless approved by TxDOT during preliminary design efforts. Approval will only be considered for existing structures.

Developer shall coordinate with TxDOT to ensure that there are no power lines or radio frequency (RF) elements in the Toll Zone that could cause interference to the toll systems. Integrator will be responsible for construction of toll gantries, foundations, columns, and trusses in the Toll Zone, as further defined in

Attachment 21-1 Integrator shall be responsible for installing power and communication conduit and lines from the roadside equipment cabinets at each Toll Zone to the Integrator's toll systems.

A complete listing of Developer/TxDOT/Integrator construction responsibilities is provided in Attachment 21-1, Toll Systems Responsibilities Matrix.

22 OPERATIONS

22.1 General Requirements

The responsibility of Developer for operations Work will begin at NTP2 and continue for the Term of the Agreement. Developer shall institute an effective operations management system to monitor the condition of the Project and each Element within the Project and institute an effective operations and maintenance program to comply with the performance measures established in the Maintenance Management Plan.

22.2 General Operations Obligations

Developer shall prepare an Operations Management Plan (OMP), which shall set forth in detail, at a minimum, the approach, procedures, and implementation for the following:

a) Employment and training of competent personnel to carry out all aspects of the OMP
b) Monitoring the condition and operational performance of the Project
c) Incident response, management and reporting
d) Traffic operations restrictions, including periods of lane closure restrictions
e) Standard operating and communication procedures for Emergency preparation, response, and recovery, including impacts from extreme weather conditions
f) Planning and coordination with all affected Governmental Entities, including Emergency Services
g) Analysis of vehicular accident patterns to identify safety issues and implement cost effective solutions to maximize safety
h) Corridor management including coordination of activities of other entities with interests within the Project Limits. Coordination with TxDOT Toll Operations Division (TOD) and the North Texas Tollway Authority during toll integration and toll operations
i) Coordination with TxDOT, DalTrans and TransVision during ITS integration and ITS operations. Liaison with any Traffic Management Centers that TxDOT or other entities may establish Identification, containment and disposal of Hazardous Materials spills
j) Patrolling the Project
k) Coordinating policing of the Project
l) Prompt investigation of reports or complaints received from all sources

Developer shall submit the OMP for operations during the DB Phase to TxDOT for approval at least 60 days prior to NTP2; approval of the plan by TxDOT shall be a condition of NTP2. The OMP for the DB Phase shall be developed to a level of detail appropriate for the operations to be performed during the DB Phase.

The OMP shall be updated as necessary to include the operations to be performed after Substantial Completion. The updated OMP shall be submitted to TxDOT at least 60 days prior to Substantial Completion; approval of the OMP by TxDOT shall be a condition of Substantial Completion.

Between NTP1 and the NTP2, Developer will coordinate with TxDOT to ensure a smooth transition of operation responsibilities from TxDOT to the Developer, which will be effective as noted in Section 5.3 of the Agreement.

Developer is to prepare the following reports on a quarterly basis, except as noted below:

a) Incident Reports: For each Incident, the report shall identify the nature of the Incident, time, date, location, parties involved, and actions taken. Developer shall include details for any traffic control in place at the time of the Incident. For Incidents involving deaths, a report shall be submitted to TxDOT within 24 hours of the Incident.
b) Non-Conformance Reports: For each material Defect in the Project Elements, the report shall identify the location, nature, and cause of the material Defect and the steps that will be, or have been, taken to address the material Defect.
c) Traffic Reports: Each traffic report shall summarize traffic volumes along the Project on a daily, weekly, and monthly basis.
d) Maintenance Work Report: Each maintenance work report is to describe the following:

- Inspections conducted, including the date and type of inspection
- Material Defects or damage identified, including the date, infrastructure component, details of material Defect or damage
- Details of the maintenance work carried out
- Quality conformance summary (i.e., the results of a quality program).
- Environmental monitoring activities, as required in Section 4

e) Rehabilitation plans (annually): Description of the rehabilitation program conducted in the previous year and updates to the five-year rehabilitation plan to describe the planned rehabilitation Work and identify any changes from the previous plan.
f) Operations plans (annually): updates to the OMP, including planned operating procedures and any changes from the previous operations plan.

Upon request, Developer shall also provide TxDOT any technical documentation it maintains regarding the operations or maintenance Work.

22.3 Operation of the Project

22.3.1 Corridor Management

Developer shall coordinate access to the Project by companies and Governmental Entities that have a legitimate need to work within the Project ROW, including Utility operators.

22.3.2 Condition Preservation

To protect the traveling public and other Users from unsafe pavement surface conditions and to facilitate drainage, Developer shall remove accumulations of dirt, sand, and gravel from the roadways, shoulders, curbs, intersections, traffic islands, and bicycle and pedestrian paths and along medians and roadside barriers throughout the year, as necessary to provide a safe, clean, free-draining condition. Developer shall ensure traffic control measures are implemented in accordance with the TMUTCD during pavement cleaning operations so that hazardous conditions are not created for the traveling public and other Users in accordance with the obligations stated in Table 19-5.

22.3.3 Patrols

Developer shall conduct regular patrols of all lanes of the facility, to identify conditions that are unsafe or have the potential to become unsafe; to identify conditions that could threaten the infrastructure; and to

attend to existing or changing conditions. Patrols must be conducted at least once every 24 hours during normal operating conditions, but no less frequently than every two hours during severe weather events with the potential to cause damage, serious social disruption, or the loss of human life such as high winds, severe thunderstorms, tornados, heavy rainfall and flooding, hail, snow, and ice storms.

The record of a patrol shall include details of the weather conditions, road surface condition and any unusual features of the method of inspection.

22.3.4 ITS Operations

Developer shall provide TxDOT with primary access to and control of all DMS, CCTV, and vehicle detection systems placed on and data/video generated from the general use lanes.

TxDOT will provide Developer with secondary access to vehicle detector data, DMS status data, and CCTV video generated by systems placed on the general use lanes.

Secondary access to data shared between TxDOT and Developer shall be through a center-to-center interface, conforming to the most current technology being used by TxDOT.

ITS operations and equipment shall be limited to real-time traffic information, public service announcements, construction/maintenance lane closures, and Incident notifications. Developer shall not engage in commercial use or selling of ITS data, equipment, or space.

22.3.5 Traffic Control and Incident Management

Developer shall manage access and use of the Project, including access and use by vehicles, cyclists, and pedestrians.

In the event of an Incident, Developer shall provide traffic management and cooperate with responding agencies, police, and Emergency Services, as appropriate, depending on the nature of the Incident.

Developer shall train its personnel who may be involved in Incident management and traffic management in accordance with all Laws. Developer shall cause a trained member of staff to be on standby 24 hours a day seven days a week to coordinate Developer's response to any Incident or Emergency. Developer shall assist Emergency Services to minimize danger, disruption or delay to the public and pollution of watercourses or groundwater.

Developer shall attend to Incidents with trained personnel, equipped to carry out the functions required in Section 22, in accordance with the obligations stated in Table 19-5.

Developer shall commence the implementation of safety procedures (including road signing, information for Users, information for law enforcement agencies) as soon as practicable.

Developer shall provide services for automobile towing of Users' light and heavy vehicles at the Users' expense.

Where an Incident or Emergency has an effect on the operation of the Project, Developer shall clear obstructions and repair damage to the Project, in accordance with the comprehensive Incident Management Plan procedures and protocols described below, under the supervision of Law enforcement

agencies if necessary, such that the Project is returned to normal operating standards and safe conditions as quickly as possible. Where liquid or soluble material spills are involved, Developer shall take all necessary measures to minimize pollution of watercourses or groundwater. Where structural damage to highway structures is suspected, Developer shall cause that a suitably qualified bridge engineer or specialist inspector is available to evaluate the structure and to advise on temporary repairs and shoring needed to provide safe clearance of the Incident or Emergency. Where such an Incident or Emergency involves a personal injury, Developer shall not remove any vehicle or other item that may assist the investigation until authorized to do so by jurisdictional law enforcement agencies.

Developer shall appoint a Traffic Safety Officer and one or more deputies to make all arrangements necessary for safety and traffic control including the provision and operation of recovery vehicles for breakdowns. Developer shall cause the Traffic Safety Officer or one of his/her deputies to be on site at all times when safety and traffic management measures are proceeding and to be readily available at all times to deal with matters related to safety and traffic control.

Developer shall not reopen any area of the facility which has been closed, until all appropriate safety and traffic management measures have been completed.

As a part of Developer's OMP, a comprehensive Incident Management Plan (IMP) shall be developed and documented to ensure that the Developer has considered, planned, addressed, and trained for all likely natural and man-made events or situations that are Incidents or Emergencies, and has established protocols, procedures, and guidelines to mitigate the impacts, and respond to and recover from all such events. In the IMP, Developer shall clearly distinguish between events or situations considered as either Incidents or Emergencies. Developer shall prepare the IMP and its subcomponents in coordination with and input from the Participating Agencies that are responsible for resolving Emergency events.

Developer shall submit the IMP for incidents during the DB Phase to TxDOT for approval at least 60 days prior to NTP2; approval of the plan by TxDOT shall be a condition of NTP2.

The IMP shall be updated as necessary to include procedures and protocols for addressing Incidents and Emergencies after Substantial Completion. The updated IMP shall be submitted to TxDOT at least 60 days prior to Substantial Completion; approval of the IMP by TxDOT shall be a condition of Substantial Completion.

Developer shall submit the IMP as a part of the Project's OMP submittal and shall include in the IMP the following items:

a) Procedures to identify Incidents and notify Emergency Services providers and establish traffic control for Incident management activities in a timely manner;
b) Procedures for removal of stalled, broken down, wrecked or otherwise incapacitated vehicles from the travel lane, including coordination with Emergency Services/law enforcement;
c) Procedures to provide a maximum response time of 15-minutes by Developer and all measures to be instituted by Developer to clear the Incident and return lane availability within 15-minutes of arriving at the Incident site;

d) Procedures for cleanup of debris, oil, broken glass, etc. and other such objects foreign to the roadway surface;
e) Procedures to communicate IMP information to Developer's public information personnel and notify the public of traffic issues related to Incidents in keeping with the requirements of Section 3; and
f) Descriptions of contact methods, personnel available, and response times for any Emergency condition requiring attention during off-hours.
g) Procedures to conduct follow-up workshops after incidents have occurred to improve the process, response time and roles and responsibilities.

22.3.6 Policing

Developer shall coordinate Project policing requirements with the appropriate law enforcement agencies to provide a level of policing consistent with that provided on other similar facilities.

Should Developer require additional policing over and above this level, Developer shall be responsible for negotiating this additional service at no additional cost to TxDOT.